INSTITUT DE PHYSIQUE THÉORIQUE DE SACLAY

Hcéres Evalutation 2024
Self-evaluation report: January 2018 - December 2023

RESEARCH UNIT SELF-ASSESSMENT DOCUMENT

2024-2025 EVALUATION CAMPAIGN
GROUP E

September 2023

1- GENERAL INFORMATION FOR THE CURRENT CONTRACT

1- Unit Identification

Unit name: **Institut de Physique Théorique**

Acronym: **IPhT**

Label and number: **Unité Mixte de recherche CEA & CNRS, UMR 3681**

Main scientific field:

> **ST: Science and Technology**

Panel 1

ST2: Physics

In particular, the following sub-panels:

> ST2_1: Physique nucléaire et particules, astroparticules et cosmologie, et leurs applications

> ST2_3: Physique de la matière condensée, nanoscience, propriétés électroniques, systèmes complexes, et approches multi-échelles

Panel 2

ST1: Mathematics

Executive team:

- Catherine Pépin, director of IPhT
- Anne Capdepon, deputy director in charge of research support
- Grégoire Misguich, scientific deputy director (from September 1st 2024 the scientific deputy director will be Gregory Soyez)

List of the research unit's supervisory institutions and bodies:

- CEA
- CNRS

Doctoral schools of affiliation:

- Ecole doctorale 564 Physique en île de France, EDPIF[1]
- A few researchers are affiliated to the école doctorale (574) de mathématiques Hadamard, EDMH[2]

2- Presentation of the unit

History, location of the unit:

The Institut de physique théorique (IPhT) is a research institute of the Direction de la Recherche Fondamentale (DRF) of the Commissariat à l'énergie atomique et aux énergies alternatives (CEA), and of the Institut de physique (INP, now CNRS-Physique) of the Centre national de la recherche scientifique (CNRS, UMR 3681). It is part of the Paris-Saclay CEA center, and is located in the (open) site of L'Orme des Merisiers, on the Plateau de Saclay, about 20km south-west from Paris. Furthermore, the IPhT is a member of the Graduate Schools of Mathematics and of Physics of the Paris-Saclay University.

The Service de Physique Théorique (SPhT) was created in February 1963 as a CEA unit directly dependent on the Division de la Physique, the forerunner of the present Direction de la Recherche Fondamentale. This has consolidated the role of theoretical physics at CEA, after more than a decade of theoretical and mathematical activities in connection with atomic piles.

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[1] www.edpif.org
[2] www.fondation-hadamard.fr/fr/campus-de-paris-saclay/formation/edmh

At that time the Service de Physique Théorique was hosted in the main Saclay Center area and consisted of about 20 CEA physicists. From the outset they were joined by PhD students and, in 1964, by physicists employed by CNRS. Soon after the laboratory had moved to L'Orme des Merisiers in 1968, particle physics and quantum field theory became the major subjects of research in the laboratory, though nuclear physics remained an important component. In the following decades the research carried out at IPhT has flourished in multiple directions, in particular statistical physics, covering a large fraction of all the topics present in theoretical physics. The IPhT is now one of the largest structures dedicated to theoretical physics worldwide. This broad spectrum, together with the preservation of a common core of knowledge, is one of the main reasons for the success of the IPhT. Among the important topical inflexions since the dawn of third millennium, one can mention string theory, condensed matter and, more recently, quantum information theory.

The rise of the third millennium has also seen a number of administrative changes for the unit. In 2001, the Service de Physique Théorique acquired the status of Unité de recherche associée (URA) of the CNRS, thus strengthening its links with this institution. In 2008 it became a CEA Institute, and in 2015 it became a Unité Mixte de Recherche (UMR) of CNRS and CEA. Until 2023 the IPhT was affiliated with the INP of CNRS (now CNRS Physique), and in 2023 it also became affiliated to the IN2P3 (secondary affiliation).

Structure of the unit

- Direction

The director of the Institute is nominated by CEA and CNRS. He or she is assisted by two deputy directors, one in charge of the support to research (administrative, financial and human-resources questions), and the other in charge of the scientific questions.

The two directors during the period covered by this report are François David (from 2017 to 2021) and Catherine Pépin since January 2022. François Gélis has been scientific deputy director from 2016 to 08/2020 and Grégoire Misguich has been scientific deputy director since 09/2020. On the administrative side, Caroline Meysson has been deputy director from 2019 to 08/2023. Since December 2023 Anne Capdepon is deputy director in charge of the support to research.

- Administrative support ("soutien à la recherche") team

The administrative team is composed of four people (4 CEA and 1 CNRS).

The team is led by the administrative deputy director and provides invaluable support to researchers on financial, administrative and human resource matters. This includes, for example, the preparation of the recruitment of students and postdocs (in collaboration with the human resources departments of the DRF, CEA and CNRS), the management of the missions of the permanent and non-permanent researchers, the short and long term invitations (including reimbursement or housing reservations). One member of the team is also in charge of the documentation (library management, purchase of new books, subscriptions to scientific journals) and communication. The team also provides some very useful support for the organization of the conferences which take place at IPhT (including the « Rencontres Itzykson » which take place every year).

- Computer/IT team

The IPhT IT team consists of two engineers and one technician. They are responsible for the operation and evolution of the institute's information system, from workstations, multiple servers and computing machines to software licenses and hardware orders. They take care of the audiovisual equipment in the seminar room and in the amphitheater. They provide some much-appreciated proximity support to researchers and support team members. The team works closely with the LSCE team. The IPhT shares a number of hardware and software computing infrastructures with LSCE.[1]

- Thematic groups (A,B & C)

The researchers of the institute are divided into three thematic groups (traditionally called A, B and C).

A: Mathematical physics, string theory and gravitation

B: Cosmology, astrophysics, high-energy physics and hadronic matter

C: Statistical physics and applications, condensed matter, quantum information

Each group has a manager ("responsable de groupe") who is appointed collegially. He or she acts as a coordinator and animator. Each group has a dedicated budget for invitations and post-docs or Ph. D hirings, in years when the budget allows it. These groups are rather lightweight structures, and this organization has been

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[1] Laboratoire des Sciences du Climat et de l'Environnement

stable for a long time in our institute. From a scientific point of view, the boundaries between the groups are quite permeable and there are frequent and sometimes long-lasting inter-group collaborations.

Note that despite its relatively big size,[1] the institute is not divided into smaller laboratories. Each group meets on a regular basis to discuss various scientific policy issues, like, for instance, seminar organization, long-term invitations or recruitments.[2] During the present evaluation period Mariana Graña has been in charge of group A, Stéphane Lavignac has been in charge of group B and Cristina Bena has been in charge of group C.

In the previous self-evaluation report (2018), the laboratory was presented as a *single-team* unit. We present it here as structured into *three* scientific *teams* (plus the support team). It is however important to emphasise that this does not reflect any change in the organization of the institute, nor a change in the practices of its researchers, and that the three groups had actually existed for a long time. We felt that this change in the way the institute's activities are presented was appropriate, given the unit's broad thematic scope (and given the Hcéres guidelines on portfolio size). Even though these groups are lightweight structures it make sense to treat them as *teams* in the Hcéres sense, insofar as each group has a leader and its own budget for certain activities (short and long-term invitations).

- The scientific council

The scientific council, known as the "conseil scientifique", is an internal body with a consultative yet significant role. Its focus is on scientific matters, and it convenes on a regular basis. The director, along with the deputies, are members of the council. Other members are elected for a two-year term.[3] This election is open exclusively to permanent researchers. In the inaugural meeting following the election, the newly formed scientific council has the option to co-opt additional members. The council also appoints a secretary who is tasked with organizing and scheduling meetings, as well as documenting the proceedings. On specific occasions, the scientific council seeks insights from lab members. Key topics of discussion include the definition of the recruitment strategies (definition of priority themes and analysis of the applications) the allocation of funds, financial contributions to conference planning, and broader issues pertinent to the institute's scientific policy and administration. Permanent researchers are notified in advance about the upcoming meeting's agenda and are invited to propose additional topics for discussion.

- The laboratory council:

The laboratory council, or "conseil de laboratoire", focuses on everyday activities and practical, as well as organizational matters. The guidelines for its composition and operation are similar to those of the scientific council. But in addition to permanent researchers (who are the members of the scientific council) it also contains two representative of the support staff, one representative of the graduate students, and one representative of the postdoctoral researchers. Within the CEA and CNRS frameworks, the laboratory council fulfills the function of the "conseil d'unité".

- IT/computer commission ("commission informatique")

The computer commission is comprised of two members from the direction (typically the two deputy directors), personnel from the computer and IT team, and several volunteer researchers selected through co-optation. This group convenes to address questions related to the institute's computing and IT resources, such as local networking, web servers, web services, and the allocation of the IPhT's funds for these resources. This commission has a longstanding history and has been instrumental in the strategic planning and administration of our computing and IT resources. A notable accomplishment of this group includes advising the management on the critical decision to disconnect from the CEA "Bulle Recherche" network and transition to the Paris-Saclay/CNRS network in 2017.

Teams, platforms, shared services, etc.:

- The IPhT is a purely theoretical laboratory, without experimental facilities. The laboratory however has computing and IT resources (including a cluster with about 60 nodes and ~1000 CPU cores).
- The institute has a library with books and about 450 linear meters of review journals. Although we now have only a few subscriptions to paper journals we keep an important number of journals which date back to the 1960's to 2000'.[4]

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[1] About 50 permanent researchers and about 110 persons including support staff, students and postdocs.
[2] As an illustration of the role of the groups, in Fall 2019, Fall 2020 and Fall 2021 some postdocs positions have been opened by IPhT, one for each group, three consecutive years. For these positions, the candidate selection was made inside each group.
[3] With a limitation of two consecutive terms.
[4] As part of the redevelopment of the library, a project launched in 2023, the number of paper journals has been significantly reduced, from over 1100 linear meters to around 450 meters. See also Area 1/Standard 2 page 21.

Size and composition of the teams (if applicable) at 31/12/2023:

Compared with other institutes or laboratories devoted to theoretical physics in France or abroad, IPhT is one of the largest. It is large in terms of number of researchers but also from the point of view of the spectrum of scientific themes.

Group A: Mathematical physics, string theory and gravitation

BAUER Michel, BENA Iosif, BOURGET Antoine, DI FRANCESCO Philippe, EYNARD Bertrand, GRAÑA Mariana, GUICA Monica, GUIDA Riccardo, MAZÁČ Dalimil, MINASIAN Ruben, PASQUIER Vincent, PERLMUTTER Eric, RAMASSAMY Sanjay, RIBAULT Sylvain, SALEUR Hubert, SERBAN Didina, VANHOVE Pierre. **Total: 17**

Emeritus: KOSTOV Ivan (CNRS), DAVID François (CNRS), VOROS André (Conseiller scientifique CEA)

Group A manager until 2023: Mariana GRAÑA. New group manager (from 01/2024): Sanjay RAMASSAMY.

Group B: Cosmology, astrophysics, high-energy physics and hadronic matter

BELLAZZINI Brando, BERNARDEAU Francis, BRAX Philippe, D'AGNOLO Raffaele, FLEURY Pierre, GELIS François, IANCU Edmond, KORCHEMSKY Gregory, KOSOWER David, LAVIGNAC Stéphane, OLLITRAULT Jean-Yves, SOYEZ Gregory, VALAGEAS Patrick, VERNIZZI Filippo, VON HIPPEL Mathew[1]. **Total 15**

Emeritus: BLAIZOT Jean-Paul (CNRS), PESCHANSKI Robi (Conseiller scientifique CEA)

Group B manager until 2023: Stéphane LAVIGNAC. New group manager (from 01/2024): Brando BELLAZZINI.

Group C: Statistical physics and applications, condensed matter, quantum information

BANCAL Jean-Daniel, BARTHELEMY Marc, BENA Cristina, DUPLANTIER Bertrand, FOINI Laura, GODRECHE Claude, GOLINELLI Olivier, GUITTER Emmanuel, HOUDAYER Jérôme, JOLICŒUR Thierry, LUCK Jean-Marc, MALLICK Kirone, MISGUICH Grégoire, MONTHUS Cécile, PEPIN Catherine, SANGOUARD Nicolas, URBANI Pierfrancesco, WIEDER Benjamin. **Total: 18**

Emeritus: ORLAND Henri (Conseiller scientifique CEA)

Group C manager until 2023: Cristina BENA. New group manager (from 01/2024): Thierry JOLICŒUR.

Remark: The above lists represent the permanent CEA and CNRS employees at 31/12/2023. They do *not* include researchers on secondment.

Team D: Support team (« soutien à la recherche »)

CAPDEPON Anne, DE LABORDERIE Emmanuelle, DIONISI Justine, FLOURET Camille, GIRAULT Philippe, MOTCHAN Lukas (CEA fixed term contract), SAUBOY Laure, SENGMANIVANH Laurent, **Total: 8**

Scientific orientations of the unit and its teams (if applicable):

The main mission of IPhT is carry out research in theoretical physics, at the highest scientific level, and to produce knowledge on the organization of matter, from the smallest scale to the largest ones, and to develop the conceptual, mathematical or numerical tools to study these systems. This also includes problems at the interface between physics and other disciplines. This is in line with the DRF and the Institute of Physics of CNRS fundamental research mission. It contributes to the CEA's missions by providing the organization with some expertise, methods and theoretical skills, as well as a strong interface with the academic world. Another aspect of our activity is the dissemination of knowledge and the sharing of our expertise. This dissemination is not only aimed at the academic world (researchers, students, etc.), but also at the public sphere (outreach, etc.).

3- Scientific subjects and their implications

The main aim of research at the IPhT is to formulate and study the physical and mathematical laws governing the universe, its structure and organization. It covers almost all the major subjects of modern theoretical physics: from the study of fundamental interactions, with a particular focus on describing the primordial universe, to the development of models for understanding certain biological structures. It also involves the mathematical study of complex systems in statistical physics and field theory. The following paragraphs describe these activities and some important and representative works carried out at the IPhT over the last 6 years. This presentation relies on about sixty important reference (out of more than 1,200 publications over the period).

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[1] M. Von Hippel left IPhT in January 2024.

Group A: Mathematical physics, string theory and gravitation

The research in group A is focused on the description of interacting systems via quantum field theories, string theories and statistical models. A particularly important class of quantum field theories under consideration are two- or higher-dimensional CFTs, which can describe critical points of statistical systems, or strongly interacting systems subject to the gauge-string correspondence. Integrability plays often a central role, encoding the infinite symmetries of such systems. Quantum gravity is a central theme of research in the group, addressed from complementary points of view *e.g.* as statistical models in random geometries, or from the point of view of string theory or black-hole physics. Fundamental aspects of string theory like the landscape of vacua, stability of solutions with a positive cosmological constant, black-hole solutions, brane systems and deformations are under intense scrutiny. The tools employed are various and interconnected, and include bootstrap, integrability, combinatorics, random matrices, topological recursion. There are deep links with the activities in the other groups and with mathematics. These topics are described in more detail below under 4 themes (denoted by A1, ..., A4)

A1 Quantum field theory, CFT, bootstrap

Research at IPhT explores several aspects of quantum and conformal field theories (CFTs) in diverse dimensions. These include formal properties of the space and structure of CFTs, and applications to statistical physics, the AdS/CFT correspondence, and spectral problems in hyperbolic geometry. Technical tools include the conformal bootstrap, combinatorics, moduli space geometry, harmonic analysis, and random matrix theory.

Towards solving critical loop models — In the critical limit, statistical loop models give rise to two-dimensional CFTs whose understanding has long been a challenge. Using numerical and analytic conformal-bootstrap techniques, we have found a combinatorial description of the space of correlation functions, computed four-point connectivities of the Potts model to high numerical accuracy, and exactly determined a number of structure constants.[1]

Bootstrapping geometry — Conformal-bootstrap techniques have been applied to harmonic analysis on hyperbolic manifolds, yielding rigorous mathematical bounds on the spectra of differential operators, which in some cases are saturated by known manifolds to several digits of precision. Moreover, using the moduli space of principal bundles, we have constructed geometrical objects that obey the bootstrap axioms and therefore describe correlation functions in two-dimensional CFT.[2]

Conformal field theory, holography and black holes — We introduced a rigorous formalism embedding random-matrix dynamics in two-dimensional CFTs, using harmonic analysis on the modular group, leading to a Gutzwiller-type trace formula for the chaotic density of states. In the context of AdS/CFT, this incorporates random matrix statistics of black hole microstates into a putative theory of pure gravity.[3] We also explored a new type of non-local quantum field theory, namely "$T\bar{T}$" and "$J\bar{T}$" deformations of CFTs, with connections to QCD and integrability: these have exactly solvable spectrum and correlation functions.[4]

Superconformal field theory — In four dimensional maximally-supersymmetric gauge theory, we applied harmonic analysis techniques to process the consequences of S-duality for physical observables, providing a new formalism that constrains the structure of instantons and correlation functions.[5] In more than four dimensions, where known interacting CFTs are intrinsically strongly coupled, we studied the singularity structure of the geometry of the moduli space of vacua, showing that the complexity of these geometries can be arbitrarily high by using "magnetic quivers," and establishing a non-trivial link between high dimensional theories and IR fixed points of certain three-dimensional gauge theories.[6]

A2 Integrable systems, integrable field theories

One of the research themes developed in the Institute, to which its members made important contributions, is that of integrable systems and integrable field theories. This theme has deep interconnection with statistical physics, CFT, high-energy physics and mathematics, being broad and interdisciplinary.

Integrable spin chains, statistical models on the lattice and integrable 2d field theories — Integrable spin chains are often used as lattice regularizations of integrable field theories, and for massless cases they can be used to approach criticality in a controlled way. They are particularly useful for non-compact or non-unitary theories, as they offer analytical control via the representation theory of quantum groups. In this context, an important effort was devoted to study boundary conditions which preserve integrability and conformality.[7] Integrability was also

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[1] *Global symmetry and conformal bootstrap in the two-dimensional O(n) model*, L. Grans-Samuelsson, R. Nivesvivat, J.-L. Jacobsen, S. Ribault, H. Saleur, SciPost Phys. 12, 147 (2022).

[2] *From the quantum geometry of Fuchsian systems to conformal blocks of W-algebras,* R. Belliard, B. Eynard, arXiv:1907.10543

[3] *AdS₃ Pure Gravity and Stringy Unitarity*, G. Di Ubaldo, E. Perlmutter, arXiv:2308.01787 (Phys. Rev. Lett. 2024)

[4] *TT́ and the mirage of a bulk cutoff*, M. Guica and R. Monten, SciPost Phys. 10, 024 (2021)

[5] *Harnessing S-duality in N = 4 SYM & supergravity as SL(2, ℤ)-averaged strings*, S. Collier, E. Perlmutter, JHEP 195 (2022)

[6] *Magnetic quivers for rank 2 theories*, A. Bourget, *et al.*, J. High Energ. Phys. 2022, 208 (2022)

[7] *Algebraic Bethe Ansatz for the Open XXZ Spin Chain with Non-Diagonal Boundary Terms via $U_q sl_2$ Symmetry*, D. Chernyak, A. M. Gainutdinov, J. Lykke Jacobsen, H. Saleur, SIGMA 19, 046 (2023)

used to build lattice regularizations of topological defects in two-dimensional CFTs, and to uncover a large family of new topological defects.[1] Integrable models were used in condensed matter physics to describe transport out of equilibrium, both numerically and analytically. A combinatorial reformulation of Thermodynamical Bethe Ansatz as a tree expansion was used to prove a conjectured Fredholm determinant expression of the boundary entropy of an integrable system,[2] and some key results in the Generalized Hydrodynamics. New results have been obtained using the method of separation of variables, both for higher rank and non-compact spin chains. Finally, new long-range integrable models and their spin chain limits were proposed and solved, some of them possessing quantum affine/Yangian symmetry.

Random matrices, quantum gravity, quantum mechanics and relationship with mathematics — Random matrix theory remains a focus of the activities of the Institute, both for formal aspects and for the applications to quantum gravity. Correlation functions were studied via loop and differential equations[3] and via a geometric approach using the fundamental form of second kind. Matrix models for dually-weighted graphs, and matrix models with non-polynomial potential corresponding to massive spineless fermions on dynamical planar graphs were studied. Exact WKB methods were applied for homogeneous 1d potentials and their spectral zeta functions. In analytic number theory, contributions to an alternative approach towards the proof of the Riemann hypothesis were made.

Correlation functions in four-dimensional integrable supersymmetric gauge theories — Integrability proved extremely useful in solving strongly interacting higher-dimensional (super)CFT, giving hope to develop more universal non-perturbative techniques. In this context, a particular correlation functions in the planar N = 4 SYM theory with large charges was obtained for any value of the coupling constant.[4] The associated object, called octagon form factor, also appearing in the expression of various quantities associated to certain N = 2 super-conformal models, is closely related to the celebrated Tracy-Widom distribution and its finite temperature generalization,[5] [see Portofolio]. Correlation functions of the so-called fishnet theory, corresponding to rectangular Feynman graphs, were determined using integrability techniques and were shown to be Yangian invariant.

A3 Combinatorics, enumerative and random geometry, topological recursion and miscellaneous mathematical physics

A sizeable part of IPhT's activity lies at the intersection of statistical mechanics, random geometry and integrable systems.

Dimer models— A first set of problems stems from the statistical physics of dimers, vertex models and tiling in two dimensions. In the same vein as the famous Alternating Sign Matrix conjectures, remarkable relations were established by IPhT researchers between different enumeration problems, such as that between the 20 Vertex model and the domino tiling of some suitably symmetrized domain. A novel one-to-one correspondence was discovered[6] between dimer models on bipartite planar graphs and embeddings of these graphs as circle patterns, paving the way for a new approach to proving limit shape results. The IPhT also pursued the investigation of Schur processes, a wide class encompassing many solvable models in the Kardar-Parisi-Zhang universality class. A powerful and systematic way to prove the integrability of many geometric dynamics was proposed.

Random geometry — Another source of combinatorial problems is the enumeration of random maps. Powerful tools for map combinatorics have been developed in our Institute, such as the topological recursion and the slice decomposition, revealing close links between the geometry of maps and that of hyperbolic surfaces. A remarkable enumerative result is the extension of the celebrated Tutte's formula for the number of ways to glue polygons into a sphere.[7] A wider field of research studied at IPhT deals with the geometry of random maps decorated by statistical mechanics models. The 'mating' of a pair of continuous random trees (CRTs) produces a topological sphere canonically embedded in the Riemann sphere, whose random measure is that of Liouville quantum gravity (LQG), the tree interface yielding a space-filling Schramm-Loewner evolution (SLE).[8] The law of the CRT pair was shown to correspond to the scaling limit of random maps decorated by Fortuin-Kasteleyn clusters, thereby providing a first rigorous proof of their convergence to LQG decorated by a conformal loop ensemble (CLE). Extreme nesting in the O(n) loop model was studied via large deviations functions, recovered by using the CLE-LQG formalism, and the Knizhnik-Polyakov-Zamolodchikov (KPZ) relation. A team at IPhT explored fully-packed loop models on random bipartite maps, measuring critical exponents numerically and

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[1] *Topological defects in lattice models and affine Temperley-Lieb algebra*, J. Belletête, A. M. Gainutdinov, J. L. Jacobsen, H. Saleur, T.S. Tavares, Commun. Math. Phys. 400, 1203 (2023)

[2] *Boundary TBA, trees and loops*, Ivan Kostov, Didina Serban, Dinh-Long Vu, Nucl. Phys. B 949, 114817 (2019)

[3] *Recursions and ODEs for correlations in integrable systems and random matrices*, B. Eynard, D. Mitsios, S. Oukassi, arXiv:2307.14904

[4] *The Octagon as a Determinant*, I. Kostov, V. B. Petkova, D. Serban, *JHEP*, 178 (2019)

[5] *Octagon at finite coupling*, A.V. Belitsky, G.P. Korchemsky, *JHEP* 219 (2020)

[6] *Dimers and circle patterns*, R. Kenyon, W. Y. Lam, S. Ramassamy and M. Russkikh, Ann. Scien. de l'ENS, 55, 863, (2022)

[7] *On quasi-polynomials counting planar tight maps*, J. Bouttier, E. Guitter, G. Miermont, arXiv.2203.14796

[8] *Liouville quantum gravity as a mating of trees*, B. Duplantier, J. R. Miller, S. Sheffield, Astérisque, 427, (2021)

predicting several exactly, resulting in an astonishing failure of the KPZ relations for specific exponents.[1] Another problem of random geometry is to measure the volume of the moduli space of Riemann surfaces equipped with an r-spin structure. Witten had conjectured that the generating function of these numbers is an r-KdV Tau-function. The case r=2 was proved by Kontsevich, who also conjectured a graph model for the r-spin case. The combinatorics of these r-spin graphs was studied at IPhT, with, in particular, the explicit computation of the generating functions showing that they obey the topological recursion. Finally, the relation between 2D random geometry and LQG was further explored via the random Delaunay triangulation model, with the study of isoradial triangulation deformations.[2]

Topological recursion — Besides its application to map enumeration, the topological recursion, which is a recursive definition of invariants of spectral curves, has applications in enumerative geometry, random matrix theory, mathematical physics, string theory and knot theory. A major challenge is to prove the 'quantum curve conjecture', namely that topological recursion provides the WKB expansion of wave functions of integrable systems. This had been proved in the easiest cases (rational spectral curves) and a team at IPhT proved it for elliptic, then hyperelliptic, then nearly general algebraic curves.[3]

Mathematical physics — IPhT researchers have reframed classical multivariate orthogonal polynomial theories (like Macdonald) by situating their operator algebra within cluster algebra—a combinatorial theory involving quiver mutations and their quantization. This gives a new combinatorial interpretation for the families of operators of which the polynomials are common eigenfunctions. Exact results were obtained for the complex integral means spectrum of whole-plane SLE, as driven by Brownian motion with drift or by a symmetric Lévy process. Using LQG yields the most intricate exact multifractal spectrum to date.

A4 String theory and black holes

String theory is the most advanced way of quantifying gravity, while at the same time unifying it with the other three forces of nature. At low energies, string dynamics are described by field theories that encompass both general relativity and gauge theories. The structure of the theory is exceptionally rich, combining a wide range of physical and mathematical ideas. The IPhT has made key contributions to the exploration of the string theory landscape of low energy solutions, higher derivative corrections to low energy effective actions, resolution of the black hole information paradox, the understanding of strong coupling behavior of super CFTs by holography, bootstrap methods as well as by their geometric engineering from string theory.

The string theory landscape — One of the important questions in string theory is the classification of its "landscape" of vacua after the reduction of extra dimensions by compactification. Researchers at IPhT have systematically explored a vast part of the landscape,[4] which served as testing grounds for swampland conjectures (conjectured conditions that low energy theories should possess in order to be able to couple them to quantum gravity). On the other hand, our team has found instabilities in all non-supersymmetric solutions explored, corresponding to universes with a positive cosmological constant -de Sitter,[5] providing top-down support to the bottom-up-inspired conjecture that stable de Sitter solutions cannot be constructed in quantum gravity.

Our group continued the study and made progress in the long-standing problem of the non-linear completions of higher-derivative couplings in string theory effective actions based on higher-point interactions. Having previously studied one-loop couplings, in Ref. [6] we computed tree-level five-point contact terms. Furthermore, we explored the constraints imposed by IIB duality symmetry on eight-derivative (perturbative and non-perturbative) couplings.

Black Holes in String Theory — The IPhT has expanded the evidence that the pure states that give rise to the black hole entropy are horizonless solutions. Our team has shown that these solutions display the same absorptive properties as black holes, without information loss. Their multipole moments differ from those of the black hole[7] which raises the hope of detection of the horizon-scale structure expressed by these solutions with gravitational-wave detectors.

Moduli spaces of brane systems and geometry — Supersymmetric field theories, which include strong coupling phenomena like instantons and high dimensional CFTs,[8] can be studied by means of string theoretic methods, i.e. brane systems, geometric engineering, or a mixture of both. The central technical tool is the concept of magnetic quiver, whose range of applicability has been probed by our team by scanning systematically

[1] *Exponents for Hamiltonian paths on random bicubic maps and KPZ*, Ph. Di Francesco, B. Duplantier, O. Golinelli, E. Guitter, *Nucl. Phys.* B 987 116084 (2023)
[2] *Perturbing isoradial triangulations*, F. David, J. Scott,. Ann. Inst. Henri Poincaré Comb. Phys. Interact. (2024)
[3] *From topological recursion to wave functions and PDEs quantizing hyperelliptic curves*, B. Eynard, E. Garcia-Failde, Forum Math. Sigma 11 e99 (2023)
[4] *Exploring the landscape of heterotic strings on T^d*, A. Font *et al.*, JHEP 194 (2020)
[5] *Uplifting Runaways*, I. Bena, E. Dudas, M. Graña, S. Lüst, Fortschr. Phys. 1800100 (2018)
[6] *Higher-derivative couplings in string theory: five-point contact terms*, J. T. Liu, R. Minasian, Nucl. Phys. B, 967 (2021)
[7] *Multipole Ratios: A New Window into Black Holes*, I. Bena, D. R. Mayerson, Phys. Rev. Lett. 125, 221602 (2020)
[8] *Fibrations and Hasse diagrams for 6d SCFTs*, A. Bourget, J. F. Grimminger, JHEP 159 (2022)

through the landscape of a class of theories. The IPhT has also developed a program of study of anomalies in supersymmetric CFTs (SCFTs) using holography and M-theory anomaly cancellation mechanism via inflow.

AdS/CFT — Our group also has a strong focus on holography and the AdS/CFT Correspondence. We have developed new tools for probing black hole microstate spectra using CFT analogues of random matrix theory and field theory techniques (borrowed from spectral analysis) for studying bulk space-time emergence from strongly coupled gauge theory.[1] The IPhT has explored certain exotic "$T\bar{T}$" deformations of CFT, which embed non-AdS versions of holography in the context of string theory.[2]

Group B: Cosmology, astrophysics, high-energy physics and hadronic matter

The research of this group encompass strong interactions, the standard model and extensions thereof, as well as some aspects of astrophysics and cosmology. Despite this broad range of areas being considered, a common approach in the group's research is to start from a description of interactions at a fundamental level, and to work out the possible observational and phenomenological consequences of theses interactions. The work of the group therefore ranges from formal endeavours, at the level of the theoretical formalism itself, to practical questions in direct connection with experimental aspects.

B1 Nuclear matter at high density, heavy ion collisions, jet physics

At low baryon density and temperature, quarks and gluons are confined inside bound states (protons, neutrons, pions, ...) and cannot exist as individual states. Lattice Quantum Chromodynamics predicts a deconfinement transition at high temperature or baryon density, that liberates the quarks and gluons to form a state called "quark gluon plasma". During the expansion of the early universe, this transition did not leave any visible imprints accessible to astronomical observations. Experiments to recreate the conditions for this transition are realized (LHC at CERN, RHIC at BNL) by colliding large atomic nuclei at relativistic energies. IPhT members are involved in studies of various aspects of the theory of these collisions.

The gluon density inside nucleons and nuclei increases with energy, but this growth saturates due to gluon recombinations above a certain critical density called the gluon saturation scale. This phenomenon plays a crucial role in the theoretical description of the early stages of a high-energy nucleus-nucleus collision. Gluon saturation has also been studied in its own right, in order to improve the formalism with higher order corrections and to determine good observables that may reveal experimentally its main features.

The matter produced in a collision is initially far from equilibrium. Equilibration in such a system involves a competition between the scatterings that reshuffle the momenta, and the longitudinal expansion that reduces the longitudinal momenta. Several aspects of this question have been studied: the isotropization in momentum space, the onset of hydrodynamical flow, and the dynamics of heavy quarks embedded in the quark-gluon plasma.

Although the timeline of a nucleus-nucleus collision cannot be observed directly, one may relate measurements in the final state to various aspects of the initial state, for instance its geometrical shape and the fluctuations thereof. This has been a fruitful thread of research at IPhT. In particular, it has been possible for the first time to extract from experimental data the temperature and entropy density of the quark gluon plasma,[3] that are consistent with predictions from lattice QCD. Somewhat unexpectedly, with these methods, high-energy nucleus-nucleus collisions can also be used to determine properties of nuclei better than with dedicated low energy experiments.[4]

In QCD, an important class of observables is based on jets, i.e., collimated sprays of particles whose definition is immune to collinear and infrared divergences. How these jets are modified when they traverse a dense medium such as the quark-gluon plasma is an area of intense research, as these modifications are potentially good candidates to extract information about the traversed medium.[5] In parallel, studies have been devoted to various aspects of jets in vacuum (jet algorithms, partons showers and event generators beyond leading order, jet substructure).[6]

B2 Scattering amplitudes (for gauge theories and gravity)

Scattering amplitudes play a vital role in understanding the interactions between fundamental particles. They underpin calculations of various physical phenomena, including scattering probabilities, gravitational waveforms, cosmological correlators, and can be used to constraint on extensions to the Standard Model. Traditionally, computing these quantities using perturbation theory is challenging.

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[1] *Harnessing S-Duality in N=4 SYM & Supergravity as SL(2,Z)-Averaged Strings,* S. Collier, E. Perlmutter, JHEP 195 (2022)

[2] *Infinite $T\bar{T}$-like symmetries of compactified LST*, S. Georgescu, M. Guica arXiv:2212.09768 [SciPost Phys. 16, 006 (2024)]

[3] *Thermodynamics of hot strong-interaction matter from ultrarelativistic nuclear collisions*, F. G. Gardim, G. Giacalone, M. Luzum, J.-Y. Ollitrault, Nature Phys. 16 615 (2020)

[4] *Constraining the quadrupole deformation of atomic nuclei with relativistic nuclear collisions,* G. Giacalone, Phys.Rev. C 102 024901 (2020)

[5] *Vacuum-like jet fragmentation in a dense QCD medium*, P. Caucal, E. Iancu, A.H. Mueller, G. Soyez Phys. Rev. Lett. 120 232001 (2018)

[6] *Colour and logarithmic accuracy in final-state parton showers*, K. Hamilton *et al.*, JHEP 03 041 (2021)

Our research group has made significant progress in developing efficient methods for evaluating scattering amplitudes and physical observables. This has been achieved through novel approaches to constructing and analytically evaluating scattering amplitudes, enabling us to connect them to observable phenomena.

Calculations with massless particles can be complicated by the presence of infrared divergences, hindering the extraction of exact results. We address this by introducing approaches that define specific, infrared-finite observables and integrals, leading to exact formulae.[1]

The duality between colour factors and kinematic factors allows us to construct many gravitational amplitudes from gauge theory amplitudes. This has enabled the calculation of the ultraviolet behaviour of maximal supergravity at five-loop order,[2] confirming earlier (2010) predictions based on symmetry analysis.[3]

Significant insights into classical gravitational radiation have been gained by deriving the classical gravitational waveforms emitted during two-body interactions using quantum scattering amplitudes. The KMOC[4] and newly introduced exponential formalisms[5] are crucial tools for this derivation, developed by our research group.

Finally, advanced mathematical techniques, including differential equations,[6] and integration-by-part identities,[7] have been developed by our group to facilitate the efficient evaluation of Feynman integrals in the context of scattering amplitudes.

B3 Beyond the Standard Model of particle physics

There are two sets of questions that are not answered by the Standard Model (SM) of particle physics, the theory that precisely describes all particle interactions besides gravity. The first arises from the structure of the theory, the second from experimental observations.

In the first set we have fine-tuning problems and the accidental symmetries of the SM. The SM leaves unexplained the value of the Cosmological Constant, of the Higgs boson mass and of the QCD θ-angle. In all three cases, explaining measured values requires an exponentially large accidental fine-tuning of unrelated parameters. The first joint explanation ever found for the Higgs mass and the QCD θ-angle was obtained at IPhT in 2021.[8] This work shows an important connection between the two problems that was not appreciated before.

The second subset of theory questions pertains to flavor physics and the approximate global symmetries of the SM. One of the main open questions in this category is the origin of neutrino masses. They remain unexplained in the SM and suggest new physics in the lepton sector. The possibility to constrain this yet unknown new physics through various processes, such as coherent elastic neutrino-nucleus scattering, heavy sterile neutrino production at colliders, or flavor violating decays of charged leptons, has been studied at the IPhT. In particular, it was shown that upcoming experiments with charged leptons have the capability to exclude some TeV-scale new physics models that can explain neutrino masses or flavor physics anomalies.[9]

The second set of questions on the SM arises from cosmological observations. Purely within the SM we cannot describe 80% of the matter in the Universe (dark matter). An experiment proposed by IPhT researchers to detect dark matter[10] had a worldwide impact. Prototypes are currently being built at SLAC, Fermilab and CERN. Complementary approaches based on cosmological observations are described in the next section (B4). Another unexplained observation is the matter-antimatter asymmetry of the Universe, which is being studied in a leptogenesis scenario involving a cosmological phase transition.

To conclude, it is important to mention a general methodological approach that is potentially relevant to all of the above questions. Researchers at IPhT are leading the efforts of constraining general SM extensions from first principles, such as causality, unitarity and the crossing symmetry of scattering amplitudes. Recent notable work includes[11] where it was shown how a large class of theories that appear completely healthy from a low-energy perspective are impossible to UV-complete within a causal and unitary Quantum Field Theory. An example where this is particularly relevant within a cosmological setting is the effective field theory of massive gravity that was shown to be inconsistent with causality and unitarity.[12]

B4 Cosmology and gravity

The IPhT investigates two major cosmological issues: the nature of dark energy (DE) (driving the current acceleration of the expansion of the Universe) and of dark matter (DM), and new topics associated with the

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[1] *Generalizing event shapes: in search of lost collider time*, G. Korchemsky, E. Sokatchev and A. Zhiboedov, JHEP 188 (2022)

[2] *Ultraviolet Properties of N = 8 Supergravity at Five Loops*, Z. Bern *et al.*, Phys. Rev. D 98, 086021(2018)

[3] *The Critical Ultraviolet Behaviour of N=8 Supergravity Amplitudes*, P. Vanhove, arXiv:1004.1392

[4] *Amplitudes, Observables, and Classical Scattering*, D. A. Kosower, B. Maybee and D. O'Connell, JHEP137 (2019)

[5] *On an exponential representation of the gravitational S-matrix*, P.H. Damgaard, L. Planté and P. Vanhove, JHEP 213 (2021)

[6] *Algorithms for Minimal Picard Fuchs Operators of Feynman Integrals*, P. Lairez and P. Vanhove, Lett. Math. Phys. 113, 37 (2023)

[7] *Direct Solution of Integration-by-Parts Systems*, D. A. Kosower, Phys. Rev. D 98 (2018)

[8] *Sliding Naturalness: New Solution to the Strong-CP and Electroweak-Hierarchy Problems*, R. T. D'Agnolo and D. Teresi, Phys. Rev. Lett. 128 021803 (2022). Featured in Physics. See also the portfolio

[9] *Distinguishing models with $\mu \rightarrow e$ observables*, M. Ardu, S. Davidson and S. Lavignac, JHEP 101 (2023)

[10] *Axion Dark Matter Detection by Superconducting Resonant Frequency Conversion*, A. Berlin *et al.*, JHEP 088 (2020)

[11] *Positive moments for scattering amplitudes*, B. Bellazzini *et al.*, Phys. Rev. D 104 036006 (2021). See also the portfolio

[12] *Massive gravity is not positive*, B. Bellazzini, G. Isabella, S. Ricossa and F. Riva, arXiv:2304.02550 [Phys. Rev. D 109 02405 (2024)]

emission and propagation of gravitational waves, from theoretical works to collaborations with observational missions.

Upcoming data releases by galactic surveys (Euclid, DESI, LSST) will only shed new light on DE and DM if theoretical predictions and statistical analysis improve. We showed how to remove the sensitivity to small scales (more difficult to model) with the Bernardeau-Nishimichi-Taruya nulling scheme introduced at IPhT.[1] Developing the use of the probability distribution as a statistical tool (pioneered by IPhT), we performed the first forecast for the weak-lensing convergence for Euclid-like surveys, showing how it outperforms standard analysis.

Line-of-sight effects in strong gravitational lensing, traditionally treated as a nuisance, could be a cosmological observable in its own right. Focusing on the distortions of Einstein rings, we provided the first demonstration that they can be observed,[2] opening a promising avenue with upcoming data by JWST, LSST and Euclid.

Complementary to cosmological probes, laboratory experiments can provide constraints on DE models involving new degrees of freedom. Computing the associated fifth force, we showed[3] that Rabi resonance spectroscopy of ultra-cold neutrons already excludes many DE models, while near-future Casimir experiments will place competitive bounds. We pointed out that the electron recoil excess reported by the XENON1T collaboration could be due to the production of DE quanta.

As WIMPs have not been detected yet, alternative DM scenarios have recently become popular, especially since they may alleviate the small-scale problems of the standard paradigm. We performed the first detailed analysis of scalar-field DM scenarios with non-negligible self-interactions, such as the formation of solitons and the flow around Black Holes.[4]

The detection of GW by LIGO/Virgo has provided new constraints on gravity. Their propagation speed, the decay of GW into DE fluctuations, the triggering of DE instabilities rule out many modified-gravity theories. We made significant contributions to the challenging computation of the emission of GW by binary systems, which is crucial for the analysis of LIGO/Virgo and future LISA data. Using tools recently developed in particle physics, we derived, for the first time using purely classical methods, the four-momentum radiated at leading order in the post-Minkowskian expansion,[5] including tidal and spin effects.

Group C: Statistical physics and applications, condensed matter, quantum information

The research activity of group C concerns low energy physics, from hard condensed matter, to quantum information, statistical physics and interdisciplinary applications. A common research line is the study of strongly correlated, driven and disordered systems. At the classical level, these give rise to rich complex behaviors, in particular glassiness and amorphous phases of matter; at the quantum level the phenomena investigated go from high-temperature superconductivity to topological materials. A particular emphasis is put on out-of-equilibrium systems both classical and quantum, the mechanisms behind the absence or approach to thermalization and their description through stochastic processes, field theoretical techniques and advanced mean-field methods. Finally, applications of statistical physics to interdisciplinary applications such as learning problems, complex networks and biophysics are developed as well as a research direction in quantum information, from the study of quantum computing architectures to quantum communication protocols.

C1 Quantum Condensed-matter

Several modern topics have been actively pursued in condensed matter theory at the institute. Studies of superconductivity in strongly correlated materials have been focused notably on the understanding of the competition between superconductivity and phases involving real-space modulation of the electronic density.[6] This phenomenon is crucial for understanding the cuprate hight-Tc materials which remain enigmatic even after several decades of research. An emerging field is the physics of artificial atomically thin two-dimensional materials fabricated by stacking layers of various materials like bilayer graphene[7] or more complex layered structures. Such a stacking may involve a twist angle the layers leading to the appearance of Moiré pattern. This has been shown to be an interesting arena for strong correlations because of the formation of very flat bands. The pairing symmetries may be non-conventional. In some circumstances, the flat bands have nonzero Chern number as if they were under an applied magnetic field. This fascinating phenomenon is under scrutiny

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[1] *K-cut Cosmic Shear: Tunable Power Spectrum Sensitivity to Test Gravity*, P. L. Taylor, F. Bernardeau, T. D. Kitching, Phys. Rev. D 98, 083514 (2018)

[2] *Measuring line-of-sight shear with Einstein rings: a proof of concept*, N. Hogg, P. Fleury, J. Larena, M. Martinelli, MNRAS 520, 4, 5982 (2023)

[3] *Acoustic Rabi oscillations between gravitational quantum states and impact on symmetron*, G. Cronenberg, Ph. Brax, H. Filter *et al.*, Nature Phys., 14, 1022 (2018)

[4] *Fate of scalar dark matter solitons around supermassive galactic black holes*, Ph. Brax, J. Cembranos, P. Valageas, Phys. Rev. D, 101, 023521 (2020)

[5] *Radiated momentum in the Post-Minkowskian worldline approach via reverse unitarity*, M. M. Riva, F. Vernizzi, JHEP 228 (2021)

[6] *Charge, bond, and pair density wave orders in a strongly correlated system*, A. Banerjee *et al.*, Phys. Rev. B 105, 134505 (2022)

[7] *Flat band and Lifshitz transition in long-range-ordered supergraphene obtained by Erbium intercalation*, A. Zaarour *et al.*, Phys. Rev. Research 5, 013099 (2023)

at the Institute. It holds the promise of creating devices with topological properties without applying any external magnetic field.

Dynamical mean-field theory (DMFT) has been also applied and extended in scope in recent years becoming a practical tool that goes beyond the well-established density functional theory of band structures. The importance of topology in the properties of wavefunctions describing the energy bands of periodic solids has led to important developments with the arrival of a new member of the institute involved in the so-called topological quantum chemistry approach to material structure. Topology is also a key point of the physics of the fractional quantum Hall effect, which has been studied by a combination of variational techniques including density-matrix renormalization group (DMRG) and exact diagonalization techniques notably to decipher the competition between quantum Hall liquids and the Wigner crystal in two-dimensional electron gases crated in GaAs devices as well as in bilayer graphene. The peculiar physics of Landau levels in two-dimensional systems leads to the so-called quantum Hall ferromagnetism whose excitations are spin-waves that carry an electric dipole moment which has been detected in interferometric measurements in collaboration with the SPEC neighboring laboratory.[1]

C2 In- and out-of-equilibrium dynamics (quantum & classical)

Many natural systems remain far from thermodynamic equilibrium by exchanging matter, energy or information with their surroundings. As these transfers break time-reversal invariance, these processes are beyond the realm of traditional thermodynamics and their intrinsic fluctuations do not follow the principles of equilibrium statistical mechanics. Understanding the physics of classical or quantum processes far from equilibrium is major theoretical challenge. New tools and insights have been developed at the IPhT, with important impact on the field and promising applications.

Away from thermodynamics, equilibrium state functions, such as the entropy or the free energy, become ineffective and are superseded by the unifying concept of large-deviation potentials. The mathematical study of various levels of large deviations and their properties and their consequences on macroscopic fluctuations in various classical processes (Glauber-Ising chains, records, stochastic resetting, jamming and metastability, interacting particle systems, Polya walks, temperature quench...) have been at the center of many contributions.[2] The use of integrability methods for box-ball system has shed light on generalized hydrodynamics [see Portfolio], and allowed to compute analytically the full counting statistics of charge transfer in a classical automaton.[3]

Ideas of non-equilibrium physics plays a crucial role to devise effective optimization algorithms, such as the stochastic gradient descent,[4] used to train artificial neuron networks for deep learning, and more generally in the exploration of complex dynamics of glassy systems. Similarly, by conditioning on large deviations, a new set of algorithms, inspired from optimal transport, was proposed to generate transition paths for protein folding.[5]

Quantum processes out of equilibrium can be explored by simulating driven dissipative spin systems with multiple steady states.[6] The role of quantum measurements can be thoroughly studied in some pristine models, such as the newly introduced quantum exclusion processes, a toolbox to study the interplay between decoherence and measurement.[7] Bounds to quantum chaos and the Eigenstate Thermalisation hypothesis have been the subject of a series of highly noted contributions [see Portfolio].

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[1] *Excitonic nature of magnons in a quantum Hall ferromagnet*, A. Assouline *et al.*, Nature Physics 17, 1369 (2021)

[2] *Large deviations at level 2.5 and for trajectories observables of diffusion processes: the missing parts with respect to their random-walks counterparts*, C. Monthus, J. Phys. A: Math. Theor. 57 095002 (2024); see also the Portfolio.

[3] *Exact Anomalous Current Fluctuations in a Deterministic Interacting Model*, Z. Krajnik *et al.*, Phys. Rev. Lett. 128, 160601 (2022)

[4] *The effective noise of stochastic gradient descent*, F. Mignacco, P. Urbani, J. Stat. Mech. 083405, (2022)

[5] *Sampling constrained stochastic trajectories using Brownian bridges*, P. Koehl and H. Orland, J. Chem. Phys. 157, 054105 (2022)

[6] *Multistability of Driven-Dissipative Quantum Spins*, H. Landa, M. Schiro, G. Misguich, Phys. Rev. Lett. 124, 043601 (2020)

[7] *Monitoring continuous spectrum observables: the strong measurement limit*, M. Bauer, D. Bernard, T. Jin, SciPost Phys. 5, 037 (2018)

C3 Disordered systems and multidisciplinary applications of statistical physics
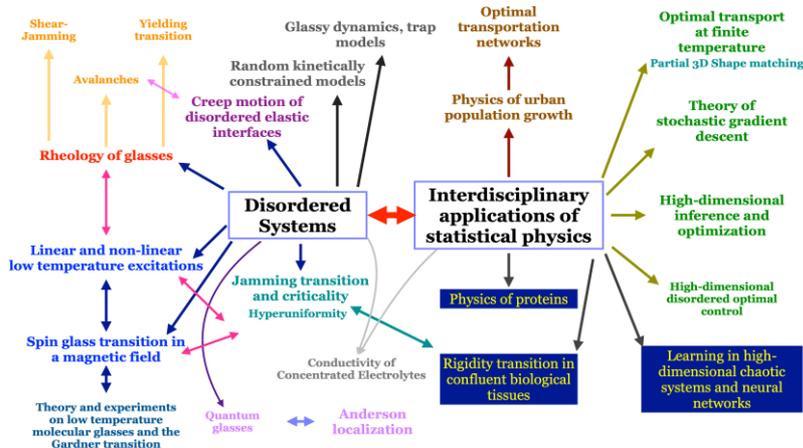
Figure 1. The color codes and arrows are chosen to highlight the connections between the topics and to perform a tentative thematic clustering.

A graphical summary of the most recent research directions on the statistical physics of disordered systems and interdisciplinary applications is presented in Fig. 1.

Disordered systems — Disordered systems appear naturally in condensed matter physics. Examples are amorphous materials such as glasses and spin glasses. A substantial research activity aimed at clarifying the nature and properties of amorphous solids at low temperature by combining the solution of infinite dimensional models of glasses,[1] extensive and improved numerical simulation techniques and experiments (in collaboration with researchers at SPEC). Specific results have been obtained in the understanding of colloidal and granular systems through the study of the jamming transition of non-spherical particle models[2] and the discovery that jamming criticality can be extended to dense soft sphere glasses at zero temperature above jamming for a particular type of particle interaction.[3] The rheology of amorphous solids has been also studied extensively by developing theoretical approaches to describe the yielding transition. Furthermore a theoretical approach to understand linear and non-linear low energy excitations of amorphous systems has been constructed. Correspondingly, a new picture on the fate of low-temperature finite-dimensional spin glasses and the emergence of a spin glass transition in a magnetic field has been proposed. Finally large deviations have been employed to describe the typical and rare events that occur on various spatial and time scales in disordered systems. Examples of applications include glassy phases of random trap models, inference from long random walks in disordered media, kinetically constrained models, finite-size Lyapunov exponents in Anderson localization models.

Interdisciplinary applications of statistical physics — Theoretical tools rooted in the physics of disordered systems have been applied to optimization problems in high dimension. An entire research line has been developed to understand the properties of gradient based optimization algorithms to solve high-dimensional inference problems. At the same, dynamical mean field theory has been developed to study the stochastic gradient descent algorithm,[4] which is the workhorse of the deep learning technology. This has allowed to benchmark the performances of this algorithm in prototypical high dimensional non-convex optimization settings. Optimal transport problems and their connections to computer science problems have been studied through statistical physics methods. A generalization of these problems to finite temperature has allowed the development of new algorithmic strategies to efficiently solve them.[5] Applications of statistical physics to problems in biophysics have been also considered. In this regard field models for confluent biological tissues have been introduced[6]. Furthermore, theoretical and algorithmic approaches have been developed to study the structure of proteins and the transition paths between their states. Moreover, tools of disordered systems have been applied to study learning strategies in recurrent neural networks and, more generally, high-dimensional chaotic systems. Finally, an entire research line has been developed to describe the growth of cities [see Portfolio] and a theory combining tools of statistical physics and stochastic processes has been proposed.

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[1] *Theory of Simple Glasses*, G. Parisi, P. Urbani, F. Zamponi, Cambridge University Press, 2020

[2] *Universality of jamming of nonspherical particles*, C. Brito *et al.*, PNAS, 115, 11736 (2018)

[3] *Critical Jammed Phase of the Linear Perceptron*, S. Franz, A. Sclocchi, P. Urbani, Phys. Rev. Lett. 123, 115702 (2019)

[4] *Dynamical mean-field theory for stochastic gradient descent in Gaussian mixture classification*, F. Mignacco, F. Krzakala, P. Urbani, L. Zdeborova, Adv. in Neural Information Processing Systems 33 (NeurIPS 2020)

[5] *Statistical Physics Approach to the Optimal Transport Problem*, P. Koehl, M. Delarue, H. Orland, Phys. Rev. Lett. 123, 040603 (2019)

[6] *A continuous constraint satisfaction problem for the rigidity transition in confluent tissues*, P. Urbani J. Phys. A: Math. Theor. 56, 115003 (2023)

C4 Theoretical quantum information: computation & communication

Quantum physics produces highly accurate predictions on the collective behaviour of systems at the atomic scale. These predictions underpinned the development of key technologies in the twentieth century, such as lasers and transistors. Recent experimental progress now makes the manipulation of individual quantum systems possible. Together with the support of quantum information theory, progress has fuelled expectations of a second wave of disrupting quantum technologies in sensing, communication and computation, as testified by large investments in these directions by public institutions and the private sector alike. For example, quantum cryptography leverages unique quantum properties, such as entanglement, to provide provably secure communications that are resistant to quantum-computer attacks. Quantum computing relies on unique elementary gates leveraging the quantum superposition principle to execute algorithms with super polynomial speed-ups compared to their classical counterparts, with potential applications in drug discovery, optimization problems and simulation of quantum systems. Quantum information concepts have also opened new vistas across many domains of physics. For example, we have understood that different quantum phases of matter can be distinguished according to the structure of their long-range quantum entanglement, that the spacetime geometry in a model of quantum gravity can admit an alternative description, in which the geometry is encoded in the quantum entanglement of a quantum system that does not involve gravitation at all and that Nature produces correlations that cannot be reproduced by local models.[1] Powerful insights like these indicate that quantum information science has become an essential tool to grasp Nature's hidden secrets in addition to be the primary theoretical tool for advancing quantum technologies.

Research interests in quantum information at IPhT span across both fundamental and applied inquiries. Notably, IPhT researchers have demonstrated the utilization of quantum non-locality for establishing secure communications with partially characterized devices.[2] Additionally, they have employed advanced numerical simulations to characterize quantum computing platforms.[3] These should not be considered the sole facets of quantum information studied at the institute, but rather as illustrations of some of the team activities.

4- Activity profile

Our institute is a theory laboratory focused on fundamental research. Even if the permanent researchers of IPhT are employed by the CNRS or the CEA, more than a third also have a regular and often significant teaching activity in nearby universities and Grandes Écoles (Université Paris-Saclay, École Polytechnique, ENS Paris, Université Cergy-Pontoise).

Activities (Distribute 100 points on these 7 items)	
Contribution to innovative teaching based on research (University Research Schools - EUR, structuring training through research - SFRI, etc.)	0
Research administration (responsibility for steering research (VP, Institute Management, Scientific Director, etc.), participation in evaluation systems (CNU, CoNRS, CSS, etc.), responsibility for IdEx, project management (ANR, Horizon Europe, ERC, CPER State-Region contract, France 2030, etc.), editorial responsibilities in national or international journals or collections.	10
Research dissemination (sharing knowledge with the general public, scientific outreach, interface between science/society)	5
Research and research supervision (involvement in supervision at doctoral level and post-doctoral level)	75
Technical expertise (for national and regional public authorities, businesses, international bodies (UN, FAO, WHO, etc.)	1
Valorisation, transfer, innovation	1
Other activities **Teaching** (at different university levels from Batchelor and Grande Écoles to Master 1 and 2)	8

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[1] *Loophole-free Bell inequality violation with superconducting circuits*, S. Storz *et al.*, Nature 617, 265 (2023)

[2] *Experimental quantum key distribution certified by Bell's theorem*, D. P. Nadlinger *et al.*, Nature 607, 682 (2022)

[3] *Dissipative Dynamics of Graph-State Stabilizers with Superconducting Qubits*, L. Shirizly, G. Misguich, and H. Landa, Phys. Rev. Lett 132, 010601 (2024)

5- Research environment

- CEA

The CEA is one of the two supervisory authorities (*tutelles)* of IPhT, and IPhT is located inside a CEA research center. IPhT is part of the Direction de la Recherche Fondamentale (DRF) of CEA.

The institute naturally has many scientific collaborations with other institutes of DRF. We can mention in particular IRAMIS (condensed-matter), IRIG (quantum many-body physics, quantum technologie), JACOB (physics of macromolecules) and IRFU (particle physics, astroparticles, cosmology). IPhT has also some links with laboratories of the Direction de la Recherche Technologique (DRT/LIST and DRT/LETI) in the field of quantum technologies, and occasional collaborations with the Direction des Energies (DEs).

- CNRS

The CNRS is the other *tutelle*. IPhT is affiliated to *CNRS Physique* and, since 2023 and in a secondary manner, to *CNRS Nucléaire & Particules* (ex IN2P3). The laboratory is affiliated to the section 02[1] of the CoNRS and is managed by the DR4.[2] About one third of the permanent researchers are members of CNRS. This strong link with CNRS – the largest research organization in Europe – puts the institute at the heart of the French academic ecosystem. The CNRS provides some resources to the institute (operating budget, one member of the administrative team, and the salaries of the CNRS researchers) as well as opportunities to collaborate with other laboratories or to participate in projects or networks (see the list of GDR and IRN below).

- Paris-Saclay University

The IPhT is associated to the university Paris-Saclay[3] and is part of two Graduate schools of the University: Mathematics and Physics.
  - o At the institutional level, IPhT has participated at different levels in the construction and organization of the Paris-Saclay research ecosystem.
    - PhOM:[4] since 2014 there is one member of IPhT in the PhOM council. The institute has also been a driving force in the Theoretical physics board of PhOM.[5]
    - IPhT is also represented at the Fondation Mathématique J. Hadamard (FMJH).[6]
  - o At the scientific level IPhT has also numerous collaborations with other laboratories of the Paris-Saclay University. We may in particular cite AIM, IHES, LPTMS, LPS, IAS, LPT Orsay (now theory division of ICJLab).
  - o The IPhT has several tight connection with IHES. The CEA and IHES have created visiting positions, which allow IPhT researchers to join the IHES as "CEA Research Directors" on a part-time basis for a period of two years. From 2018-2023, this position was held by B. Eynard, G. Korchemsky and E. Perlmutter. Some scientific events are also organized in common, like the Itzykson Seminar.[7] Some lectures organized by IHES are followed by numerous IPhT researchers. Finally, the head of IPhT is also the representative of CEA in the board of directors of IHES.
  - o Institut Pascal (IPa).[8] One central mission of IPa is to finance and host some long-term research programs (four weeks or more). This type of scientific event is particular adapted to the research in theoretical physics and several members of the IPhT have been organizers of programs at IPa. In addition, IPhT has also played in important role in the ramp-up phase of IPa, through the *Initiative de Recherche Stratégique* "PSI^2" [active from 2017 to 2019][9],[10] of the university Paris-Saclay.

- École Polytechnique

  - o IPhT has several collaborations with CPhT, which is a theory laboratory with a large spectrum of research fields in theoretical physics, from low energy physics (condensed-matter etc.) to high-energy physics (string theory, etc.), somewhat similarly to IPhT.

  - o There is a long tradition of teaching at the École Polytechnique among the researchers of the IPhT researchers. This can be at the tutorial level (so called "petite classe") or for full courses.
- The institute has been involved in 3 Laboratoires d'excellence (LabEx)

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[1] Théories physiques : méthodes, modèles et applications
[2] La délégation régionale CNRS Île-de-France Gif-sur-Yvette
[3] The University Paris-Saclay is however not a *tutelle* (supervising authority) of the Institute
[4] PhOM (*Physique des Ondes et de la Matière*) was a department of the Paris-Saclay university until 2020, when it became one of the three axes of the graduate school of physics.
[5] This board existed from 2015 to 2020 and was led by a member of IPhT (G. Misguich).
[6] S. Ribault is in charge of the « Math-Phys. » program of FMJH.
[7] www.fondation-hadamard.fr/en/our-programs/thematic-programs/mathematical-physics/itzikson-seminary
[8] www.institut-pascal.universite-paris-saclay.fr
[9] One of the 3 project leaders of the PSI^2 project was a member of IPhT
[10] www.universite-paris-saclay.fr/recherche/institut-pascal/psi2-2017-2018-and-2019

- o LabEx « Physique Atomes Lumière Matière » (PALM).[1] It's role has now been taken by Graduate School of Physics / axe PhOM.[2]
  - o LabEx « Physique des 2 Infinis et des Origines » (P2IO).[3] Its role has now been taken by GS de Physique / axe P2I.[4]
  - o LabEx Hadamard (LMH),[5] which role has now been taken by the FMJH and the GS de Mathématique
- "Programmes et équipements prioritaires de recherche" (PEPR), part of the national plan France 2023 to develop certain fields of basic research :
  - o IPhT participates in two projects of the Quantum PEPR (DIQKD & EPIQ). DIQKD is managed by IPhT.
- « Fédérations de recherche », « Groupements de Recherche » and « International Research Networks » (IRN) of CNRS. Here is the list of such collaborative structures in which IPht members participate:
  - o "Fédération de Recherche Interactions Fondamentales" (FRIF)
  - o GDR Matériaux, États ElecTroniques, Interactions et Couplages non-Conventionnels (MEETIC). gdr-meeticc.cnrs.fr/le-gdr-meeticc (INP)
  - o GDR TeQ (which succeeded IQFA) on quantum technolgies (INP and INSIS)
  - o GDR « Analyse Multifractale et Autosimilarité » » (AMA) gdramf.math.cnrs.fr/index.html
  - o GDR QCD gdrqcd.in2p3.fr (IN2P3 and INP)
  - o GDR « Interaction, Désordre, Elasticité » (IDE) gdr-ide-2023.sciencesconf.org (INP)
  - o GdR "Branchement" branchement.pages.math.cnrs.fr/gdr-branchement (INSMI)
  - o GDR DynQua on Quantum Dynamics dynqua.math.cnrs.fr (INSMI)
  - o GDR IM "Informatique-Mathématique" www.gdr-im.fr (INS2I et INSMI)
  - o IRN Terascale terascale.in2p3.fr (IN2P3) (IPhT involved in the management committee)
  - o GDR Intensity Frontier gdrintensityfrontier.in2p3.fr (IN2P3 and INP)
  - o GDR Cophy gdrcophy.in2p3.fr/organisation IN2P3)
  - o GdR « Ondes Gravitationnelles » gdrgw.in2p3.fr (IN2P3)
  - o GDR « Matrices Et Graphes Aléatoires » - MEGA www.ceremade.dauphine.fr/dokuwiki/mega:start
  - o IRN Quantum Fields and Strings qfs.cnrs.fr (IPhT involved in the steering committee)
  - o IRN Neutrino gdrneutrino.in2p3.fr (IPhT involved in the direction)
  - o IRN PIICQ (piicq.pages.math.cnrs.fr)
- Connections with international research bodies
  - o CERN is of course a central place in Europe concerning high-energy physics and many researchers (mostly from group B) have frequent scientific interactions with people at CERN. Many of them regularly visit CERN and these visits often last several months.

6- Consideration of the recommendations in the previous report

A - Recommandations sur la production et les activités scientifiques (critère 1) :
La qualité des recherches menées par l'IPhT est remarquable. La seule recommandation que l'on puisse faire est de continuer dans cette direction.

→ Actions taken : continue to recruit researchers at the highest possible level, provide a research environment which favors the intellectual productivity of researchers, the emergence of new ideas and new collaborations.

B - Recommandations sur l'organisation et la vie de l'unité (critère 2) :
⚠ *Améliorer la communication entre la direction et le personnel.*
→ Actions taken :
- Regular general meetings (2-3 times a year).
- Distribution of detailed minutes of Scientific Council and Laboratory Council meetings. These reports include information on scientific policy (see below, recommendation C)
- The annual interview between the IPhT director and researchers has gradually been made more frequent, moving from an interview at the employee's request, typically every few years, to one that now takes place every year (see also page 21).

C - Recommandations sur la stratégie et les projets scientifiques (critère 3) :
⚠ *L'IPhT devrait être proactif en ce qui concerne les plans de recrutement et le développement éventuel de nouveaux domaines de recherche. En particulier, il devrait travailler sur un projet scientifique de développement*

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[1] www.labex-palm.fr
[2] www.universite-paris-saclay.fr/en/graduate-schools/graduate-school-physique/recherche-graduate-school-physique/physics-waves-matter-phom
[3] www.p2io-labex.fr
[4] www.universite-paris-saclay.fr/en/graduate-schools/graduate-school-physique/recherche-graduate-school-physique/physics-2-infinities-p2i
[5] www.fondation-hadamard.fr/en/fundation/about-us/the-labex-mathematique-hadamard-lmh

pour les années à venir et rédiger un tel document après discussions et concertation entre les membres de l'Institut. Ce processus devrait améliorer la transparence interne. (Ce document devrait évidemment être mis à jour avec une périodicité raisonnable).

→ Actions taken:

For several years now, and at least since 2018, some priority scientific themes are defined on a collegial basis inside the institute and these themes are used to target the recruitment of permanent CEA researchers. These themes are also transmitted to the CNRS INP for the annual DIALOG campaign and discussed with CEA and CNRS at the *Dialog Objectifs Ressources* (DOR) meetings. The main place for such discussions is the institute's scientific council (which includes elected researchers, a few appointed researchers, and the institute's management). Discussions are also taking place at group level. As mentioned above, the minutes of the scientific council meetings detail the orientations and are distributed to all permanent researchers. In concrete terms, these scientific themes have played an important role since they determined the profiles of all CEA positions open during the evaluation period at IPhT:

- Physics beyond the Standard model, recruitment in 2019.
- Quantum information theory, two recruitments in 2019 and 2020
- High-energy phenomena and quantum field theory, from amplitudes and integrability to gravitational waves: position opened in 2022, starting in summer 2023.
- Quantum matter, quantum and topological materials, classical and quantum simulations, quantum computing, quantum communication: position opened in 2022, starting in 2022.
- High-energy phenomena in quantum field theory, centered on scattering amplitudes, from particle physics to gravitational waves: position published end 2022, recruitment in autumn 2023.
- Applications of statistical physics: physics of life, artificial intelligence, neuroscience, complex systems, etc.: position published end 2023, recruitment planned for 2024 (on going).
- Computational quantum many-body physics: position published end 2023, recruitment planned for 2024 (on going).

2- PORTFOLIO INTRODUCTION

The main characteristic of the research activities carried at the Institut de Physique Théorique is probably their breadth. The research teams at the IPhT cover almost all aspects of theoretical physics: string theory, fundamental quantum field theory, mathematical physics, cosmology, astrophysics, particle and beyond-the-standard-model physics, condensed matter, quantum information, statistical physics of complex systems (including artificial intelligence), physics applied to biological organisms, etc... Extracting only a handful of highlights from such a diverse group of 50 permanent researchers, who contributed more than 1200 scientific publications over the past 6 years, is therefore bound to be incomplete. Our selection of highlights has been guided by an attempt at showcasing this broad diversity of research activities conducted in our Institute. The next few paragraphs put this selection into the broader environment of the Institute and briefly touch upon other important achievements.

While the Institute is organized in three thematic groups, many researchers and collaborations live at the interface between these groups. The local environment of the Institute indeed favors discussions between experts in different domains. Even within each group, interactions between researchers of different backgrounds often turn into fruitful collaborations with important physics results. A subset of the selected highlight is meant to present some of these interdisciplinary results. This includes applications of mathematical physics to condensed matter, work at the intersection between high-energy physics and nuclear physics, applications of "Amplitude" techniques to gravitational waves, studies of how fundamental quantum field theory properties constrain theories of gravity, statistical-physics interpretations of quantum chaos, applications of integrability and cellular automatons to the onset of hydrodynamics, and connections between the physics of continuous phase transitions in spin chains and in the early universe.

The rest of the selected scientific highlights is also meant to showcase the ability of the IPhT to reach scientific milestones across a wide spectrum of theoretical physics domains, ranging from a proposal for a new equation governing the growth of cities to a new conjecture in string theory. Mathematical physics has always been a flagship activity of the IPhT, noticeably with strong connections to the nearby IHES. Recent breakthroughs on strongly-coupled gauge theories and on the relations among critical exponents of certain two-dimensional statistical models exemplify this progress. On a different perspective, the first images of the Euclid satellite have recently made the headlines of the public press. The cosmologists at the IPhT are deeply involved in the Euclid Consortium with one of our researchers being the deputy coordinator. The diversity of our activities in particle physics is showcased by new thermodynamic studies of the quark-gluon plasma and a new proposal for a combined solution to the hierarchy and strong CP problems. Finally, the newly-hired team working on quantum information has made breakthroughs in quantum key distributions. Of course, this selection omits several other major achievements conducted in our Institute over the past few years.

Even though the primordial aim of the Institute is to conduct first-grade international research, several other aspects are essential in building a complete framework. The remaining set of highlights are therefore meant to illustrate how the IPhT is involved in scientific activities beyond research.

Even though the Institute is part of the Paris-Saclay University, its staff is employed either by the CEA or by the CNRS, with a primary goal to conduct research. Several members of the Institute nonetheless take part in teaching at nearby Universities and Grandes Écoles (e.g. the Paris-Saclay University, the École Polytechnique or the École Normale Supérieure). The institute's researchers have given more than a hundred university courses (the majority at Master level) over the past 6 years. This extends to teaching in foreign Universities and international schools. One specificity of the Institute (see the corresponding highlight) is also the local organization of master/PhD-level courses. For example, 24 courses were given at IPhT over the reporting period. In a similar spirit, the upgrade of our seminar room has allowed for the recording of many events, including the lectures, colloquia and some seminars. These videos, together with short recordings of various events in the Institute, feed the IPhT-TV YouTube channel, which we also consider as a positive recent local development in terms of teaching and outreach.

In a further effort to participate in scientific collaborations and knowledge dissemination, the IPht has aslo helped organize (and sometimes funded) more than 100 national and international conferences over the past 6 years. Of these, two representative examples have been selected as highlights in this portfolio. The series of 6 conferences on "black-hole microstructure" was born from the COVID-19 era to bring together different communities. The tradition of "Itzykson meetings", started in 1996, is still running. Five more conferences on various themes connected with Claude Itzykson's research interest have been organized since 2018.

Finally, activities with a more social orientation are contributing to the overall quality of the Institute's environment. This of course includes occasional retreats gathering staff, postdocs, students and support staff for a few days of discussions of scientific and non-scientific news. It also includes regular general assemblies and traditional social events. Over the reporting period, one of these events was definitely worth mentioning as a highlight, namely the 60th anniversary of the Institute. For this occasion, a two-day conference covering the history of the Institute has been organized.

In summary, this portfolio is aimed at showing that the IPhT is able to provide first-class research in many domains of theoretical physics, maintaining his historical activities and opening to new fields and topics, and that it also puts significant efforts in providing a lively environment in which this research can be comfortable performed.

3- SELF-ASSESSMENT DOCUMENT

3-1 Self-evaluation of the unit

Evaluation area 1: Profile, Resources and Organization of the Unit

Standard 1. The unit has set itself relevant scientific objectives.

The main mission of IPhT is to develop research programs at the highest international level in physics and all its interfaces, in particular with mathematics, computer science and biology. The IPhT covers a large fraction of the spectrum of modern theoretical physics and this thematic spread makes it cross disciplinary. By pushing the boundaries of knowledge in fundamental physics, the institute contributes to the missions of DRF and CNRS Physique. In 2019, the previous Hcéres report stressed the quality of the research carried out *at* IPhT[1] and a central objective has been to keep this high scientific level by providing the researchers a favorable local ecosystem and by paying particular attention to recruitments. Another important aspect of our activity is the dissemination of knowledge and the sharing of our expertise. Not only to the academic world (researchers, students), but also beyond (outreach, etc.). This goes hand in hand with maintaining a high level of visibility for the institute, both nationally and internationally through publications of all kinds, teaching, participation and organization of schools, conferences, training students, hosting researchers,...

The Saclay plateau, where our institute is located, and more generally the île de France region offer an outstanding scientific environment. With numerous universities and institutes, numerous experimental and theoretical laboratories, IPhT is at the heart of a large and active physics (and maths) community. As detailed in Sec. 5 of chapter 1, the institute is tightly connected to the local and national ecosystems, and this is an essential ingredient to develop high-level research activities.

IPhT has been able to adopt several scientific directions encouraged by CEA and CNRS and has been able to seize the associated opportunities. We can in particular mention the strong impulse given to the field of quantum information and quantum technologies, with the recruitment of two permanent researchers in quantum communications and quantum computation (more details in section 3-2/croup C, page 32).

Finally yet importantly, one of the laboratory's objectives is to be proactive in responding to calls for tender from national and European funding agencies, within the Institute's scientific perimeter. The list of external funding received at IPhT in the recent years shows that the researchers of the institute has been quite successful on this point. The example of the ERC is particularly striking, with 6 projects which started during the evaluation period.[2]

Covid 19 pandemic — The pandemic and the confinements had a significant impact on the laboratory's activity.[3] Access to the building was impossible for a period of about two months, but partial restrictions on access, as well as restrictions on travel, lasted considerably longer. To mitigate the impact, the institute could provide relatively quickly, from spring 2020, some hardware tools (laptops, particularly for the support team, monitors, etc.) and software (video conferencing, instant messaging, …[4]) for teleworking. But conferences and face-to-face discussions (often in front of a blackboard) with colleagues and collaborators are very important components of the activity of physicists and theorists in particular. The impossibility of travelling, of inviting collaborators, and the cancellation of numerous scientific events penalized the scientific activity. But it is clearly the doctoral students (especially those at the beginning of their thesis) and postdocs who have been the most affected in their work. Although the measures taken by the CEA and the University of Paris-Saclay to extend their thesis periods (generally by a few months) have enabled some of them to make up for lost time, the fact remains that the 2020–2021 period has been particularly difficult for our youngest colleagues.

Standard 2. The unit has resources adapted to its activity profile and research environment and mobilizes them.

Resources — The total budget of the unit is of the order of 9M€ per year, including the salaries of the permanent researchers (CEA and CNRS). These salaries weigh a bit more than 6M€.[5] The CEA and CNRS endowments cover a bit more than this payroll. The rest of the income of the institute originates from research contracts (Europe,

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[1] Original statement in French : *La qualité des recherches menées par l'IPhT est remarquable. La seule recommandation que l'on puisse faire est de continuer dans cette direction*.
[2] Stringlandscape (M. Graña), QBH Structure (N. Warner), ReNewQuantum (B. Eynard), QGBoot (E. Perlmutter), Ampl2Einstein (D. Kosower), TopoRosetta (B. Wieder)
[3] See for instance the plot representing the number of publications per year, page 29.
[4] See also the paragraph on open source software, page 25.
[5] The total salaries for permanent CEA and CNRS employees in 2023 amounts to 6162k€.

ANR, LabEx, …).[1] In terms of financial volume, this has been largely dominated by European funding, and ERC projects in particular.[2] On the administrative side, it should be emphasized that the importance of external funding goes hand in hand with a heavy workload for both the support and the direction team. This includes for instance the contractualization tasks, the recruitment process and the associated human-resources (and sometimes legal) questions, financial reporting, etc. It is important to stress that this workload is currently close to the limit of what the institute's support team can handle. Due to the small size of the support team, the institute relies on the expertise of the DRF/IRAMIS administrative group for management control and that of the DRF management for human resources.

Compared with other laboratories or institutes with similar profiles worldwide, however, the financial resources available to the IPhT are not particularly high. There are several areas in which our activity is probably not at full potential because it is limited by the availability of funding. These include, for example, the number of PhD students (every year there are high-quality thesis projects that cannot be carried out because of a lack of funding), invitations of foreign researchers or the funding of starter packages for new recruits.

Redistributing — The research contracts not only allow specific research projects to be funded, but also provide some funding for the Institute through the overhead mechanism. Some contracts, and ERC projects in particular, also allow to recover some fraction of the salary of the PI.[3] This resource (about 800k€ in 2023), has been used by the direction for the functioning of the institute. This includes, for instance, travel expenses or computer equipment for researchers without research contracts, subsidies for the organization of conferences, internships and starter packages for new staff members. Over the evaluation period this has also allowed to fund 4 PhD thesis and 9 postdocs contracts. These recruitments have been used as tools of scientific policy to support or develop certain themes.

Scientific infrastructures and premises — The IT system is an important infrastructure in a theoretical physics laboratory and we regularly invest in its modernization, of the order of 15k€ per year on average. This includes for instance audiovisual equipment, data storage equipment (shared with LSCE) or the computing cluster of the institute. Regarding the premises, we launched in 2023 an important renovation project for the library and the coffee room. The goal of this project is two-fold. First, this will free some space that was used by paper journals that are available online and not consulted anymore. This space will be used to create two offices and a meeting room. Second, we will create an attractive common space, connected to the coffee room, for scientific discussions or social events.

Documentary resources — The institute has online access to a large number of physics journals thanks to the subscriptions from CEA and CNRS Physique. We also have a few own subscriptions at the level of the laboratory, including a few paper subscriptions (ex: Nature or Nature Physics). We however note some difficulties to access some journals in mathematics for which the CEA has less subscriptions than in physics. On the CNRS side the access are those provided by CNRS Physique (we unfortunately do not have access to those of CNRS Mathématiques). We have frequent interactions with Le Service d'Appui à la Recherche et à l'Information Scientifique (SARIS) of the CEA concerning subscriptions to scientific journals, in particular when there are commercial negotiations with publishers. With regard to paper journals, the laboratory has a large collection dating back to the 50s. In 2023, we have eliminated some of the journals that are easily available online. But, in the basement of the library, we will still have around 450 linear meters of journals that are either difficult/impossible to fine online or which have some historical interest.[4]

Standard 3. The unit's functioning complies with the rules and directives defined by its supervisors on human resources management, safety, environment, ethical protocols and data as well as scientific heritage protection.

Human resource management — In terms of recruitment and career management, we benefit on the CEA side from the support and experience of the DRF human resources department, which provides a solid framework of procedures and rules. The fact that the IPhT is directly attached to the DRF puts our laboratory in a privileged position, enabling us to exchange regularly with the head of DRF's human resources on subjects such as recruitment and career development. As mentioned above, we rely on the expertise of the DRF for all your specialized human resources management questions.

The annual interview between the IPhT director and researchers has gradually been made more frequent, moving from an interview at the employee's request, typically every few years, to one that now takes place every year (at least for CEA researchers). These annual meetings between each researcher and the head of the institute is part of our answer to one recommendation formulated by the previous Hcéres committee (see

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page 16). The interview is an opportunity to discuss the researcher's career development, as well as the laboratory's scientific strategy and organization. For PhD students an annual interview takes place each year with the scientific deputy director. For postdocs, the annual interview takes place with the scientific supervisor (not necessarily every year).

On the CNRS side the recruitments and career management of permanent researchers are handled very differently. Recruitment is carried out via national competitions, and individual evaluations are managed by CoNRS. Exchanges with the INP (now CNRS Physique) and in particular with the Directeur Scientifique Adjoint (DAS) in charge of IPhT, which begin each year with the unit director's message in the DIALOG application, have always ensured consistency between CNRS recruitment and the IPhT's scientific priorities.

Postdocs and PhD students — The vast majority of the fixed-term contracts of peopled employed by IPhT (essentially postdocs and PhD students) are CEA contracts and not CNRS ones. This is simply due to the fact that most external funding is currently managed by the CEA. As an example, of all the PhD students recruited by the IPhT over the evaluation period, only two have CNRS contracts. Almost all the others are either employed by the CEA or by a university or a Grande École. The same is same is true for postdocs, who are almost all employed by CEA.

Gender equality — Theoretical physics is among the least balanced disciplines. With 7 women among the 50 permanent researchers (14%) the IPhT is also very far from parity. Among doctoral students, the percentage over the evaluation period is comparable,[1] but it is even lower for postdocs. This percentage is comparable with that of women candidates in the CNRS recruitment concourse for section 02, which was 12% in 2019.[2] We are aware of our responsibility, as recruiters, to improve this situation and we pay particular attention to applications from female researchers. Women represented 11.5% of the short-listed candidate, and a comparable percentage of the total number of candidates. Unfortunately, this has not resulted in the hiring of any women on a permanent CEA position over the evaluation period. To finish on a positive note, since January 2022, the Institute has been headed by a woman, for the first time.

Prevention of psycho-social risks (PSR) and quality of life at work (QLW) — These topics have become increasingly important in recent years. We are benefiting from a number of CEA initiatives: a team of PSR referents at the Paris-Saclay CEA center, periodic psychosocial risk evaluation surveys (conducted at the IPhT in 2017 and 2024) by the center's quality, safety and environment unit (CQSE), e-learning training for all employees on the prevention of psychosocial risks (in 2023), or a campaign conducted at the DRF in 2022 to share and promote the best practices in terms of QLW. We have also been active at the local level. Among the initiatives taken at the IPhT we can mention several actions in favor of conviviality within the institute:

- seminar organized by and for students and postdocs, with pizzas offered by the institute
- regular "wine-and-cheese-like" tastings of local products (to which our colleagues and neighbours from SPEC are invited),
- popularization seminars, aimed in particular at the support team, during which researchers from the institute explain certain research topics in a way that is accessible to non-scientists,
- or a 3-day residential seminar with all laboratory members, including the support team, postdocs and students (in L'Isle sur la Sorgue in 2018 and in Autrans, Vercors, in 2022).

Last but not least, the laboratory has set up in 2022 an independent unit (without any member of the direction) to prevent sexist and sexual violence. One of its concrete actions has been the dissemination of prevention messages. Some members of this unit are also members of the network of "référents parités" created by INP of CNRS in 2023.

Safety — As a theoretical laboratory, we are subject (only) to the risks associated with a tertiary activity. This includes in particular threats to the IT system. One engineer of the computer team is in charge of IT security and he interacts regularly with the CEA and CNRS information systems security departments. In fact, the laboratory takes advantage of both networks: the potentially sensitive RH and financial information are on the highly secured CEA INTRA network, whereas the researchers' workstation are on the more open CNRS network. Security is also a key focus of attention in the project to migrate our website to a new platform (scheduled for 2024). The CEA has a strong safety culture and we benefit from this expertise. The set of CEA safety procedures for dealing with maintenance and renovation works in the building are very complete and on this matter we are in constant relation with the 'chef d'installation',[3] his deputy as well as the 'Ingénieur Sécurité d'Installation'. With regard to fire safety, the project to refurbish and renovate the library and the coffee room includes a number of points aimed at improving safety (additional fire-stop elements and a significant reduction in the amount of paper stored).

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[1] Out of 8 to 10 new PhD students arriving each year, on average the laboratory has welcomed a bit more than one new female PhD student every year (with some fluctuations: 3 in 2018, but 0 in 2022).

[2] rapports-du-comite-national.cnrs.fr/rapport_conjoncture_2019/section-02-theories-physiques%E2%80%89-methodes-modeles-et-applications

[3] This "installation" comprises the SPEC and IPhT buildings. Its head, who is also SPEC's director, is in charge of ensuring that all employees and outside contractors working in the building comply with safety regulations.

Environment— A "CEA Sustainable Development Action Plan" was launched in 2017, asking us in particular to give preference to rail over air on destinations where the two modes of transport are in competition. Examples of concrete measures taken recently at the level of the CEA Saclay center was the reduction of the temperature at which buildings are heated and a closer monitoring of electricity consumption. The IPhT is also thinking about integrating these issues into its own strategy and organization, but we have not yet drawn up a charter on the subject. A carbon footprint audit (based on the tool developed by labo 1.5[1]) is scheduled for 2024.

Synthetic self-evaluation

The primary mission of the Institut de Physique Théorique is to advance the frontier of knowledge in physics and at its interfaces, and to transmit this knowledge. The laboratory's reputation in this field goes back to the quantum mechanics lectures given by A. Messiah on the Saclay plateau in the 1960s, through to the numerous scientific monographs that have accompanied several generations of students in their learning of this discipline. Today, the IPhT advances and disseminates knowledge through its numerous publications (peer-reviewed journals, monographs, …), through the visibility and excellence of its researchers, and through a series of courses covering the entire spectrum of theoretical physics (see the Portfolio). The laboratory's location within the Université Paris-Saclay and its productive interface with its two supervisory bodies, the CEA and the CNRS, make research enjoyable and the scientific environment conducive to creativity. Particular attention has been paid to the scientific freedom of the researchers and to quality of life at work, as well as to Human Resources (HR), ethical protocols, safety and energy efficiency. An anti-harassment cell has been set up, and the laboratory has a scientific integrity correspondent and safety officers. The "living together" of the laboratory has been enhanced by joint activities, some of them festive and some more formal, such as the creation of a working group where we propose to explore together a research topic of common interest.

The funding of the laboratory's operations, is currently supported by our success at European calls, at the ANR and at national and European quantum programs. This success is double-edged, however, as the bar is set high for obtaining these prestigious grants. There are also inevitable and significant fluctuations in the number of new financing contracts signed each year. We are therefore considering opening up to sponsorship to breathe some life into our operating structure. We also note a risk of aging among the laboratory's researchers, with some retirements at CEA being postponed beyond normal standards. We have also observed a number of departures of very bright researchers in the middle of their careers, attracted by positions in prestigious places, in France or abroad. In recent years, these departures have been partly offset by the recruitment of young researchers of the highest international caliber.

Evaluation area 2. Attractiveness

Standard 1. The unit has an attractive scientific reputation and contributes to the construction of the European research area.

Over the years the IPhT has built up a solid scientific reputation both nationally and internationally. This is the result of the high level of the scientific production, but it is also the consequence of the large number of collaborations in which the IPhT is involved and the numerous dissemination activities (conferences, teaching, etc.). The visibility of the institute's researchers is reflected in a number of different areas.[2] For example, over the 6 years of the evaluation period, we count more than 450 oral presentations in conferences, workshops or schools by permanent members of the institute (much more if we also count presentations by postdocs and PhD students). The vast majority of these contributions are invitations to international events. We should also stress an important activity in the organization of scientific events, with more than 120 conferences, schools or workshops organized or co-organized by IPhT members over the evaluation period. The institute also partially funds between 5 and 10 such events each year. Concerning outreach and communication toward the general public the number of conferences or TV and radio interviews in media is above 45 for the 2018-2023 period.

Another concrete indicator of the visibility and influence of the institute in the physics community is the number of participations in selection committees, evaluation committees and scientific committees. There were over 90 such participations (not counting participation to thesis jurys nor the committees associated to the organization of conferences).

Finally, we wish to mention awards and distinctions. There has been 13 such distinctions awarded to IPhT members during the 6 years of the evaluation period. These include in particular a Galileo Galileo medal awarded by the Italian National institute for Nuclear Physics (INFN), a Jean-Ricard and two Langevin prizes of the Sociéte Française de Physique, a bronze medal of CNRS, a medal and a Claude-Berthault prize of the Académie des Sciences, and an election to the American academy of Arts and Sciences.

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[1] apps.labos1point5.org/ges-1point5
[2] Most of the data mentioned here are detailed in the spread sheet `tableau_donnees_caracterisation_production.xlsx`

Standard 2. The unit is attractive for the quality of its staff hosting policy.

New collaborators — The laboratory organizes each Fall a half-day session for newcomers, PhD students and postdocs in particular, where they can present themselves briefly to the rest of the laboratory. Practical information is provided in a welcome booklet, as well as along the year at the occasion of general laboratory meeting. Generally speaking, one should praise the availability of the support team, who does its utmost to guide newcomers and answer their questions. On the administrative side, each CEA recruitment on a permanent position is accompanied by an interview with a member of the human resource department, during which some general information is provided on the CEA, on the employment contract and social security. Some administrative help is also provided to foreigners by the International Welcome Desk, part of the Department for European and International Affairs of the Université Paris-Saclay.[1] Despite these various measures, it can happen that some new foreign employees encounter difficulties - generally administrative - when settling in France. For this reason, we would like to improve the support we provide, even if the human resources available to do so in the institute are limited.

On the scientific side, IPhT could offer several new CEA and CNRS researchers a starter package enabling them to finance the hiring of a postdoc or a PhD student, to start building up a small team. This represents an important financial effort for the institute but it is an important ingredient in the attractiveness of a laboratory that aims to recruit the best young theoreticians. Such packages, which typically include a thesis fellowship or two years of support for a post-doctoral fellowship, are financed by overheads from external funding and are therefore subject to fluctuations over time. Thus, not *all* young recruits can systematically benefit from them, although this is an important factor in the attractiveness of the laboratory, which competes on the job market with other theoretical physics institutes around the world.

Visitors — Visiting other laboratories to exchange ideas and pursue or initiate collaborations is an important component of work in theoretical physics, and probably more so than in the experimental sciences. IPhT has therefore a long experience in welcoming numerous scientists each year. This activity contributes to the international visibility of the institute and some significant resources are dedicated to it. Each group (A, B, C) has a budget dedicated to such invitations, of the order of 70k€ per year and per group. To this must be added the invitations financed as part of the scientific projects (ANR, ERC, …) themselves. To this must also be added the funds received from the CNRS-INP to support long-term invitations, which are typically of the order of 2-3 months in total each year. We count of the order of one hundred visits per year, either for short (a few days) or longer stays (a few months). On the practical side the support team provides our guests some help find housing, for the reimbursements of their local expenses, etc.

Scientific integrity (SI) — Since 2023, one member of IPhT participates in the SI correspondent network of CEA. Information on this issue is regularly distributed to laboratory members, such as certain OFIS bulletins[2] and the European Code of Conduct for SI.[3] Additional details can be found page 29 (evaluation area 3/Standard 3).

Open Science & Publications — The institute promotes publication in open access journals and discourages the payment of publication fees. With rare exceptions, access to our publications is available via arXiv and HAL. This policy is in line with CEA and CNRS guidelines, as well as with the guidelines in favor of open science issued by funding agencies such as ANR or Europe. As a very concrete example of our commitment to Open Science, a significant number of IPhT researchers regularly publish in the journals of the SciPost Foundation (about 50 papers during the evaluation period). This is an example of a virtuous publication model (genuine/diamond open access, publication costs financed by academic sponsors, author retains copyright, etc.). The IPhT also made an association with SciPost for the publication of the lecture notes of IPhT courses (see in the portfolio the highlight on IPhT courses).

Open Science & Data — Our current involvement in open data remains relatively modest, mainly because many research topics in theoretical physics do not involve large amounts of data or large codes. However, the various issues related to data management (FAIR [Findable, Accessible, Interoperable, Reusable] practices, etc.) will play an increasing role in the future, and the IPhT will closely follow the work of the CEA working group Data4science, which is dedicated to the processing of scientific and technical data.

Open Source — The institute is committed to promoting the use of open source software at various levels. A large number of workstations and administrative servers, not to mention our computer cluster, run on the Linux operating system and host associated open source software suites. Speaking of collaborative open source software, our IT team, in collaboration with that of LSCE, has set up a number of platforms:

- a BigBlueButton (BBB) server for video conferencing,
- an OBS Studio server for video streaming and recording of lectures and seminars,
- a MatterMost server for instant messaging,

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[1] www.universite-paris-saclay.fr/en/campus-life/international-welcome-desk
[2] www.ofis-france.fr/veille-scientifique
[3] www.ofis-france.fr/edition-revisee-2023-du-code-de-conduite-europeen-pour-lintegrite-scientifique

- and an OwnCloud server for file storage and sharing.

We are also actively working with a developer from CEA's DRF to replace the old software running the IPhT website with a modern open source content management system. At the level of promoting open source software, some initiatives have been taken to introduce IPhT researchers to the use of open source computational software (e.g. SymPy/NumPy/SciPy, SageMath), with the aim of reducing the need for (expensive) commercial alternatives. Finally, researchers often release their scientific codes (simulations, etc.) with open source copyrights to make them available to the wider scientific community.

Standard 3. The unit is attractive because of the recognition gained through its success in competitive calls for projects.

Project-based research funding has become increasingly important in France over the last 15-20 years, and from the outset IPhT researchers have taken full advantage of the opportunities offered by this evolution. This has continued over the past 6 years and a large number of projects have been funded by the ANR, by LabEx's or by Europe, to mention only the most important sources of funding for the institute (complete list provided in the spreadsheet).

Eleven ERC projects[1] have been led by IPhT physicists during the evaluation period (including some that started before 2018) and 6 new projected started during this period. Relative to the size of the laboratory these figures are important. These projects provided significant resources to IPhT and enabled the creation of highly dynamic teams. Having a regular flow of new funded projects is of great importance for the functioning and for the visibility of the institute and the direction of IPhT strongly encourages researchers to apply for external funding, particularly from the ERC. In the recent years, this is a point that has been systematically discussed during job interviews with candidates for permanent CEA positions. At the practical level the direction and the administrative teams of the institute provide some help for setting up the administrative and financial aspects of the proposals. The DRF of the CEA and the University of Paris-Saclay also provides invaluable assistance with ERC applications. On a more scientific level, IPhT has a large pool of researchers who have already won ERC funding and they frequently help new applicants.

As presented earlier in this chapter (section Evaluation area 1/ Standard 2, page 20) the financial resources made available to the institute through the project overheads (as well as part of the PI's salary in the case of ERCs) have enabled numerous actions that benefit all members of the laboratory, including the financing of starter packages for newly recruited researchers and several postdoctoral contracts (so called "group postdocs").

Concerning national investment programs ("Investissements d'Avenir" of the French government), the laboratory has benefited from regular support from three LabEx: LMH (mathematics), P2IO (high-energy physics and cosmology) and PALM (statistical physics and condensed matter). About 30 projects have been funded by these 3 LabEx over the evaluation period. These LabEx operated in the Paris-Saclay area and their local character made them quite efficient and complementary to national (or international) ones.

Standard 4. The unit is attractive for the quality of its major equipment and technological skills.

As a theory laboratory, the IPhT has of course no technical platforms or equipment apart from computers. The IT systems contains multiple servers (storage, gateway, hypervisor, website, …) and a computing cluster with about 1000 CPU cores. Two IT engineers, who are part of a common team shared between DRF/LSCE and IPhT, ensure the computer system's operation and security, and design certain technical upgrades. For computations that exceed the capabilities of our local cluster, we also have access to the *Topaze* supercomputer (>100.000 cores) on the Centre de Calcul Recherche et Technologie (CCRT), which is one component of the computing center of CEA (TGCC in Bruyères le Châtel). One of the specificities of our unit is that the researchers' workstations are on a CNRS network and not on a CEA network. This offers certain flexibility in terms of access and exchanges with the academic world.

The technical equipment of the laboratory also includes a seminar room which has been renovated. It is equipped with a modern audio and video capture system which allows to organize hybrid meetings and seminars and to record and/or stream them. The laboratory also benefits from the Bloch amphitheatre (150 seats) for the organization of conferences or meetings requiring more seats. This room is shared with the neighbouring SPEC laboratory as well as with the DRF units of Saclay in general. IPhT has also modernized the audio and video equipment in the amphitheatre but the room would deserve an in depth renovation.

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[1] preQFT (J.-J. Carrasco), NuQFT (H. Saleur), Champagne (C. Pépin), Emergent-BH (M. Guica), Smile (L. Zdeborova), Stringlandscape (M. Graña), QBH Structure (N. Warner), ReNewQuantum (B. Eynard), QGBoot (E. Perlmutter), Ampl2Einstein (D. kosower), TopoRosetta (B. Wieder)

Synthetic self-evaluation

The IPhT's attractiveness is based primarily on one of its greatest assets: the quality of its scientific output. This is evidenced by the many physics prizes it has won, and by its success in obtaining European as well as national funding. Of particular note is the high success rate in obtaining ERC grants, underlining our participation and high profile in the *Excellent science* pillar of the H2020 and Horizon Europe programs. The multi-cultural aspect of the laboratory also contributes to its performance with the European research area. Indeed, IPhT's permanent researchers come from a wide range of nationalities, but all have a European focus, creating a strong network of interactions and collaborations with European universities. In addition, many of the laboratory's researchers sit on evaluation committees for funding or prizes, contributing to the Institute's visibility. This success and visibility ensure the laboratory's attractiveness, particularly to the younger generation of physicists. The IPhT also benefits from a remarkable scientific environment within the Université Paris-Saclay, which makes it a welcoming place for foreign visitors and young scientists alike. The IPhT's support team is dedicated, efficient and supportive of research. We benefit from beautiful, pleasant heritage facilities that encourage discussion and interaction between researchers at the blackboard and over a cup of coffee. Renovation of these facilities is scheduled for 2024.

In terms of weaknesses, we have had some difficulty in providing sufficient support in administrative procedures for our recently recruited foreign collaborators (students, postdocs, visitors and also permanent researchers). These difficulties - which are not entirely of our own making, but reflect national anxiety about welcoming foreigners - are visible at every level of reception, such as obtaining residence permits, understanding the peculiarities of the French tax system, welcoming families, etc. Our interaction with the Université Paris-Saclay needs to intensify so that we can become more efficient in this area. Particular attention will be paid to this difficulty in future years.

Evaluation area 3. Scientific production

Standard 1. The scientific production of the unit meets quality criteria.

The scientific production of IPhT spans essentially all fields of physics and in each of them the researchers of the Institute have contributed in an original way to the newest advancements. Despite this remarkable diversity in the research topics, the last six years of research activity can be viewed under a certain number of grand-directions which have been taken across the different research groups and subgroups.

Developing and understanding general constraints on and from physical theories — One of these research directions, which is very methodological in nature but has led to a set of beautiful fundamental results, aims at understanding the general structure of fundamental physical theories *using non-perturbative constraints coming from the properties of the theories themselves*. A first concrete incarnation of this idea is in the bootstrap approach to CFTs which aims at understanding the structure of such theories via the constraints imposed to four-point correlations functions by crossing symmetry. This way of thinking has led to a remarkable set of new results among which new advancements in the understanding of the structure of critical two-dimensional Potts models[1] (which is central to statistical field theory).

The same type of general idea has been applied by researchers of IPhT to classify string theories and the structure of their vacua. This is a very important subject due to its relation with the swampland conjectures which aim at constraining low-energy theories which can be coupled to quantum gravity.[2] Furthermore, central problems in high-energy physics, such as the naturalness of the Standard Model (SM) parameters, the unexplained observation of matter-antimatter asymmetry and the cosmological constant problem are currently addressed with the same line of reasoning by constraining SM extensions via physical first-principles requirements relying on causality, unitarity and crossing symmetry of scattering amplitudes.[3]

Finally, besides studying the effects of non-perturbative constraints on physical theories, researchers have also worked on the space of solutions to such constraints to understand their general structure. In order to clarify this point they have come up with exactly soluble non-trivial models of theories obeying bootstrap-like constraints. A remarkable example is the one of the spectrum of differential operators on hyperbolic manifolds.[4] The last way to constrain the structure of fundamental physical theories is by using techniques that can be very powerful

[1] *Global symmetry and conformal bootstrap in the two-dimensional O(n) model*, L. Grans-Samuelsson, R. Nivesvivat, J.-L. Jacobsen, S. Ribault, H. Saleur, SciPost Phys. 12, 147 (2022)
[2] *Exploring the landscape of heterotic strings on T^d*, A. Font *et al.*, JHEP 194 (2020)
[3] *Positive moments for scattering amplitudes*, B. Bellazzini *et al.*, Phys. Rev. D 104 036006 (2021)
[4] *Spectral Bounds on Hyperbolic 3-Manifolds: Associativity and the Trace Formula*, J. Bonifacio, D. Mazáč, S. Pal, arxiv:2308.11174

in special but paradigmatic models. Such approaches rely on integrability, scattering amplitudes, random matrices, combinatorial structures to study problems from strongly coupled field theories to random geometries and their relation to quantum gravity.

Constraining the structure of physical theories is only one side of the coin. A complementary activity of the IPhT researchers has tried to constrain the outcomes of experiments via advanced theoretical computations. This approach is extremely important to guide experimental research and assess experimental results. Important results in this research direction have been obtained in the context of the physics of gravitational waves where the four-momentum radiated by binary systems, which is crucial for the analysis of LIGO/Virgo and future LISA data, was computed at leading order in the post-Minkowskian expansion,[1] including tidal and spin effects.

Search for new fundamental laws of nature — While understanding the structure of current fundamental theories is an essential task, at the same time researchers at IPhT have been very active to propose new physical principles or fundamental laws to resolve some of the puzzles which arise in our fundamental understanding of several physical phenomena. In high-energy physics a new mechanism for a solution of the strong-CP and electroweak-hierarchy problem, called Sliding Naturalness, has been proposed.[2] At the same time, a natural explanation for the magnitude of the cosmological constant has been formulated via concepts rooted in string theory.[3] High-temperature superconducting phases are still not understood and typically emerge below a so-called strange metal phase. It has been recently proposed that this can also emerge from incoherent bosonic excitations.[4]

Out-of-equilibrium physics, disorder and complexity — Symmetry and equilibrium concepts are organizing principles of fundamental high-energy/space-time theories. However when it comes to low energies, such principles may be not enough. In many condensed matter systems and beyond, symmetry and equilibrium are rather the exception than the rule. Physical systems are indeed either out-of-equilibrium and/or very heterogeneous. The study of out-of-equilibrium systems, both classical and quantum, is at the heart of the major advancements by researchers at the IPhT. In this regard, a remarkable result has been obtained recently by solving explicitly non-trivial instances of the so-called Macroscopic Fluctuation Theory[5] which is a powerful generalization of equilibrium statistical mechanics concepts in contexts out-of-equilibrium. At the same time a first principle theory of glasses and amorphous materials has been developed from the exactly soluble limit of infinite spatial dimensions.[6] Amorphous systems are not only interesting per se but are also paradigmatic examples of complex systems characterized by metastability, intermittency and jerky behavior under perturbations. Driven quantum systems are also the subject of an intense research activity due to the centrality with quantum-information experimental setups. The theoretical study of many-body phases of driven quantum systems has been recently performed in the context of spin models.[7] Finally out-of-equilibrium concepts have been developed to describe transient processes in heavy-ion collisions and quark gluon plasma.

Fundamental problems in interdisciplinary applications of theoretical physics — The development of interdisciplinary concepts and tools of theoretical physics has been a major trend in the research activity worldwide. The IPhT is certainly not an exception. A group of researchers at the Institute has borrowed tools, concepts and methods to study fundamental problems emerging in the fields of optimization, computer science, machine learning and neural networks. Notable results have been obtained in the study of optimal transport problems via statistical physics. This has lead to the introduction of novel algorithmic strategies.[8] At the same time, concepts of out-of-equilibrium physics and disordered systems have been employed to develop a theory about how optimization algorithms that are currently employed in machine learning, such as stochastic gradient descent, explore the high-dimensional loss landscape used to train artificial neural networks.[9]

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[1] *Radiated momentum in the Post-Minkowskian worldline approach via reverse unitarity*, M. M. Riva, F. Vernizzi, JHEP 228 (2021)
[2] *Sliding Naturalness: New Solution to the Strong-CP and Electroweak-Hierarchy Problems*, R. T. D'Agnolo and D. Teresi, Phys. Rev. Lett. 128 021803 (2022). Featured in Physics.
[3] *Bare-Bones de Sitter vacua*, I. Bena, E. Dudas, M. Graña, G. Lo Monaco, D. Toulikas, Phys. Rev. D 108, L021901 (2023)
[4] *Strange Metals from incoherent bosons*, A. Banerjee, M. Grandadam, H. Freire, C. Pépin, Phys. Rev. B, 104 (5) 054513 (2021)
[5] *Exact solution of the Macroscopic Fluctuation Theory for the symmetric exclusion process*, K. Mallick, H. Moriya, T. Sasamoto, Phys. Rev. Lett. 129, 040601 (2022)
[6] *Theory of Simple Glasses*, G. Parisi, P. Urbani, F. Zamponi, Cambridge University Press, 2020
[7] *Multistability of Driven-Dissipative Quantum Spins*, H. Landa, M. Schiro, G. Misguich, Phys. Rev. Lett. 124, 043601 (2020)
[8] *Statistical Physics Approach to the Optimal Transport Problem*, P. Koehl, M. Delarue, H. Orland, Phys. Rev. Lett. 123, 040603 (2019)
[9] *Dynamical mean-field theory for stochastic gradient descent in Gaussian mixture classification*, F. Mignacco, F. Krzakala, P. Urbani, L. Zdeborova, Adv. in Neural Information Processing Systems 33 (NeurIPS 2020)

Standard 2. Scientific production is proportionate to the research potential of the unit and shared out between its personnel.

Volume of publications — The core of the IPhT's scientific output consists of articles in international peer-reviewed journals. The number of such publications is 1073 for the evaluation period (see the associated spreadsheet). If we also include proceedings, conference communications, books, book chapters and thesis, the number of publications exceeds 200 items (registered in HAL) per year. Moreover, about 50% (~520 out of 1073) of all publications in peer-reviewed journals are articles in high-quality journals with an impact factor of over 5. The table below gives the number of publications in highly visible journals with an impact factor of over 8. The journal with the most articles published (273) is JHEP.

Nb. of papers	Journal (impact factor ≥ 8)
57	Physical Review Letters
6	Physical Review X
6	PNAS
3	Nature
4	Nature Physics
2	Reviews of Modern Physics
2	Physics Reports
2	Nature Communications
1	Nature Reviews Physics
1	Science Advances
1	Nano Letters
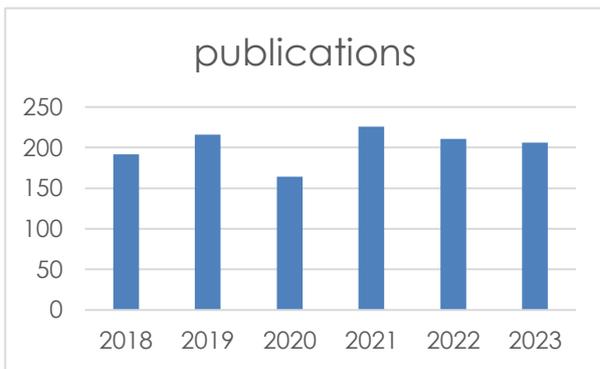
Top: Number of publications per year over the evaluation period (peer-reviewed journal articles, proceedings, conference communications, thesis and HDR, books and book chapters). The mean is slightly above 200 items per year. The effect of the pandemic is visible in 2020. Right: Number of publications in journals *with impact factor above 8.*
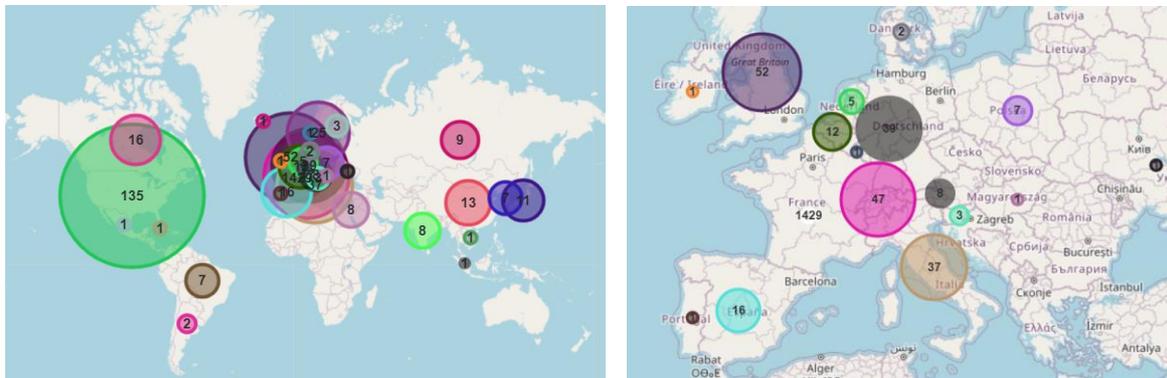
Number of international co-publications worldwide (left) and a zoom on Europe (right).

Even if this is a somewhat superficial way of measuring scientific output, we can indicate that the number of publications (in peer-reviewed journals) appears to be relatively well balanced between the 3 groups: group A: 385, group B: 384, group C: 334 (the sum exceeds the total number of publications thanks to the publications involving authors from two different groups). Even though the laboratory is organized in three groups there are no barriers preventing collaborations between people from different groups. We count 32 papers involving authors from two different groups. The number journal articles signed by (at least) one PhD student is 172 (with 39 theses defended between 2018 and 2023). The number of (peer-reviewed journals) publications signed by at least *two permanent researchers* of IPhT is about 100. The number of publications that are not signed by any permanent member but only by doctoral students and post-doctoral fellows (or possibly by long-term visitors) is around 260. This represents more than 20% of all the unit's publications, and reflects a certain scientific autonomy of the unit's young researchers. An important point for the direction of the IPhT is the help given to less active researchers. As a concrete and positive result of our initiatives, two researchers who had a low publication rate were recently able to engage in new collaborations and sign several articles and preprints with colleagues from the institute.

Standard 3. The scientific production of the unit respects the principles of scientific integrity, ethics and open science. It complies with the applicable guidelines in this field.

Scientific integrity — The CEA has set up a scientific integrity (SI) committee, and a network of SI correspondents ("Correspondants intégrité scientifique", or CORIS). These correspondents act as relays in their units to ensure the implementation of the CEA's policy on SI. They can receive reports of breaches of SI and answer questions concerning any situation that might fall into this category. They take part in awareness-raising and training initiatives. There is a joint CORIS for the LSCE and the IPhT. Since the beginning of 2023, an IPhT member holds this position (it was previously a researcher from LSCE). IPhT has not referred any such cases to the correspondent in the last 6 years.

Open science — The community of researchers in theoretical physics was one of the very first to adopt the use of preprint repositories in the 90s (arXiv in particular) and the IPhT is of course no exception. Essentially all of the work done at the IPhT is posted there and is therefore freely accessible, generally before publication in a journal. We now also systematically put our scientific production on HAL. More details on the open science policy of the IPhT can be found above in the in the section "Area 2/Standard 2" (page 24).

Synthetic self-evaluation

The unit's scientific output is intense and covers most fields of theoretical physics, from string theory to the physics of emergent quantum matter states. The quantity is there: more than 1070 publications in peer-review journals were produced from 2018 to 2023. The unit published about 80 papers in high-impact journals. This may seem low compared to the Institute's thousand publications during this period. It is in the laboratory's tradition not to neglect the more technical papers, which are also the prerogative of certain research fields, and to prioritize the quality requirement of our productions. Researchers' publication rates can also vary widely within the laboratory, with some being more prolific than others. The laboratory tries as far as possible to support each researcher so that each can flourish. We are not aware of problems with scientific integrity. An integrity correspondent is at the disposal of researchers and our hierarchy for all litigious cases.

Evaluation area 4. Contribution of Research Activities to Society

Standard 1. The unit stands out by the quality and quantity of its non-academic interactions.

The activities of the institute are primarily academic. There was no funding of our research activities by private companies during the reporting period.[1]

Standard 2. The unit develops products for the cultural, economic and social world.

Interactions with economic actors — In general, the impact of our research activities to the economic world need to be considered over the very long term. In many cases the new ideas and concepts emerging in theoretical physics first impact other fields of science, themselves closer to applications, before having a possible economic impact.

Indeed, the research carried out at IPhT is on average at (very) low TRL.[2] It however sometimes happens that a scientific result leads to some patent or other form of valorization, but such situation did not occur in the evaluation period.

Culture — In 2023 the laboratory volunteered to get some artistic works by the artist Helène Launois[3] and two of them have been installed in the hall of our building. These two works were produced at the end of her artistic residency at the CEA Paris-Saclay research center and are made from objects (electronic components, etc.) gathered from some laboratories of the Saclay center. Apart from this example, the initiatives toward the cultural and social worlds are encouraged but they are mostly individual initiatives. We can for instance mention the participation of a researcher of IPhT (cosmologist) as an actor (central role) in a play mixing music, theater and science (title: "L'horizon des évènements").

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[1] We however have some contacts with a few companies, see for instance the paragraph Area 4/standard 1 of Group C (page 33).
[2] Technology Readiness Level
[3] www.helenelaunois.com

Standard 3. The team shares its knowledge with the general public and takes part in debates in society.

Quite a few researchers at IPhT are passionate about outreach and knowledge transmission. This has resulted in a large number of presentations, interviews, press articles, etc.

- More than 45 conferences[1] or radio[2] interviews were given by permanent IPhT researchers in the 2018-2023 period.
- Researchers of the institute took part in numerous articles and written interviews in newspapers aimed at the general public.[3]
- IPhT regularly welcome some junior high school or high school students for some one- or two-week 'observation' internships
- Members of the laboratory took part in several popular science videos posted on CEA youtube channels such as "Les équations Clefs de la physique" (*Boltzmann formula[4]*) or "Les principes Clefs de la physique"(*the Curie principle[5]*), but also some interviews ("*Modélisation de la ville : l'équation qui éteint des controverses centenaires*"[6] or "*Que se passe-t-il au fond d'un trou noir*"[7]).
- Last but not least, we mention the realization in 2023 of a 25 minutes film for the general public. This film was made entirely by members of the laboratory. It presents the institute and its history, it gives an overview of what is research in theoretical physics, and what are the motivations and the daily work of researchers at IPhT. The fil is available on the YouTube channel of IPhT.[8]

Synthetic self-evaluation

The unit has a long tradition of disseminating and transmitting knowledge. We make regular contributions to seminars for the general public, to public debates on topical issues such as the growth of cities, and to talks in schools. Our network of influence extends both in France and abroad, giving us a high profile in the academic world. Our network of influence outside the academic world is not very active.

3-2 Team self-evaluation (in the case of multi-team units)

The organization of IPhT in three scientific teams/groups (A,B and C) is a relatively light structure. The groups have a lot in common and relatively few important differences in the way they operate, except of course for the core of their scientific themes (described in the section "Scientific subjects …", page 5). Note that the interactions between the teams seem to become more and more lively in the recent years, and the boundaries between teams are porous and dynamical. In the paragraphs below, we focus on a few key specificities of each group and on a few concrete elements that illustrate these particularities.

Group A: Mathematical physics, string theory and gravitation

Evaluation area 1: Profile, Resources and Organization of the team

The group A is organized into a number of thematic subgroups, including string theory, field theory (in particular conformal field theory), enumerative and random geometry, integrability and the mathematical physics of quantum systems (see page 6 for a detailed description of the scientific themes).

Mathematics — A particular feature of group A is its thematic proximity to mathematics. This is testified, among other things, by the frequent collaborations and publications[9] with mathematicians working in mathematics laboratories. These close thematic links are also reflected, for example, in the involvement in LabEx LMH and the FMJH (see also *Research environment* page 15). We should also mention the fact that a few PhD students have been affiliated to the mathematics doctoral school (EDMH) and some theses are co-supervised between the IPhT and the Laboratoire de Mathématique d'Orsay (LMO). In 2019 the group welcomed a newly recruited CNRS mathematician,[10] thus strengthening the institute activities at the frontier between pure mathematics and

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[1] Examples of places and occasions where/when the conferences were given: "fête de la science", numerous high schools, Section Paris-Sud of the SFP, Institut Pascal (Orsay), Colloque de l'Orme, Forum universitaire de l'ouest parisien, Institut Henri Poincaré, Association Française d'Astronomie, hôpital de la Pitié-Salpêtrière, théâtre du Châtelet, Congrès de psychanalyse
[2] Radio channels where some interviews were given: France Inter, France Culture, RTBF, BFM business, Sud Radio, RFI, Swiss French radio TRS.
[3] Clefs CEA, Pour la Science, Epsiloon, La Recherche, Techniques de l'ingénieur, Libération, Physics World, Science & Vie, Le Monde, Le point.
[4] www.youtube.com/watch?v=vs0J9qpppUA
[5] www.youtube.com/watch?v=m7a3sPW-uP8
[6] www.youtube.com/watch?v=UhNi7KWxpZw
[7] www.youtube.com/shorts/0BUSZYjT4rE
[8] "IPhT, une expérience théorique", www.youtube.com/watch?v=FWeGaGBRRUM
[9] Over the period 2018-2023, there has been about 50 articles co-authored with a mathematics laboratory in France or abroad.
[10] S. Ramassamy, recruited by the section 41 of CoNRS (Mathematics).

physics. Movements between the two disciplines also take place in the other direction and a CEA researcher[1] from IPhT spent the evaluation period as PAST in mathematics (Département de Mathématiques et Applications, ENS Paris) while another[2] was recruited at the end of 2023 as full professor in mathematics (Institut de Mathématiques de Jussieu-Paris Rive Gauche).

Evaluation area 2. Attractiveness

Area 2 / Standard 1. The team has an attractive scientific reputation and contributes to the construction of the European research area

Visibility — Mathematical physics has been a speciality of IPhT for decades. The activity on string theory (in a broad sense) is more recent but it also enjoys an important visibility. The group A is part of an organization[3] which collects postdoc applications for a group of European institutes in the field of the unification of fundamental interactions (string theory in particular). This contributes to the high visibility of the group in terms of recruitment of young talented researchers. Another factor of visibility is the connection of the group with nearby laboratories. As a concrete example, we can mention that some members of the group are organizers of the "Rencontres théoriciennes"[4] which take place every two weeks in Paris. We can also mention the implication of some group A members in the "séminaires Itzykson" organized at IHES. Periodic scientific meetings organized at the IPhT, such as the 'CFT days', also attract researchers from the Paris-Saclay and Paris areas. Concerning the organization of larger international events, see also the *Black Hole microstructure conferences* in the Portfolio.

Students — Students who love mathematics as well as the most abstract problems in physics are naturally attracted by the topics studied by group A. This enhances the capacity of the group to attract good students, in particular because the French academic system produces very good students with this type of profile.

Area 2 / Standard 3. The team is attractive because of the recognition gained through its success in competitive calls for projects

ERC grants — Among the 11 ERC projects which have been active at IPhT during the evaluation period, 6 of them were led by members of group A. Of the 6 ERC projects that began at the IPhT during the period under evaluation, 4 were led by group A researchers.[5] This enabled in particular the group to welcome a significant number of young researchers, to achieve critical mass, and to create an important dynamics in the associated fields.

Evaluation area 3. Scientific production

Area 3 / Standard 2. Scientific production is proportionate to the research potential of the team and shared out between its personnel.

Collaborations with the other groups — Thanks to its thematic positioning, mathematical physics has interfaces with many themes in physics, and at IPhT there are frequent collaborations both between group A and group B and between group A and group C. Of the 385 publications (focusing on articles in peer-reviewed journals) in group A, 22 are joint with group C, and 8 with group B.

Group B: Cosmology, astrophysics, high-energy physics and hadronic matter

Evaluation area 1: Profile, Resources and Organization of the team

The group B is characterised by research in theoretical physics prominently focused on the phenomenological aspects of particles physics and gravitational dynamics, relevant for present and future experiments in these areas. Thematic subgroups include high-energy particle physics, collider physics and the study of scattering amplitudes, heavy-ion and hadronic physics, cosmology and astroparticle physics (see page 9 for a detailed description of the scientific themes).

Large collaborations and international organizations — Particle physics and astrophysics projects often involve large, international collaborations, larger than is typical in other areas of physics. This specificity influences the organization of the communities as well as the work of the theorists who participate in these major collaborations, or who work with data produced in the context of these collaborations. Concerning IPhT, we can in particular mention the participation in the Euclid (see *Euclid* in the portfolio) and LISA projects. Many researchers from group B have collaborations with the CERN and some of them regularly visit CERN for long-term stays (up to one year).

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[1] M. Bauer
[2] J. Bouttier
[3] itf.fys.kuleuven.be/postdoc-application/instructions
[4] string.lpthe.jussieu.fr
[5] *Deconstructing the string landscape* (Stringlandscape, 2018-2024) led by Mariana Graña, *The Quantum Structure of Black Holes and the Recovery of Information* (QBH Structure, 2019-2024), led by Nicholas Warner, *Recursive and Exact New Quantum Theory* (ReNewQuantum, 2019–2025), led by Bertrand Eynard, *Scattering Strings and Other Things: A Modern Approach to Quantum Gravity and the Conformal Bootstrap* (QGBoot, 2020–2025), led by Eric Perlmutter

Evaluation area 2. Attractiveness

Recrutements — The group enjoys a high level of national and international recognition. As a concrete illustration of its visibility, the CEA position opened in 2019[1] received about 200 applications, the position opened in 2023[2] received more than 150 applications. The profile of the CEA position open in 2022 was broader than group B (it also included a statistical physics section) but it received more than 220 applications. The number of applications for each post-doctoral position open in the group is of the same order of magnitude, and in 2020 the group B post-doc position attracted 400 applications !

Over the past decade, there have been four new hires in group B (three CEA researchers[3] and one Chargé de Recherche[4] at CNRS). These just compensate for the departures (mobilities to other institutes[5]) which took place since 2015 but they do not fully compensate for the departures over a longer period of time. With only 15 permanent members, group B remains significantly smaller than the other groups of IPhT, with a much smaller proportion of CEA researchers. This results in difficulties in achieving a critical mass in certain subfields, and it is hoped that the forthcoming recruitment of researchers from the CEA and CNRS will contribute to reinforcing group B in the near future.

Area 2 / Standard 3. The team is attractive because of the recognition gained through its success in competitive calls for projects

Grants — Over the evaluation period, the group has been involved in two ERC projects. One member of the group has participated in the project PanScales[6] (*Spanning TeV to GeV scales for collider discoveries and measurement*), which in particular develops innovative methods related to the accuracy so-called parton showers, which are crucial tools in collider physics. The project Ampl2Einstein (*New theoretical approaches for understanding gravitational waves 2021-2025*), led by a member of the group,[7] has allowed to develop an activity around a topic that now occupies an important place in high-energy physics, namely the calculation of quantum scattering amplitudes in gauge theories. In particular, the *Ampl2Einstein* project focuses on using these tools to develop more accurate methods and better mathematical descriptions of gravitational signals.

Regarding national funding, 5 members of group B have been PIs of ANR grants during the evaluation period, including two projects that started in 2023: one on Einstein rings, [8] and the other one on the relation between the Higgs boson mass and cosmology. [9] Finally, researchers of group B have been involved in two Flasgship Projects of the LabEx P2IO, Gluodynamics and BSM-Nu (on neutrino physics). These large projects with budgets of roughly 1 million euros involve several experimental teams in the Paris-Saclay era together with a smaller number of theorists.

Evaluation area 3. Scientific production

The group B has published 384 article in peer-reviewed journal between 2018 and 2023. About 20 of these publications have been signed by at least two permanent researchers of the group. There has been about 8 papers co-authored with group A.

Evaluation area 4. Contribution of Research Activities to Society

The scientific topics covered by group B are among the ones that fascinate the most the general public, and for this reason its members are often interviewed by the written or audiovisual press, give conferences or write articles or books for the large public.[10]

Group C: Statistical physics and applications, condensed matter, quantum information

Evaluation area 1: Profile, Resources and Organization of the team

Multidisciplinary — By its very nature, statistical physics is a discipline whose concepts and tools can be applied in very different fields of physics and even beyond physics (biology, computer science, networks in general, etc.). This gives the group C a multidisciplinary character and a particularly wide range of subjects. They are ranging from the hydrodynamic description of certain cellular automata to quantum chaos, from quantum information to the quantum Hall effect in graphene, and from critical phenomena to the growth of cities

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[1] Key words in the job profile: *Cosmology and particle physics, beyond the standard model, particle astrophysics, gravitational waves*

[2] Key words in the job profile: *High-energy phenomena in quantum field theory, centered around scattering amplitudes, from particle physics to gravitational waves*

[3] Brando Bellazzini (2013), Raffaele d'Agnolo (2019), Matthew von Hippel (2023).

[4] P. Fleury arrived at IPhT in 2022.

[5] Marco Cirelli left in 2015, Chiara Caprini left in 2016, Matthew von Hippel and Pierre Fleury left in 2024.

[6] G. Soyez is involved in PanScales (2018–2024), and ERC-AdG project hosted at the University of Oxford.

[7] The project Ampl2Einst (ERC-AdG) lead by D. Kosower started on January 1st 2021.

[8] Project ELROND (*Einstein rings to observe the distribution of dark matter*), led by P. Fleury.

[9] Project EUHiggs (*The Mass of the Higgs Boson and the Evolution of the Universe*), led by R. T. D'Agnolo.

[10] Example: *À la recherche des neutrinos*, published by Dunod, Collection Quai des Sciences, 2018

(examples taken from the portfolio). See page 11 for a detailed description of the scientific theme studied by group C.

Area 1 / Standard 2. The team has resources adapted to its activity profile and research environment and mobilizes them.

Quantum physics — The activities of group C have benefited from the 'quantum inflexion', an initiative of the CEA to develop research in the field of quantum technologies and quantum physics. This field is also very active in the Paris-Saclay area, with several laboratories and private actors. The activity on quantum information theory has taken off at IPhT with the recruitments of two CEA permanents researchers in 2019 and 2020.[1] Thanks to several successes in national (PEPR) and European (Quantum Flagship) calls for proposals, this group now includes no fewer than 10 students and postdocs. Furthermore, on the quantum-materials side, the hiring of a specialist in topological insulators in 2022 and the award of ERC funding[2] on the subject enabled to launch a new activity in this very active field worldwide.

Evaluation area 2. Attractiveness

Area 2/ Standard 3. The team is attractive because of the recognition gained through its success in competitive calls for projects

Participation in national investment programs — The group C is involved in the Quantum PEPR through the project EPIQ[3] and through the project DIQKD[4] (the latter being coordinated by IPhT). We also mention the project BACQ,[5] which is part of the French national quantum strategy and France 2030. These three projects contributed to the growing visibility of the institute in the field of quantum technologies.

European grants — Over the evaluation period the members of group C have been involved in 8 European projects, including 3 ERC.[6] We can also mention the participation in several large collaborative projects in the field of quantum communications[7] and quantum computations.[8]

Evaluation area 3. Scientific production

Area 3 / Standard 2. Scientific production is proportionate to the research potential of the team and shared out between its personnel.

Out of the 334 publications (articles in peer-reviewed journals) of group C, 10% are co-signed by at least two permanent researchers of group C, and about 5% are co-signed by at least one permanent researcher of group C and one permanent researcher of group A. These figures reflect a significant number of collaborations within the group as well as with group A.

Evaluation area 4. Contribution of Research Activities to Society

Area 4 / Standard 1. The team stands out by the quality and quantity of its non-academic interactions.

In the field of quantum technologies (and quantum computing in particular), there is a large number of private-sector players doing research and the group C has developed scientific collaborations with some of them (e.g. Alice & Bob, ATOS-Eviden and Thalès TRT).

Area 4 / Standard 3. The team shares its knowledge with the general public and takes part in debates in society.

The applications of statistical physics to spatial networks and urban systems is an example of research activity of group C that is closely related to societal challenges.[9]

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[1] N. Sangouard and J.-D. Bancal

[2] The project TopoRosetta (ERC-StG) lead by B. Wieder started on Nov. 1st 2023.

[3] project.inria.fr/epiq/fr

[4] Device-Independent Quantum Key Distribution

[5] *Benchmark Applicatif pour les Calculateurs Quantiques* (BACQ). This project also involves CEA/DRT/LIST, CEA/DRF/IRIG/Pheliqs, Thales Research and Technology (coordinator), LNE, TERRATEC, EVIDEN, MajuLab (CNRS) and LPMMC.

[6] *Charge orders, Magnetism and Pairings in High Temperature Superconductors* (CHAMPAGNE, 2016–2021), led by Catherine Pépin, *Statistical Mechanics of Learning* (SMILE, 2017–2023), led by Lenla Zdeborova (who left IPhT in 2020), *A Rosetta Stone for Robust Observables of Topological States from Symmetry Group Theory* (TopoRosetta, 2023–2028), led by Benjamin Wieder

[7] *Quantum Internet Alliance* (QIA, 2018–2022), *Quantum Intern Alliance phase 1* (QIA-Phase1, 2022–2026), *Quantum Secure Networks Partnership* (QSNP, 2023–2026)

[8] *High Performance Computer and Quantum Simulator hybrid* (HPCQS, 2021–2025)

[9] *Le monde des réseaux*, M. Barthelemy, odile Jacob (2023) hal.science/cea-04546085, *Statistics and dynamics of urban populations*, M. Barthelemy and V. Verbavatz, Oxford university Press (2023), hal.science/cea-04446124

4- UNIT TRAJECTORY

When talking about the unit's trajectory, it is appropriate for IPhT to refer to a not-so-distant but still very present past, as well as to the recommendations and ambitions presented in the previous evaluation report (2013-2018). For each of the Institute's strengths and weaknesses, we need to assess whether they are here to stay or whether they are likely to evolve.

Quality of scientific research and thematic diversity

The Institute's first strength, which we would like to be sustainable, is the scientific quality of its researchers and their publications. This year, the IPhT celebrated its 60th anniversary and, since its creation, the Theoretical physics Department has distinguished itself by the quality of its scientific output and its excellence. The laboratory has been part of the French theoretical physics landscape since its creation in 1963. The laboratory has won more than a hundred physics prizes over the years, and has been awarded more than 20 ERC research grants since the launch of this prestigious funding agency. The laboratory's high profile and impact on international research is its "raison d'être", and we are working to keep it that way. We are counting on our two supervisory bodies to continue to promote our talents and the laboratory's scientific excellence, and in particular to support the activities of our PhD students and pursue a promotion policy that enables our researchers to progress serenely in their careers.

The great thematic diversity of the institute is a strength that has been built up over the years and that we wish to maintain. The IPhT is one of the smallest institutes of the DRF, but one of the largest theoretical physics Laboratories of CNRS. From the point of view of fundamental research, its vocation is to cover all the themes of theoretical physics. This ambition is underpinned by a policy of targeted recruitment to strengthen under-represented areas. For the future, we want to maintain thematic diversity, guided by excellence in the general discipline of theoretical physics, while remaining open to developments in research relevant to our time, and ensuring that the most fashionable themes are also well represented. In the past, the opening up of the laboratory to field theory and condensed matter are examples of these themes that were innovative for the balance of the scientific themes of the laboratory. Over the 2018-2020 period, new hires have been made in a variety of fields, including mathematical physics (Sanjay Ramassamy), quantum field theory and conformal bootstrap (Eric Perlmutter, Dalimil Mazáč, Antoine Bourget), physics beyond the Standard Model (Raffaele Tito d'Agnolo), quantum materials (Ben Wieder). In 2019 and 2020 we have opened up to Theoretical Quantum Information (including quantum computation and quantum communications) with the recruitments of Nicolas Sangouard and Jean-Daniel Bancal. The themes of statistical physics associated with artificial intelligence, numerical methods for the N-body problem, as well as gravitational wave cosmology and amplitude calculus are currently being strengthened by the recruitment of young researchers.

Operational considerations

The Institute's operations have undergone major changes since its creation. In the 1960s, few students were trained at the Institute, and permanent researchers were recruited from among the few students so trained. Things changed in the 2000s, which also coincides with the time when we became a UMR of CNRS. CNRS now operates in concert with the CEA, which is the "hosting" supervisory body. At that time, research funding was managed by our CEA "tutelle", which enabled us to train a limited number of students per year around a team of permanent researchers working intensively together. With the arrival of substantial external funding, small groups were formed, with numerous students and postdocs often operating around a single researcher and working on more thematic research. At present, both modes of operation coexist in the laboratory, with the formation of small groups that can then work together, or whole groups working together. This diversity of themes and working methods is a source of richness. It can also prove to be a weakness in the creativity of the researchers. In the future, we will do our utmost to encourage activities that we can all do together. Participation in a working group on a chosen laboratory theme, general laboratory colloquia and seminars, and, on a more festive note, "wine-and-cheese-like" tastings of local products help to liven up the life of the laboratory. The lab's young researchers, students and postdocs have their own pizza seminar, in which the permanent researchers do not participate. A certain degree of autonomy among the younger members of the team is invaluable, enabling them to forge links that we hope will last.

As mentioned above, the IPhT's funding arrangements have changed considerably over the years. We have gone from being funded solely by the CEA to being funded by both CNRS and CEA. With the arrival of a number of research funding portals, in particular at the European level, but also national ones (ANR, LabEx, PEPR…) the laboratory operates largely on funds gleaned from outside sources. Payroll costs are still borne by our two supervisory bodies. This mode of operation is in line with our aspiration for excellence, but may yet evolve in the current context. The unit will need to remain open to the major national projects of France 2030, as well as to

high-risk research projects.[1] Opening up the laboratory to sponsorship is a project for the future. To this end, we have launched the creation of an association of Friends of the IPhT, which will welcome donations from private individuals. For companies, donations can be de-taxed through the CEA. Our medium-term aim is to use sponsorship to finance a thesis or one or two prestigious post-doctoral contracts at IPhT. This will enable us to smooth out the financial contribution to the laboratory's operations.

Age pyramid

The age pyramid shows that during the next HCERES mandate, six or even seven physicists will retire. Eight new hires have already been made since 2019. Over the next few years, we will be facing a period of intense hiring, during which more than a third of the laboratory's members will be replaced. This makes it all the more important to ensure thematic balance and to hire at the best possible level. This will provide opportunities to put a scientific policy into action (see the scientific perspectives, page 36). Last but not least, we are going to keep a very close eye on the gender issue, even if we have not had much success in this area in recent recruitments.
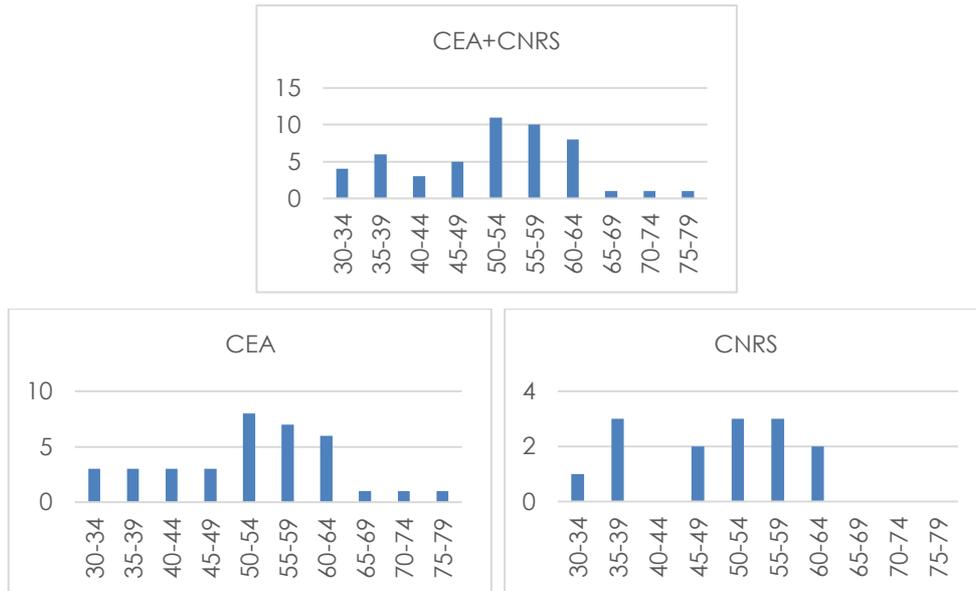
Age pyramids of the permanent researchers [in Dec. 2023]. The associate staff list if given page 5.

Network of collaborations

The IPhT's vocation is to collaborate with major national and international research organizations. In this sense, the participation of researchers in international mobility, major programs and decision-making bodies is important. For example, we wish to continue to be present on the CNRS IRP and IRN, and to maintain our privileged partnerships with institutions such as CERN and IHES, and to create new ones, such as the recent partnership with CCQ- Flatiron New York on the numerical aspects of the quantum N-body problem. In terms of our geographical environment, our collaborations and involvement in the life of the University of Paris-Saclay are set to grow in the coming years. We already benefit from good links with laboratories on the plateau, both in support of our experimental activities and simply through collaborations with other theoretical physicists. The Université Paris-Saclay brings a high degree of interdisciplinarity that is invaluable for the creativity of research on the plateau and its national influence. In this respect, it is important for the future of the laboratory to try to involve our researchers in teaching activities at UPSaclay, as they are already involved in higher education establishments (Ecole Polytechnique, ENS Paris, ENS Paris-Saclay) as well as universities such as Cergy-Pontoise and other European and international universities. There are multiple interdisciplinarity opportunities within the Direction de la Recherche Fondamentale (DRF), and with the other Directions of CEA. We intend to push and encourage all collaborative projects with other Institutes of DRF and with other CEA Directions, as for example within the framework of the risky-research-project initiative led by the DRF. The prospect of developing collaborations that go beyond theoretical physics in the strict sense is also at the heart of the recent opening of a position for a statistical physicist working in collaboration with biologists from the Institut Joliot. We would also like to mention a project for discussions and interactions with researchers from the DAM (Direction des Applications Militaires du CEA) around mathematical physics and in the context of our affiliation with the FMJH

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[1] www.enseignementsup-recherche.gouv.fr/fr/deploiement-du-programme-recherche-risque-pour-accompagner-les-idees-et-les-talents-94074

(Fondation Mathématique Jacques Hadamard) which operates as a sponsor for mathematics in the Paris-Saclay area.

In the same vein, IPhT's participation in decision-making bodies is one of our laboratory's great assets. Several of our researchers are members of Section 02 of the CoNRS, and we have representatives in the Graduate Schools (GS) of physics and mathematics, following the launch of the Université Paris-Saclay. IPhT researchers are represented on ANR committees and ERC panels, on international research grant panels, on the École Doctorale de Physique de l'Ile de France (EDPIF), École doctorale de mathématiques Hadamard (EDMH), on recruitment committees for professors and "Maîtres de Conférences" at French universities, and in various scientific publishing houses. It is a national and international presence that we hope to maintain and that is a consequence of the visibility of the laboratory.

Transparency of the Management

In terms of coordination between management and researchers, a number of measures have been taken over the past six years. We have taken care of our heritage, renovating the IPhT's coffee room and library. This work, which is undertaken once every thirty years, will provide us with new, pleasant places for discussions and meetings, enabling fruitful and convivial exchanges.

In the same vein, IPhT has been working on a pre-project for the complete renovation of the C. Bloch amphitheater (the budget for which far exceeds the institute's capacity) and we are looking for a financing solution. We are proud to have a popular science seminar specially dedicated to our support group, giving them the opportunity to take a closer interest in our work, and which is well appreciated. Within the group of researchers, there is a strong demand for dialogue, which we believe has been heard by management. In particular, we are keen to hold at least one general meeting a year, at which researchers can express their feelings and propose solutions to any difficulties encountered. The minutes of the laboratory council and the scientific council are distributed to all, and PhD students and postdocs are represented on the laboratory council. On a day-to-day basis, management and the support team are open, available and ready to listen to researchers. Annual reviews, for example, are a key way of keeping in touch with everyone's concerns.

One of the strengths we would like to maintain is the excellence of our support group, which is still going strong after a few fluctuations in previous years. The group has been enriched by the addition of a CNRS manager ("gestionnaire"),[1] who has found her place in our team. Following the retirement in 2021 of a CEA IT technician,[2] we have successively taken on two young technicians on fixed-term contracts. This period has enabled us to redefine completely our needs and the scope of this activity (toward web and audiovisual). In the medium term, we hope to be able to hire someone on a permanent contract for these tasks.

Scientific perspectives

The IPhT's scientific policy ideally aims to cover most areas of theoretical physics. To achieve this, we need to take care when recruiting new staff to ensure that we renew the scientific themes in which we are losing competitiveness, or in which we have lost researchers, often in the middle of their careers. To meet the laboratory's needs, as identified by the Scientific Council of the institute in recent years, we have strengthened the areas of amplitude computation in gauge theory and gravity, condensed matter physics and quantum information. An opening for a CEA position in statistical physics is currently planned, as is our bid for a CNRS junior chair in statistical physics and artificial intelligence. In parallel, we are recruiting a CEA researcher on the numerical aspects of the quantum many-body problem, in conjunction with the QCC, Flatiron of the Simons Foundation in New York. These two themes of research, as well as the creation of a group of researchers working on Quantum Information, will put us in a strong position in scientific fields that benefit from particular attention and visibility at national and international level. These are promising and fast-developing topics that allow us to attract the interest of many researchers in the laboratory, sometimes from more distant fields, and thus foster collaborative research. Cosmology and gravitational waves, as well as statistical physics, will require close monitoring in the years to come. The scientific prospects of group B in particular will require our close attention, with imminent decisions on the future of large structures such as the LHC, and the future directions for research that are presently discussed. For the moment, we are just waiting to hear about this aspect of research and its implications for our laboratory.

The IPhT has always been careful to keep a part of its research activity in subjects that operate on a larger time scale, in view of the fact that new ideas and concepts in theoretical physics sometimes take a number of years to mature before they find applications in more applied problems. We are committed to our excellence in

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[1] Justine Dionisi
[2] Loïc Bervas

mathematical physics and our historic links with the IHES. We intend to maintain our strength in this field in the years to come.

The balance of the IPhT's scientific themes is therefore a subtle alchemy between openness to subjects that set the research of our time ablaze, and themes that will bear fruit in the longer term. We hope to maintain this balance in the years to come, and succeed in being a place where these two approaches to research operate in concert. Please find below a more detailed overview of the scientific outlooks for each of the three groups.

Scientific perspectives: group A

Research at IPhT on conformal and quantum field theories will continue to seek to both extend the list of solvable CFTs, and to chart the broader space of chaotic, or generic, CFTs. Our work will be guided by fundamental bootstrap principles, continuing in the spirit of the ever-growing conformal bootstrap program, in which IPhT and surrounding institutes are a global epicenter. In two dimensions, we will seek exact solutions of CFTs with application to real-world critical points. On the other hand, we will probe the structure of CFTs with many degrees of freedom, particularly the structure of their high-energy states, which double as insights into black-hole physics and quantum gravity via the AdS/CFT Correspondence. Finally, we will aim to establish rigorous mathematical theorems using analogs of the conformal bootstrap, which can yield spectral data of symmetric spaces and bounds on L-functions.

For integrable quantum field theories, it would be interesting to apply them to quantum information problems, to the study the soft breaking of integrability in transport and out-of equilibrium phenomena. Applying ideas of generalized and non-invertible symmetries to higher dimensional systems, using symmetries and integrability to determine the mathematical structures of Feynman integrals is also a fruitful avenue of research.

In the field of random geometry, a promising avenue of exploration is to understand better the links between discrete and continuous models of random surfaces. Such a quest is fueled by the conviction that various bijective methods developed to solve map enumeration problems could be extended to the domain of continuous surfaces. Supporting this idea is Mirzakhani's famous work showing that Weil-Petersson volumes of hyperbolic surfaces satisfy topological recursion, just like maps. We are optimistic that other connections of a similar nature are waiting to be discovered. One proposed approach is to use enumeration formulas derived from topological recursion and look for a bijective interpretation, guided by cutting along geodesics. The ultimate goal would be to obtain a universal scheme for decomposing surfaces into elementary bricks, where the internal structure (discrete or continuous) of these bricks varies according to the type of surface under consideration, but adheres to universal assembly rules.

In the field of string theory and black holes, we aim at finding bubbling horizonless solutions with black hole charges that account for the full entropy of black holes. We expect to be able to contribute to the progress in understanding the non-perturbative regimes of string theory, to delimit the boundaries of its supersymmetric landscape, and explore the non-supersymmetric and non-geometric territories. String theory provides a surprisingly rich and ever-expanding toolbox to engineer many CFTs using branes, geometry and mixtures thereof, while on the other end, bootstrap and bottom-up techniques based on spaces of vacua constrain its possible landscape, posing the question of the convergence of these two approaches. While the quantum gravity swampland begins to be understood, we hope to shed light on the question whether there is a Super CFT swampland at all.

Scientific perspectives: group B

A rich collider program is expected in the years to come. First, the Electro-Ion Collider (EIC) is expected to start its operation in the 2030s. Its goal is to precisely image gluons in nucleons and nuclei, revealing the origin of the nucleon spin and exploring the new QCD frontier of ultra-dense gluon fields. The IPhT physicists have well-recognized expertise in this field and will contribute to the preparation of the EIC, by identifying new observables and providing accurate predictions for them. As for LHC physics, our group has already started exploring the new possibilities that will be offered by the new detectors expected after the long shut down of 2026-2029. Efforts to develop high-precision event generators and state-of-the-art jet substructure techniques will also be of prime relevance for the high-luminosity LHC and for the preparation to the next generation of colliders.

The evolution of research topics in the field of particle theory beyond the Standard Model (BSM) is mainly driven by experimental developments and by the emergence of new theoretical ideas. For instance, the absence of a hint of a weakly interacting massive particle in experiments has encouraged the study of alternative dark matter candidates, such as axions. The non-observation of supersymmetric particles and of resonances from a new strongly coupled sector at the LHC has stimulated the use of model-independent approaches based on effective field theories. In the next five years, we plan to orient our research activities in the directions suggested by these recent developments: dark matter candidates and the ways to detect them; gravitational waves as

a test of BSM physics; signals of the new physics responsible for neutrino masses in neutrino and flavor physics experiments, and generation of the matter-antimatter asymmetry of the Universe; effective field theories and amplitudes as tools to constrain possible extensions of the Standard Model.

The study of quantum scattering amplitudes, today the subfield called Amplitudes, has developed links and applications to a wide range of areas in theoretical physics and mathematics, including QCD and LHC phenomenology, supergravity, maximally supersymmetric Yang–Mills (MSYM), gravitational waves, the study of polylogarithms and their elliptic generalizations, cosmology, and others. The IPhT group has been active in several of these areas — most notably, QCD, MSYM, gravitational waves, and elliptic functions.

In coming years, the group will continue to push forward the frontier in these areas. It will continue the study of important observables in MSYM, both in perturbation theory and examining links to nonperturbative physics. This study is of interest for intrinsic understanding the MSYM theory, which is the most promising candidate for a four-dimensional theory to be solved exactly someday. It is also useful in the theory's longstanding role as a theoretical laboratory for developing techniques to be applied to QCD and real-world strong interactions. The study of elliptic functions will play an important role in precision predictions at higher orders in perturbation theory both for QCD corrections and mixed QCD-electroweak corrections. These predictions will clearly play an essential role in confronting experimental results at the LHC with theoretical predictions in the next decade and a half. The applications of scattering amplitudes to classical gravity, and to precision predictions of gravitational waveforms, will play an important role with increasing sensitivity of gravitational-wave observatories, both the current generation (LIGO–VIRGO–KAGRA) and the next generation (the planned terrestrial European Einstein Telescope and the US Cosmic Explorer, as well as the space-based LISA satellite cluster).

The cosmology group at IPhT plans to build on its theoretical and phenomenological expertise to address the challenges raised by the upcoming large-scale surveys (Euclid, LSST,...) and the detections of gravitational waves (LIGO/Virgo, LISA,...). Additionally, we aim to study further the implications of these experiments for fundamental physics. For the first theme, we will continue to develop efficient analysis and theoretical tools, which go beyond low-order statistics and lessen the theoretical uncertainties, making also full use of effective-field-theory methods recently adopted from particle physics. For the second theme, we will investigate the properties of compact objects like black holes, their response under tidal deformation, how the environment (dark matter, dark energy) or modified-gravity scenarios affect them, and their emission of gravitational waves. This will involve advancing effective field theory methods. These projects, which align with two of the main challenges of the cosmological community, will also be developed as part of the Euclid and LISA consortia, to which we contribute.

Scientific perspectives: group C

Concerning condensed matter physics, it is likely that the study of topological properties of solids will become a major topic in the coming years. An extension of the approach of topological quantum chemistry to include extra symmetries like the so-called particle-hole symmetry of superconductors is a major goal. It should be coupled with band structure computations for real materials to allow detailed quantitative predictions of quantum topological materials. The interplay of topology and strong correlations in materials is also likely to be at the forefront. The quantum many-body problem will be tackled by numerical techniques involving extensions of dynamical mean field theory, which is already well under way.

The field of non-equilibrium behavior of complex interacting systems, whether classical or quantum, still conceals many mysteries. Large deviations provide us with a versatile mathematical tool to define non-equilibrium potentials but it has not been possible, at the moment, to relate them to fundamental physical quantities such as heat, or work. The algorithmic approach and the optimal transport viewpoint are promising frameworks that encompass both equilibrium and non-equilibrium systems with potential applications to thermodynamics of small systems, active matter and biological phenomena. On the purely quantum side, the exploration of integrable open models (modeled, for instance, by a Lindblad dynamics), quantum chaos, simulation of large quantum-many body problems using tensor networks and interactions with the quantum information group will be driving forces in the coming years.

In the last forty years, statistical physics has emerged as a key research field whose concepts and tools have found an enormous range of applications in other branches of physics and beyond. Among the territories where statistical physics ideas are finding breakthrough applications are problems in biology in the broadest possible sense. Neuroscience, genomics, immunology, evolution, ecology, cellular and bacterial growth, metabolic networks, are among the most active directions where ideas coming from out-of-equilibrium statistical mechanics, disordered systems, large deviations, dynamical systems, critical phenomena, are gaining momentum as central tools to understand a wide variety of biological phenomena. Another direction where statistical physics is playing a major role, is artificial intelligence and deep learning.

Future contributions related to quantum information will encompass various applications, such as quantum communication, simulation, and computing. For instance, we will explore methods for extending a random bit string reliably, certifying the quantum nature of a simulator, and distributing entanglement over long distances. Quantum computing holds particular interest. We will introduce innovative architectures, investigate appropriate physical platforms and quantum error correction codes, and conduct comparative performance analyses using diverse algorithms and applications. Success will be achieved if we contribute to the development of a viable solution for realizing large-scale quantum computing.

Acknowledgments

This activity report was produced under the aegis of G. Misguich, assisted by A. Capdepon. Our warmest thanks go to them for their rigorous work, efficient organization and great project management. The presentation of scientific themes benefited from the invaluable skills of S. Ribault & E. Perlmutter (A1), D. Serban (A2), E. Guitter (A3), M. Graña (A4), F. Gélis (B1), P. Vanhove (B2), R.-T. D'Agnolo (B3), P. Valageas (B4), T. Jolicœur (C1), K. Mallick (C2), P. Urbani (C3), N. Sangouard (C4). Thanks to them for contributing to this exercise and sharing their expertise. Thanks to François David for his excellent management of the IPhT over much of the period covered by this document. We also thank the contributors to the porfolio[1], in particular R. Guida, and the support staff (J. Dionisi, L. Sauboy and C. Flouret) who helped collecting the administrative data.

Catherine Pépin, Cheffe de l'Institut de Physique Théorique, May 2024

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[1] R. Guida, P. Di Francesco, B. Duplantier, O. Golinelli E. Guitter, B. Eynard, S. Ribault, H. Saleur, G. Korchemsky, D. Serban, I. Kostov, E. Perlmutter, C. Bena, M. Graña, F. Bernardeau, J.-Y. Ollitrault, E. Iancu, G. Soyez, D. Kosower, R.-T. D'Agnolo, B. Bellazzini, L. Foini, G. Misguich, V. Pasquier, C. Godrèche, J.-M. Luck, T. Jolicœur, N. Sangouard, J.-D. Bancal, M. Barthelemy, K. Mallick, S. Lavignac, P. Vanhove

Portfolio IPhT
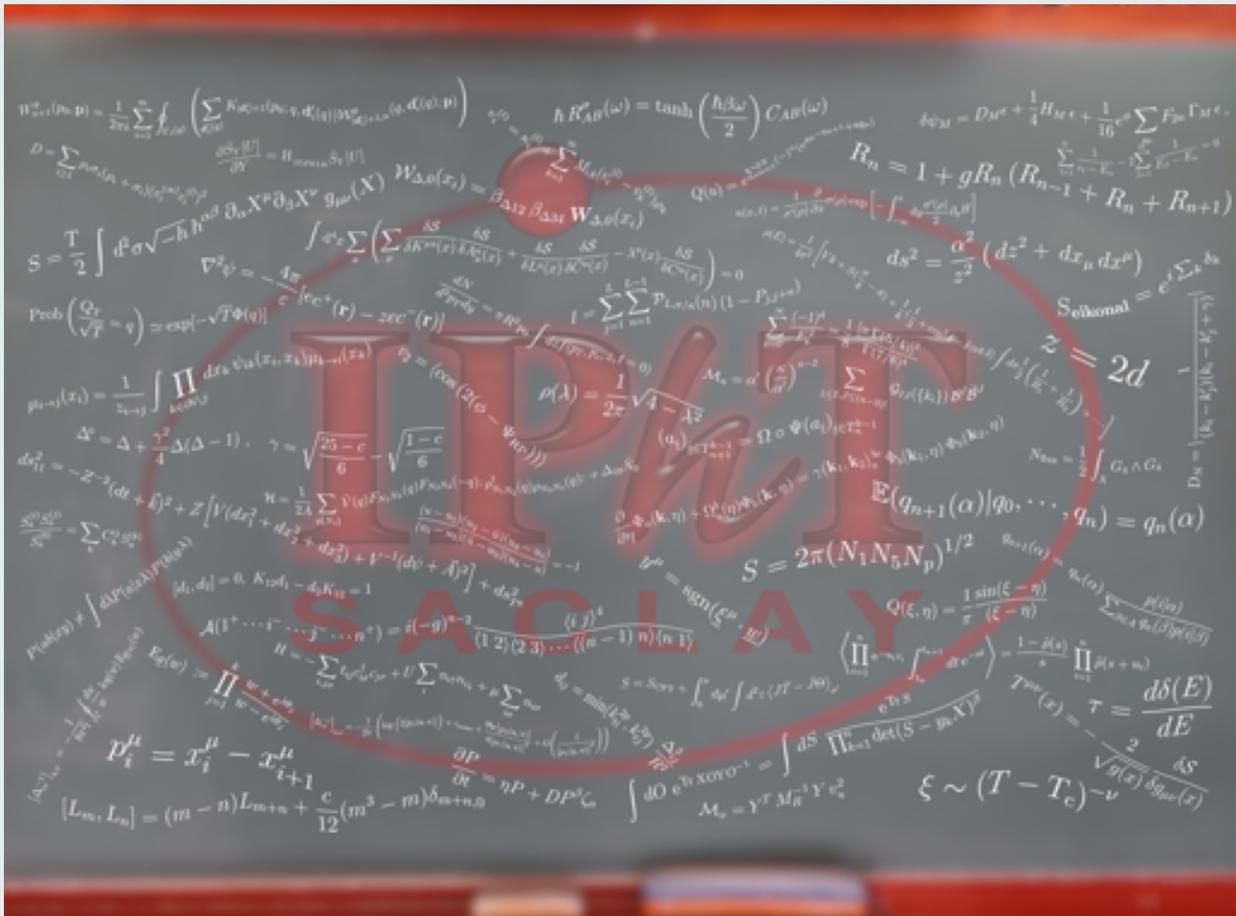
Hcéres evaluation - May 2024

Portfolio

Table of Contents

Hamiltonian paths, a challenge for KPZ
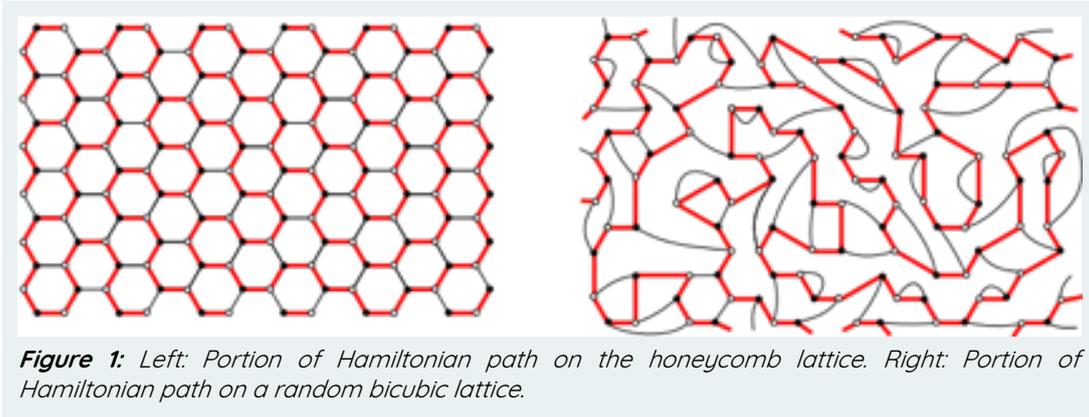
Figure 1: *Left: Portion of Hamiltonian path on the honeycomb lattice. Right: Portion of Hamiltonian path on a random bicubic lattice.*

	measured	KPZ prediction	KPZ prediction after renormalization
β_y	1.90 ± 0.01	$\frac{1}{6}\left(7+\sqrt{13}\right) = 1.76759\ldots$	$1 + \frac{\sqrt{22}}{2\left(\sqrt{13}-1\right)} = 1.90008\ldots$
β_w	1.99 ± 0.01	$1 + \frac{\sqrt{6}}{\sqrt{13}-1} = 1.94010\ldots$	$1 + \frac{2\sqrt{15}}{3\left(\sqrt{13}-1\right)} = 1.99096\ldots$

Figure 2: *Examples of measured exponents and their comparison to KPZ predictions, before and after renormalization.*

The celebrated Knizhnik-Polyakov-Zamolodchikov (KPZ) formulas relate the critical exponents of statistical models on **regular two-dimensional** lattices to the exponents of the same models on **random planar** lattices. These relations, verified exactly in a large number of statistical mechanics systems, have now acquired a rigorous mathematical status, under certain technical assumptions of statistical independence.

Hamiltonian paths on lattices, which are self-avoiding paths forced to visit all the sites of the lattice, constitute a critical statistical model where the geometrical constraints are particularly strong.

A team at IPhT studied the case of the honeycomb lattice and its random counterpart, the bicubic lattice (a bipartite lattice made only of trivalent vertices colored in black and white so that the vertices of one color are connected only to those of the other color).

The critical exponents in the first case are computed by standard Coulomb gas methods, while the critical exponents in the second case can be obtained numerically with a high accuracy from the exact enumeration of Hamiltonian path configurations for finite size lattices.

Astonishingly, the expected KPZ relations fail for some types of critical exponents, indicating that a new mechanism is at work which goes beyond their usual scope of application.

An ad hoc, heuristic procedure of renormalization (KPZ formulas readjusted with a new parameter) is proposed which seems to restore the validity of these relations. The challenge is now to understand mathematically how the particular geometrical constraints of the Hamiltonian paths influence the statistics of the bipartite random lattice.

Hamiltonian cycles on various families of bipartite planar maps were also studied, which fall into two universality classes, with respective central charges c = -1 or c = -2. The first group comprises maps of fixed vertex valency p larger than 3, whereas the second group involves maps with mixed vertex valencies, as well as a so-called rigid case. For each class, a universal configuration exponent and a novel critical exponent associated with long-distance contacts along a Hamiltonian cycle are predicted from KPZ and the corresponding exponent on regular (hexagonal or square) lattices. For these exponents, the KPZ predictions are this time numerically confirmed by exact enumeration results for p-regular maps, with p = 3, 4, 5, 6, 7, and for maps with mixed valencies (2,3) and (2,4).

The scaling limit of fully-packed systems thus raises intriguing open questions both from the perspective of Liouville Quantum Gravity and Schramm-Loewner Evolution.

[1] P. Di Francesco, B. Duplantier, O. Golinelli, E. Guitter, Nuclear Physics B 987, 116084 (2023).

[2] B. Duplantier, O. Golinelli, E. Guitter, Nuclear Physics B 995, 116335 (2023).

Intersection numbers
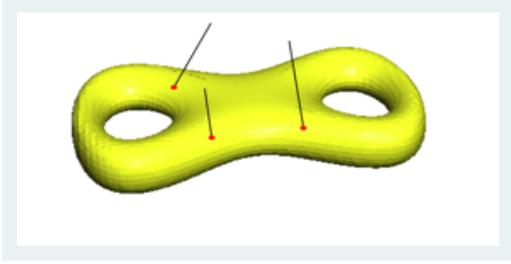
The set of all Riemann surfaces (modulo conformal isomorphisms) of genus g with n marked points is called the « moduli space » $M_{g,n}$. As the simplest model of string theory, this is the space of worldsheets of given topology, with no target-space. Amplitudes are sums of all possible world-sheets with given weights and boundary conditions. Witten defined the simplest « topological gravity » model by choosing as weight a product of powers of Chern classes ψ_i (like an electric field) at each marked point, and denoted: $\langle \tau_{d_1} \ldots \tau_{d_n} \rangle = \int_{M_{g,n}} \psi_1^{d_1} \psi_2^{d_2} \ldots \psi_n^{d_n}$. These amplitudes, called « Intersection numbers », are rational numbers, for example $\langle \tau_1 \rangle_1 = \int_{M_{1,1}} \psi_1 = \frac{1}{24}$ or $\langle \tau_{14} \tau_2 \tau_2 \rangle_6 = \frac{379}{9555148800}$.

The famous Witten's conjecture, proved by Kontsevich in 1991, was that the generating function of intersection numbers is the KdV Tau function, making a link between Geometry and integrable systems. Intersection numbers are topological invariants, they are the key to understand the topology of the moduli spaces, they are the basic building blocks of every string theory, and, as Witten-Kontsevich have shown, they are also the coefficients of expansions of KdV tau-functions and play an ubiquitous role in integrable systems, in fluid mechanics, in random matrices... They appear for instance as the coefficients of the large x expansion of the log of the Airy function

$$\log(\mathrm{Ai}(x)) =$$
$$\frac{2}{3}x^{3/2} - \frac{1}{4}\log(x)$$
$$+ \sum_{n \geq 1} \sum_{g=0}^{\infty} \frac{1}{n!}(2x^{3/2})^{2-2g-n} \sum_{d_1,\ldots,d_n} \langle \tau_{d_1} \ldots \tau_{d_n} \rangle_g \prod_{i=1}^{n} (2d_i - 1)!!$$
$$= \frac{2x^{3/2}}{3} - \frac{\log x}{4} + \left(\langle \tau_1 \rangle_1 + \frac{1}{6}\langle \tau_0^3 \rangle_0 \right)(2x^{3/2})^{-1}$$
$$+ \left(\frac{1}{2}(6\langle \tau_0 \tau_2 \rangle_1 + \langle \tau_1^2 \rangle_1) + \frac{4}{24}\langle \tau_0^3 \tau_1 \rangle_0 \right)(2x^{3/2})^{-2} + \ldots$$

An issue however is: how to compute them? As integrals over $M_{g,n}$ are undoable in practice,

recursive methods based on Virasoro algebra or KdV equations were used. We discovered an exact non-recursive formula, as sums over Young Tableaux. For example with n=3:

$$\langle \tau_{\lambda_1} \tau_{\lambda_2} \tau_{\lambda_3} \rangle_g =$$
$$\left(3^g \prod_{i=1,\ldots,3} (2\lambda_i + 1)!! \right)^{-1} \sum_{\mu_1+\mu_2+\mu_3=3g} \frac{(Q_{(0,0,0),\mu} + 6Q_{(3,0,0),\mu})K_{\mu,\lambda}}{\prod_{i=1,\ldots,3} \prod_{j=1}^{\mu_i} (j - i + 3/2)^{-1}}$$

where $K_{\mu,\lambda}$ is the Kostka number (number of semi-standard Young tableaux of shape λ and weight μ), and $Q_{\nu,\mu} = \det(1/((\mu_j - j - \nu_i + i)/3)!)$) (with the convention that factorial of non-integers $= \infty$). Another novelty is the asymptotic formula for intersection numbers at large genus. We proved the following formula

$$\langle \tau_{d_1} \ldots \tau_{d_n} \rangle_g \sim \frac{2^n}{4\pi} \frac{\Gamma(2g - 2 + n)}{(2/3)^{2g-2+n} \prod_i (2d_i + 1)!!}$$
$$\times \left(1 + \sum_{j=1}^{k} \frac{(2/3)^j}{(2g - 3 + n)^j} P_j + O(1/g^{k+1}) \right)$$

with an explicit computation of all corrections $P_j(n; n_0, n_1, \ldots)$, which are polynomials in the numbers $n_0, n_1, n_2, \ldots$ of degrees respectively $0, 1, 2, \ldots$ (the formula had been conjectured, only to leading order).
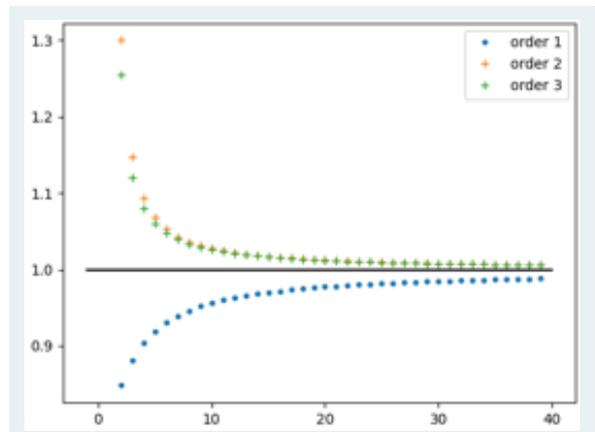
Figure 1: *Ratio of intersection numbers to the asymptotic formula as a function of the genus g.*

Large genus asymptotics control the non-perturbative effect in string theories, and in particular this computation has brought high precision non-perturbative effects for Jackiw-Teitelboim black-holes.

[1] B. Eynard, D. Mitsios, arXiv.2212.04256.

[2] B. Eynard et al. arXiv.2309.03143.

[3] B. Eynard et al. Ann. Henri Poincaré (2024). arXiv:2305.16940.

Conformal field theory of loop models

In two-dimensional statistical physics, many interesting phenomenons can be described in terms of gases of non-intersecting loops. These include polymers, percolation, and, more recently, active hydraulics.
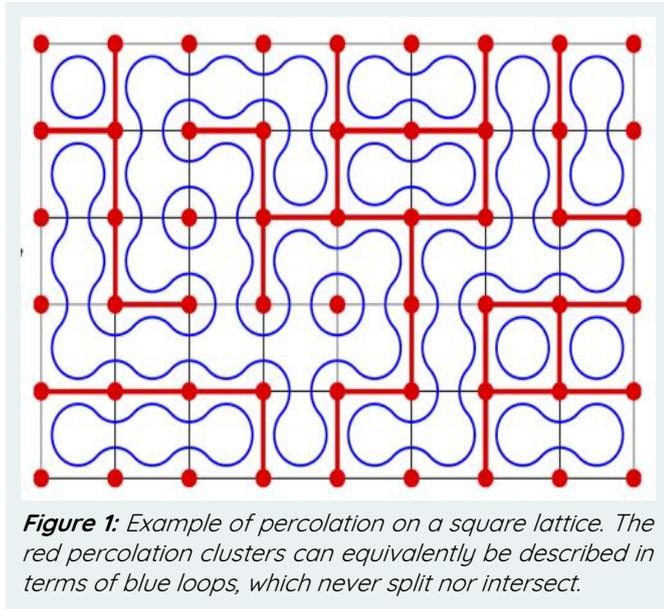
Figure 1: *Example of percolation on a square lattice. The red percolation clusters can equivalently be described in terms of blue loops, which never split nor intersect.*

In the 1980s already, there were exact results on loop models' critical exponents and spectra of conformal dimensions. After that, not much progress was made until a few years ago, when we introduced a few key ideas and techniques:

- **Conformal bootstrap techniques** specific to two-dimensional conformal field theory, which take into account the infinite-dimensional conformal symmetry algebra.
- A **unified description of all loop models**, including the Potts and O(n) models, in their dense and dilute phases.
- A focus on **generic values of the loop weight,** the parameter that controls the size and number of loops. This has eliminated much algebraic complication, and provided a continuous parameter to play with.

First we were able to elucidate the structure of the space of states. The spectra of conformal dimensions only tell us about the energy operator; our new results completely describe the action of all the symmetries. This is particularly relevant for understanding the models' phase diagrams, which

are strongly constrained by symmetries. Then we have studied the 4-point correlation functions, whose complete understanding would be tantamount to solving the models. We developed bootstrap techniques for computing individual correlation functions to high precision (dozens of significant digits), which allowed us to deduce exact formulas for some of them. Our techniques also allowed us to explore the space of all correlation functions. We conjectured that a basis of this space is given by combinatorial maps.
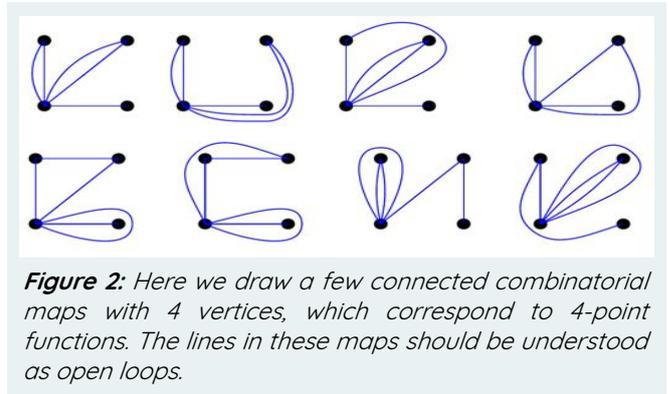
Figure 2: *Here we draw a few connected combinatorial maps with 4 vertices, which correspond to 4-point functions. The lines in these maps should be understood as open loops.*

We also studied how lattice models behave in the conformal limit of large lattice size L. Even in integrable models, calculations are typically impractical in large lattices. However, we have identified special quantities that reach their $L = \infty$ limit at a finite size $L = L_0$. This has allowed us to derive universal results from calculations in small lattices.

[1] L. Grans-Samuelsson et al. SciPost Phys. 12, 147 (2022).

[2] L. Grans-Samuelsson et al. SciPost Phys. 15, 147 (2023).

[3] R. Nivesvivat, S. Ribault, J. L. Jacobsen, arXiv:2311.17558.

Octagon form factor in AdS/CFT

The AdS/CFT correspondence is a powerful tool for studying strongly coupled gauge theories. Recently, important progress has been made in the calculation of correlation functions in four-dimensional maximally supersymmetric Yang-Mills theory (MSYM) for any 't Hooft coupling constant. According to the gauge/string duality, the MSYM four-point correlation functions are dual to the scattering amplitudes of four closed string states propagating on the $AdS_5 \times S^5$ background.

In the limit of very heavy operators, a remarkable simplification occurs — the four-point correlation function factorizes into a double copy of the open string partition function, which has been called the octagon form factor. A nonperturbative definition of the octagon relies on a dual description of the correlation functions in planar MSYM theory in terms of an effective two-dimensional integrable theory describing the string world-sheet in the AdS/CFT correspondence. The octagon takes into account the propagation of excitations (magnons) on the worldsheet. It admits a representation which is similar to an analogous form factor representation of two-point correlation functions of local operators in integrable two-dimensional models [1]. This leads to a non-perturbative formula for the octagon as the determinant of a certain semi-infinite skew-symmetric matrix [2].
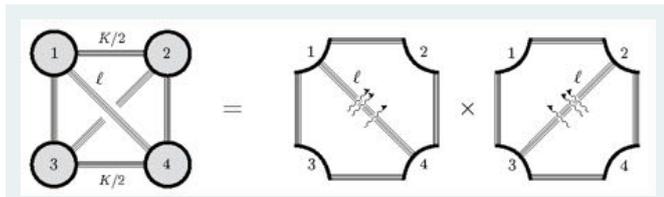
Figure 1: *Factorization of the four-point correlation function of heavy operators into a product of two octagon form factors.*

Remarkably, this seemingly complex determinant finds a connection to the world of integral equations. It can be expressed as a Fredholm determinant of the integrable Bessel operator which can be identified as a generalized Tracy-Widom distribution [3,4]. This distribution is a powerful tool to analyze a wide range of complex systems in physics. Discovered in the study of the statistics of the spacing of eigenvalues in random matrices, it was soon recognised to describe various phenomena in different fields, including quantum chaos, directed polymers, the KPZ equation, turbulence, etc. The universality of the Tracy-Widom distribution highlights the underlying connections between seemingly different physical phenomena.

Exploiting the identification of the octagon as a Tracy-Widom distribution, one can derive a system of nonlinear integro-differential equations for the octagon that are powerful enough to fully determine its dependence on the 't Hooft coupling [5,6]. At weak coupling, solving these equations yields a compact representation of the octagon in terms of known ladder Feynman integrals. At strong coupling, one can derive a systematic expansion of the octagon in the inverse powers of the coupling constant and calculate analytically the associated expansion coefficients. By combining the weak and strong coupling expansions, one can effectively determine the octagon form factor for any value of the 't Hooft coupling [7].

These results provide new insights into the strong coupling regime of four-dimensional superconformal gauge theories and invite further investigation within the AdS/CFT correspondence.

[1] I. Kostov, V. B. Petkova, D. Serban, Phys. Rev. Lett. 122, 231601 (2019).

[2] I. Kostov, V. B. Petkova, D. Serban, JHEP 2019, 178 (2019).

[3] A. V. Belitsky, G. P. Korchemsky, JHEP 2020, 219 (2020).

[4] I. Kostov, V. B. Petkova, JHEP 2021, 98 (2021).

[5] A. V. Belitsky, G. P. Korchemsky, JHEP 2020, 70 (2020).

[6] A. V. Belitsky, G. P. Korchemsky, JHEP 2021, 257 (2021).

[7] Z. Bajnok, B. Boldis, G. P. Korchemsky, arXiv:2403.13050.

AdS₃/RMT₂ Duality: A Framework for Random Matrices in Conformal Field Theory
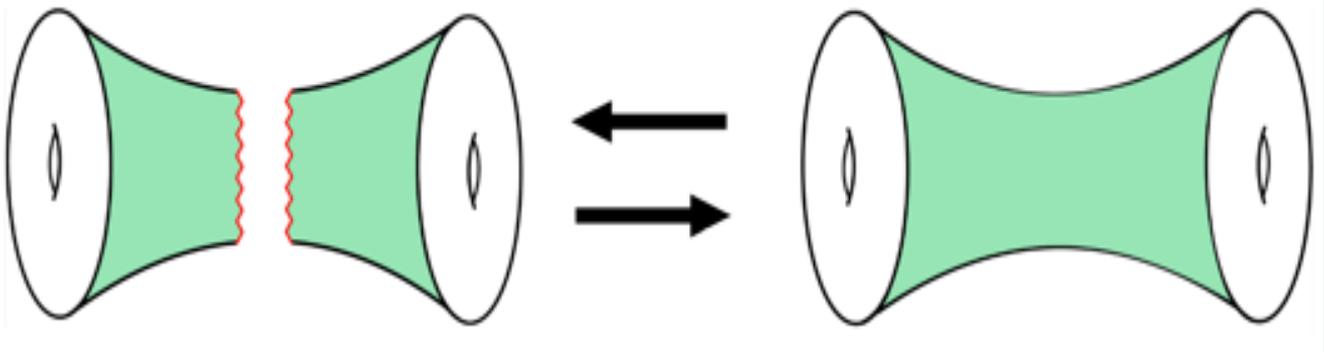
Figure 1: *Spacetime wormholes and black hole microstates in gravity are unified by a trace formula for chaotic conformal field theories.*

How do conformal field theories (CFTs) exhibit random matrix statistics in their high-energy spectra? In what sense do spacetime wormholes geometrize chaotic correlations of a dual CFT? And what, exactly, is the definition of quantum chaos in conformal field theory? These questions were the motivation for the work **[1]**, which proposed a framework for random matrix dynamics of two-dimensional CFTs, and used it to compute, via holography, non-perturbative quantum corrections to the black hole microstate spectrum of three-dimensional gravity with negative cosmological constant (AdS₃ gravity).

Recent work on holographic duality strongly indicates that the high-energy spectrum of CFTs should, by its duality with black hole microstates, exhibit a novel form of random matrix statistics. Perhaps the main justification comes from the celebrated "JT/RMT duality" of Saad, Shenker and Stanford, which identifies the Jackiw-Teitelboim theory of two-dimensional gravity with an ensemble of (double-scaled) random matrices. In higher-dimensional holography, the boundary theory is a continuum conformal field theory (CFT), carrying extra structure beyond that of random matrices. CFTs obey fundamental "bootstrap" conditions, or axioms, that guarantee their consistency. This raises the fascinating question of how random matrix theory (RMT) embeds itself into CFT in a manner respecting the requisite constraints.

This question was addressed for two-dimensional CFTs in **[1]**, where we introduced the framework of "RMT₂ for CFT₂". Two-dimensional CFTs enjoy SL(2,Z) symmetry of their torus partition functions and

spacetime Virasoro symmetry. We first discovered a trace formula, precisely analogous to the Gutzwiller trace formula for quantum systems, for CFT spectra. This followed rather intriguingly from the use of harmonic decomposition into an SL(2,Z)-invariant eigenbasis, endowing a well-known mathematical tool with novel physical meaning. This enabled a sharp identification of what the "chaotic part" of a two-dimensional CFT spectrum is. By mimicking standard approaches to random matrix universality using periodic orbit theory, this led naturally to a quantitative condition for a CFT to exhibit random matrix universality.

This toolkit paid further dividends when applied to AdS₃ gravity via holography. Smooth spacetime wormholes between two torus boundaries, somewhat mysteriously, suggested some sort of randomness of the dual CFT; our formalism provides an explanation of these geometries, which fit beautifully into the RMT₂ framework. Because the CFT₂ periodic orbits form a universal basis, the wormhole may be factorized, revealing quantum corrections to the torus partition function — a first step toward discovering the discrete spectrum of black hole microstates of pure gravity in three dimensions.

[1] G. Di Ubaldo, E. Perlmutter, JHEP 2023, 179 (2023).

Tadpole conjecture

String Theory is formulated only in ten space-time dimensions — to make contact with our four-dimensional world one has to ``compactify'' six spatial ones on a small, compact manifold. These manifolds have many moduli — deformations that cost no energy — that give rise to massless scalar fields in four dimensions. However, such massless scalar fields have been ruled out by experiments, as they would lead to long-range (unobserved) fifth forces.

Hence, to connect String Theory to the real world one must give a mass to these fields and eliminate them from the low-energy spectrum. To do this one turns on fluxes (higher-dimensional generalizations of electromagnetic flux) on the topologically non-trivial cycles of the compactification manifold. These fluxes introduce extra gravitational and electromagnetic forces, which only compensate when the cycle has a certain size, thus generating a potential for the corresponding modulus field. There is however a price to pay: fluxes have induced masses and charges, which in a compact space have to be cancelled by negative-mass and charge objects. This requirement is referred to as the tadpole condition. Fortunately, String Theory has many examples of such objects, the best known are the so-called orientifolds. Their total negative charge is fixed by the topology of the manifold, and this in turn gives an upper bound on the number of fluxes that can be turned on.

For the past twenty years the standard lore of the field has been that this upper bound does not play an important role in the process of fixing moduli, and that one can generate a mass for all moduli by turning on fluxes that have both positive and negative contributions to the tadpole, such that the total sum is below the upper bound.

Based on black-hole-physics intuition and several precise calculations **[1-4],** we have conjectured that the fluxes that stabilize a given number of moduli cannot have a charge that is less than 1/3 of this number. The first implication of this conjecture is that one can never eliminate all massless scalars in compactifications with a large number of moduli. This is because the maximum negative charge contribution in these compactifications grows like 1/4 of the number of moduli. Hence, all mathematically-

consistent (zero-tadpole) compactifications in this class will have massless scalar fields, and their flux-generated potential will contain flat directions (as shown in figure 1).
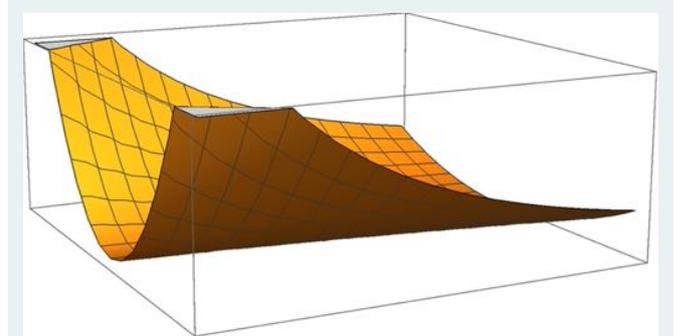
Figure 1: *Flux-induced potential for the moduli, according to the tadpole conjecture (there are always some flat direction(s)).*

A few highly nontrivial calculations in several areas of string theory (ranging from Gepner models to asymptotic Hodge structures) have spectacularly confirmed the validity of this conjecture. Furthermore, several attempts to disprove it have failed, for subtle and non-intuitive reasons.

If this conjecture is true, it would produce a change of paradigm: it would rule out 99% of the current attempts to connect String Theory to the real world, forcing the reinvention of the entire field of string phenomenology, and triggering the discovery of new ways to try to embed our Universe in String Theory.

[1] I. Bena, J. Blåbäck, M. Graña, S. Lüst, Adv. Appl. Clifford Algebras 32, 7 (2022).

[2] I. Bena, C. Brodie, M. Graña, JHEP 2022, 138 (2022).

[3] M. Graña et al., JHEP 2022, 237 (2022).

[4] A. P. Braun et al., JHEP 2023, 134 (2023).

Euclid

On Nov. 7th 2023, ESA revealed the first images taken by the Euclid satellite. These images demonstrate the exceptional performances of this new space observatory, in particular the stability of the angular resolution obtained in the visible and infrared wavelengths.

Figure 1: _The five first images taken by Euclid revealed on 7 November 2023_. Credit: ESA and Euclid Consortium, image processing by J.-C. Cuillandre (CEA Paris-Saclay).

These capabilities are crucial to Euclid's scientific objectives as they will enable to unambiguously identify a large number of distant galaxies, and precisely measure their shape and luminosity. The cosmological surveys that will be built during the mission will then be exploited to address the central scientific questions of the mission: elucidating the laws of gravity at cosmological scales and allowing a better understanding of the origin of the acceleration of the expansion of the universe, attributed to the enigmatic dark energy.

Over the last three decades, the IPhT has developed expertise in the theory of the formation and evolution of the large structures of the universe. That includes developments of dedicated codes to compute accurately the matter power spectrum, which is at the core of the measurement of the dark energy properties. Those calculations are done from first principle using Perturbation Theories applied to the growth of the large-scale structure of the universe. It has led to the development of dedicated numerical tools such as presented in **[1]**. It also led to the exploration of alternative statistical indicators **[2]**, guided by theoretical insights such as the Large Deviation Principle. The group has also developed expertise in the construction of alternative models to general relativity and the computation of their observational signatures. This is the case in particular for the so-called f(R) theories whose observational effects are examined in detail in **[4].** In **[5]** the focus is put to a class of modified gravity models characterised, at linear scales, by a scale-independent growth of perturbations while featuring different testable types of derivative screening mechanisms at smaller nonlinear scales.

The expertise acquired at the IPhT is highly visible in the project. One member of IPhT is Deputy to the lead of the Euclid Consortium (EC), in charge of scientific performance verification, i.e. verifying Euclid's performance in measuring the parameters describing the equation of state of this famous dark energy. As such he is also one of the project's spokespersons and represented the EC at the last ESA press conference.

[1] K. Osato, T. Nishimichi, F. Bernardeau, A. Taruya, Phys. Rev. D 99, 063530 (2019).

[2] A. Boyle et al., Monthly Notices of the RAS 505, 2886 (2021).

[3] Euclid collaboration, A&A 675, A120 (2023).

[4] S. Casas et al., arXiv:2306.11053.

[5] N. Frusciante et al., arXiv:2306.12368.

Thermodynamics of QCD seen in LHC data

Collisions between heavy atomic nuclei at ultra-relativistic energies are carried out at the Large Hadron Collier at CERN to produce the quark-gluon plasma, a state of matter where quarks and gluons are not confined into hadrons, and colour degrees of freedom are liberated. This state is thought to be produced as a transient phenomenon before it fragments into thousands of particles that reach the particle detectors. Despite two decades of investigations, one of the big open questions [1] was to obtain an experimental determination of the temperature reached in a heavy-ion collision, and a simultaneous determination of another thermodynamic quantity, such as the entropy density, that would give access to the number of degrees of freedom. We provide the first such determination [2].

Our approach relies on hydrodynamic simulations: It is by now firmly established that the matter produced in these collisions quickly thermalizes, and relativistic hydrodynamics has therefore become the standard tool for describing its space-time evolution until it freezes into individual hadrons. We define an effective temperature T_{eff} and an effective volume V_{eff} from the total energy and entropy of the fluid at freeze-out (as the temperature and volume of a thermalized gas at rest with the same energy and entropy). We find that the momentum per particle is almost exactly $3T_{\text{eff}}$, irrespective of unknown parameters (initial density profile, transport coefficients, equation of state). From the measured momentum per particle, we obtain $T_{\text{eff}} = 222 \pm 9 \,\text{MeV}$ for head-on Pb+Pb collisions at the current LHC energy. We then evaluate the corresponding entropy density $s(T_{\text{eff}})$ using the measured particle multiplicity, the known entropy per particle in a hadron gas, and a theoretical estimate of the effective volume V_{eff}. The result can be readily compared with first-principles calculations from lattice QCD (top panel in figure 1). These calculations predict an increase of the dimensionless ratio s/T^3 around $T = 160 \,\text{MeV}$, corresponding to the liberation of colour degrees of freedom. LHC data agree with calculations and confirm this increase. We have also evaluated the speed of sound c_s (defined by $c_s^2 = d\ln T/d\ln s$) from the increase of T_{eff} as a function of colliding energy (bottom panel in figure 1).

It also agrees with lattice QCD.
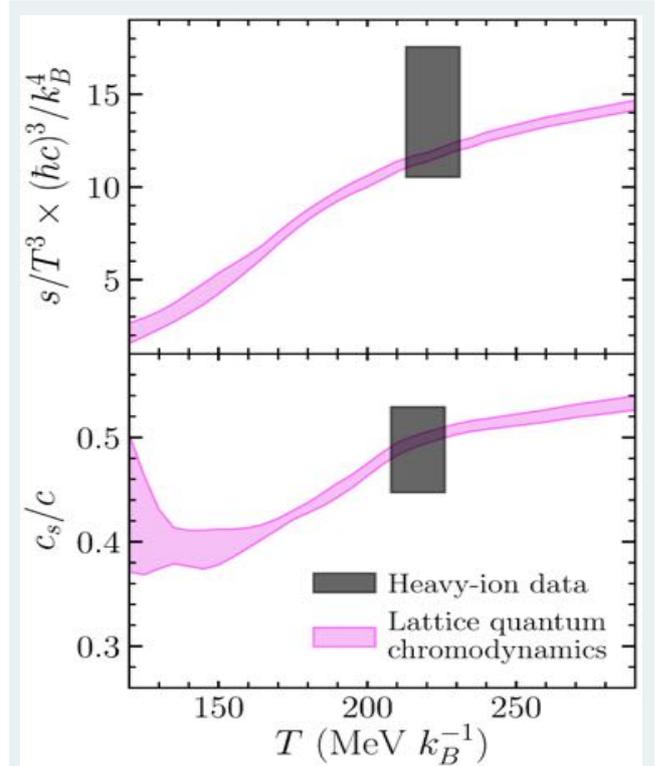
Figure 1: *Pink bands: first-principles calculation of the entropy density scaled by* T^3 *(top) and the speed of sound* c_s *(bottom) in natural units* **[5]**, *as a function of the temperature* T. *Grey boxes: our estimates from LHC data.*

As a follow-up, we have suggested a more precise determination of the speed of sound from the modest increase of the momentum per particle as a function of the particle multiplicity in "ultracentral" collisions (defined as the 0.1% fraction of collisions with the highest multiplicity, which are essentially at zero impact parameter) at fixed collision energy [3]. The CMS collaboration has recently followed our suggestion [4] and measured this increase for the first time. They obtain a speed of sound $c_s = 0.491 \pm 0.016$, in perfect agreement with lattice calculations.

[1] W. Busza, K. Rajagopal, W. van der Schee, Ann. Rev. Nucl. Part. Sci. 68, 339 (2018).

[2] F. G. Gardim, G. Giacalone, M. Luzum, J.-Y. Ollitrault, Nature Phys. 16, 615 (2020).

[3] F. G. Gardim, G. Giacalone, J. Y. Ollitrault, Phys. Lett. B 809, 135749 (2020).

[4] CMS Collaboration, arXiv:2401.06896.

[5] S. Borsanyi, et al., Phys. Lett. B 730, 99-104 (2014).

Jet evolution in a quark-gluon plasma

One important goal of the experimental programs at RHIC and at the LHC is the exploration of the quark-gluon plasma (QGP), the high-temperature phase of QCD matter where quarks and gluons are deconfined. Believed to have existed in the first microseconds of the Early Universe, this phase is recreated in the intermediate stages of ultrarelativistic heavy-ion collisions, albeit for only a very short time (10 fermi, or 10^{-23} seconds). An important approach to study this state of matter is through the physics of *jet quenching*, i.e. the modifications of the properties of an energetic jet due to its interactions with the surrounding plasma. A reliable study of jet quenching requires a solid theoretical understanding of the full jet evolution as it traverses the plasma. Until recently, such an understanding was hindered by the lack of a unified description for the two mechanisms responsible for jet fragmentation in the QGP: the standard "*vacuum-like emissions*", triggered by the parton virtualities, and the "*medium-induced*" emissions, triggered by collisions with the plasma constituents.

In **[1,2]**, we showed from QCD first principles that the two types of emissions can be factorised as three steps in time: first, vacuum-like emissions occurring at time scales mush shorter than the medium size, then medium-induced emissions happening throughout the medium, and finally vacuum-like evolution outside the medium. This physical picture has been implemented as a Monte Carlo event generator, referred to as JetMed.

In **[2,3,4]**, we have studied phenomenological consequences of this physical picture and showed that it remains valid if one includes the longitudinal expansion of the QGP. A benchmark observable is the *jet nuclear modification factor* R_{AA}, the ratio of the jet yield in heavy-ion collisions compared to proton-proton collisions. This ratio is smaller than one, due to the fact that a jet propagating through the medium loses energy via medium-induced radiation. A surprising feature is that R_{AA} remains small even at very large jet energies (cf. figure 1). The naive expectation would indeed be that the energy loss (proportional to a fixed medium energy scale) becomes negligible and R_{AA} relaxes to one. The behaviour observed in data is however naturally explained in our physical picture: as the energy of the

jet increases, the initial vacuum-like evolution creates an increasing number of gluons. Each of these gluons then loses energy via medium-induced radiation, thus increasing the total energy lost by the jet.
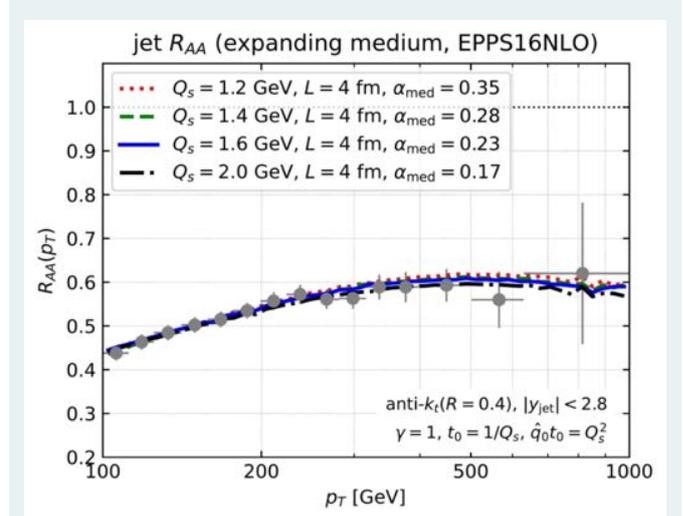
Figure 1: *The nuclear modification factor $R_{AA}(p_T)$ for jet production: our Monte Carlo predictions vs LHC data* **[4]**.
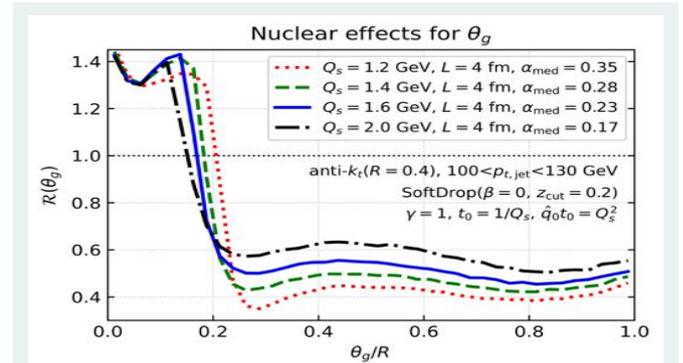
Figure 2: *The nuclear modification factor $\mathcal{R}(\theta_g)$ for the SoftDrop grooming angle* **[4]**

The physical picture underpinning JetMed also allowed us to study nuclear modifications of the substructure of jets. As a representative example, figure 2 shows the nuclear modification factor for the SoftDrop grooming angle θ_g. The transition from small to large angles, which is naturally explained by decoherence effects in JetMed, is also visible in the experimental data.

[1] P. Caucal, E. Iancu, A. H. Mueller, G. Soyez, Phys. Rev. Lett. 120, 232001 (2018).

[2] P. Caucal, E. Iancu, G. Soyez, JHEP 2019, 273 (2019).

[3] P. Caucal, E. Iancu, A. Mueller, G. Soyez, JHEP 2020, 204 (2020).

[4] P. Caucal, E. Iancu, G. Soyez, JHEP 2021, 209 (2021).

Amplitudes, Observables, and Classical Scattering

The first observation in 2015 of gravitational waves by the LIGO collaboration [1] triggered renewed interest by theorists in solving the classical two-body problem and in generating predictions for emitted waveforms. The pioneering observation, at the centennial of Einstein's development of a modern relativistic theory of gravity, also surprised us with the discovery of a new class of astrophysical objects, intermediate-mass binary black holes.

The detection of black hole mergers in laser-interferometric detectors is an incredible feat of precision engineering of lasers, mirrors, damping, vacuum, and thermal isolation. Even with damping, the raw noise level exceeds the size of most signals. Detecting events, and later extracting parameters of the binary system from observations, requires input from theoretical predictions. The required theoretical waveforms [2] have traditionally been computed using various approaches in General Relativity: the Arnowitt–Deser–Misner Hamiltonian formalism [3], direct post-Newtonian solutions in harmonic gauge [4], long-established effective-one-body (EOB) methods [5], and numerical-relativity approaches [6]. Future observations will require a greater precision than has been computed with traditional methods, which become increasingly difficult at higher orders.

Can techniques from particle physics contribute? In pioneering work starting two decades ago, Goldberger and Rothstein [7] showed how to apply an effective field theory approach to the two-body problem. Recent years have brought forward other new approaches relying on quantum field theory ideas. An important driver of this new interest is the double-copy relation between scattering amplitudes in Yang-Mills theories and those in gravity, along with the sophisticated techniques that the *Amplitudes* community has developed for computing on-shell higher-order amplitudes in perturbation theory. The successful use of these tools in the years since our article [8] appeared shows that the seeming increase in complexity in tackling a classical problem using quantum tools is worth it.

We showed how to start with a fully relativistic, quantum description of observables and obtain results for the corresponding classical observables. We examined two particular observables. The first is the change in momentum during a scattering event, both with and without accompanying radiation. This is called the `impulse'. The second is the total radiated

momentum during the event. The classical observables would ultimately be expressed as simple integrals over the classical limit of an on-shell quantum scattering amplitude or cuts thereof, order-by-order in perturbation theory. For the two quantities we considered here, the scattering amplitude is a four-point one. (A later paper [9] would extend these ideas to the radiated waveform in a scattering event, expressing it using a five-point amplitude.) The formalism we developed applies to both electrodynamics and gravity.

Writing the S matrix in terms of the transition matrix T, $S = 1 + iT$, and relying on unitarity, we found an all-orders expression in the quantum theory for the impulse on (say) particle 1,

$$\langle \Delta p_1^\mu \rangle = \langle \psi | i [\mathbb{P}_1^\mu, T] | \psi \rangle + \langle \psi | T^\dagger [\mathbb{P}_1^\mu, T] | \psi \rangle ,$$

where $|\psi\rangle$ is the initial state of two scattering particles, chosen each for example to have relativistic extensions of Gaussian wavefunctions; and $\mathbb{P}_1^\mu$ is the momentum operator for particle 1. The first term on the right-hand side is ultimately expressed in terms of integrals over an on-shell scattering amplitude, while the second is expressed in terms of integrals over the cut of an amplitude. Only the first term contributes at lowest order, while both terms contribute at higher orders in perturbation theory. Other observables will have similar expressions.

Specializing to QED and taking the classical limit, we ultimately find the following well-known expression for the impulse,

$$\langle \Delta p_1^\mu \rangle = -\frac{e^2 Q_1 Q_2}{2\pi} \frac{\gamma}{\sqrt{\gamma^2 - 1}} \frac{b^\mu}{b^2} ,$$

where Q_i are the charges of the scattering particles, b is their impact parameter, and γ is the Lorentz factor. The expression in gravity is very similar, and at this order in perturbation theory, the double-copy connection can be seen at every step in the calculation.

[1] B. P. Abbott et al., Phys. Rev. Lett. 116, 061102 (2016).

[2] A. Buonanno, B. S. Sathyaprakash, arXiv:1410.7832.

[3] R. Arnowitt and S. Deser, Phys. Rev. 113, 745 (1959).

[4] L. Blanchet, Living Rev. Relativ. 17, 2 (2014).

[5] A. Buonanno, T. Damour, Phys. Rev. D 59, 084006 (1999).

[6] F. Pretorius, Phys. Rev. Lett. 95, 121101 (2005).

[7] W. D. Goldberger, I. Z. Rothstein, Phys. Rev. D 73, 104029 (2006).

[8] D. A. Kosower, B. Maybee, D. O'Connell, JHEP 2019, 137 (2019).

[9] A. Cristofoli, R. Gonzo, D. A. Kosower, D. O'Connell, Phys. Rev. D 106, 056007 (2022).

Sliding Naturalness

In **[1]** we presented the first joint solution to the electroweak hierarchy problem and the strong CP problem. The two problems have been known for more than fifty years and this is the first result of this kind. They have each driven a large portion of the research in particle physics for decades, generating thousands of papers and, in the case of the hierarchy problem, also strongly motivating the construction of the CERN Large Hadron Collider.

Taken at face value, the two questions seem unrelated. On one side we have the hierarchy problem or the problem of explaining the observed value of the Higgs boson mass, m_h. The Higgs boson is a scalar particle that is charged under electroweak interactions and provides the largest mass scale in the Standard Model (SM) of particle physics. The masses of all known particles depend on its value. m_h is the coefficient of a relevant operator that is not protected by any symmetry of the SM. As a consequence, the selection rules of spacetime dilations, and of the other symmetries of the SM, predict a value for m_h close to the largest known scale of Nature, the Planck mass $M_{\rm Pl}$, which is 17 orders of magnitude larger than the observed m_h. We are left to wonder if multiple contributions of $\mathcal{O}(M_{\rm Pl})$ have to cancel in a part in 10^{17}.

The strong CP problem is related to the symmetries of the strong interactions. The only parameter breaking their CP symmetry is the so-called θ-angle. Other sectors of the SM break CP at $\mathcal{O}(1)$ and any extension of the SM connects the two sectors giving $\theta = \mathcal{O}(1)$. Experimentally we observe $\theta = 10^{-10}$ and we are again left to wonder if multiple $\mathcal{O}(1)$ contributions cancel in part in 10^{10}. θ is associated to a marginal operator that does not contain states charged under electroweak interactions. The resolution of this puzzle could be at any energy scale and have nothing to do with the electroweak sector of the SM. On the contrary, the relevant operator associated to m_h singles out energy scales that we can probe at the LHC and requires electroweak-charged states to be explained.

So apparently the two problems are unrelated and have been treated as such by previous known solutions. The fundamental connection that we leveraged in **[1]** is the following observation: the only local operator in the SM whose vacuum expectation value is sensitive to m_h is the one associated to θ (i.e. the antisymmetric contraction of two gluon field strengths $G\widetilde{G}$). By coupling two light scalars to $G\widetilde{G}$ we made the value of the cosmological constant and thus the evolution of the Universe strongly dependent on both m_h and θ.
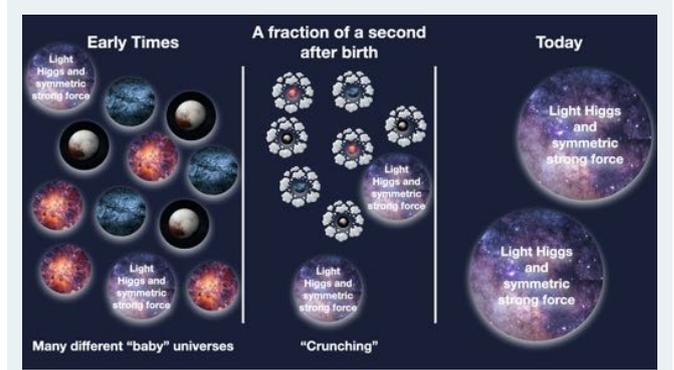
Figure 1: *Schematic representation of the basic idea behind the joint solution of the electroweak hierarchy problem and the strong CP problem. Each bubble is a causally disconnected universe and the pictures inside represent the different values of the fundamental parameters of Nature in each universe.*

If we imagine that a long enough period of cosmic inflation occurred early on in the history of the Universe and that a theory like string theory, with many distinct vacua, exists at high energies, then we do not live in a single universe, but in a vast Multiverse. Causally disconnected universes can have different values of fundamental parameters (such as m_h and θ). Our construction makes the destiny of these universes sensitive to θ and m_h. As shown schematically in figure 1, only universes with the observed values of these two parameters survive for cosmologically long times and expand into what we see today. All other universes acquire a large and negative cosmological constant and crunch to tiny sizes, much below that of an atom. In addition to scientific interest, the paper received media attention. After being published in PRL, it was highlighted by Physics Magazine, the CERN homepage and Le Scienze (Italian subsidiary of Scientific American). The IPhT author was interviewed about it for one hour by Swiss national radio RTS during their scientific broadcast CQFD.

[1] R. T. D'Agnolo, D. Teresi, Phys. Rev. Lett. 128, 021803 (2022).

Positive Moments for Scattering Amplitudes

The principles of causality and unitarity enforce non-trivial constraints on otherwise healthy-looking effective field theories (EFT), which describe the emergent infrared (IR) dynamics relevant to low energy observers. The simplest of these constraints take the form of inequalities among low-energy scattering amplitudes or Wilson coefficients, and are therefore known as positivity bounds.

Positivity bounds are extremely important because they provide non-trivial constraints on the end points of the renormalization group flow, effectively shaping the space of the resulting EFTs by constraining the structure of higher derivative interactions, on top of the usual symmetry considerations. Positivity bounds can be used to explore what is possible and what is instead impossible in an EFT that descends from a consistent (causal and unitary) UV theory.
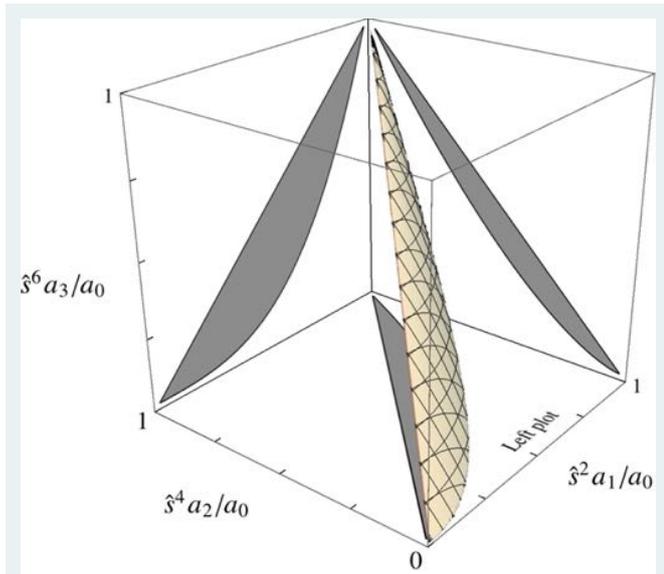
Figure 1: *Allowed region of the first 3 Wilson coefficients a_i in units of the cutoff $(\hat{s})$, in a scalar EFT endowed with a shift symmetry. The allowed space shrinks down to 0.5% once positivity bounds are enforced **[1]**.*

In **[1]** we have found the complete set of such positivity bounds associated to forward 2-to-2 scattering amplitudes. This follows by the observation that Wilson coefficients correspond to a sequence of moments of a positive measure over a compact interval. Such mathematical setting fulfills the hypotheses of Hausdorff's moment problem, whose known solution provides the set of necessary and sufficient positivity constraints on the forward amplitude. Some of these results have been then

extended beyond the forward limit, see e.g. **[2,3,4,5]** and references therein.

As an illustration of the power of positivity bounds, let us mention the following simple implication: IR amplitudes $\mathcal{M}$ whose leading energy scaling is $\mathcal{M} \sim E^{n>4}$ cannot descend by microscopic theories that are causal and unitary, regardless of tuning or symmetries among the underlying parameters.
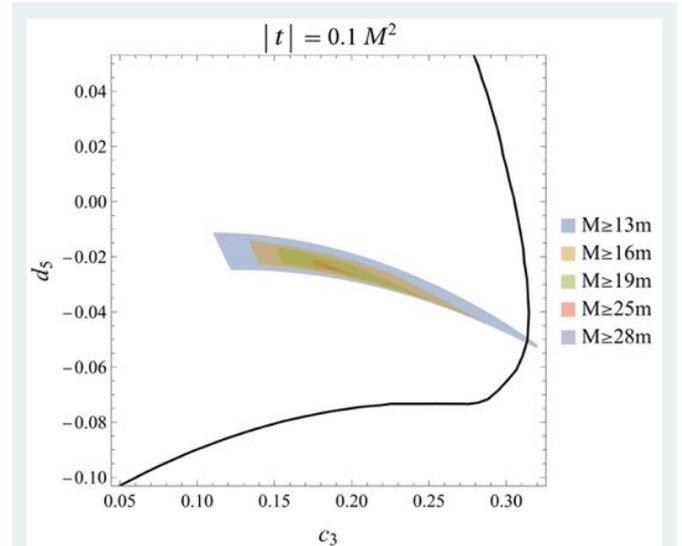
Figure 2: *Allowed parameter space carved out by positivity bounds, in massive gravity. No viable space survives, as soon as the cutoff M is larger than $O(10)$ the graviton mass m **[4]**.*

This immediately rules out interesting EFTs such as galileons and massive gravity theories, since their leading amplitudes go like E^6 in the IR. In fact, one can turn this argument around and determine the regime of validity of the EFT (its cutoff scale M) by demanding that new physics states must enter at some $E < M$, before the onset of the inconsistent energy scaling $E^{n>4}$. This is represented for instance in figure 2, for the case of massive gravity.

[1] B. Bellazzini et al., Phys. Rev. D 104, 036006 (2021).

[2] B. Bellazzini, F. Riva, J. Serra, F. Sgarlata, Phys. Rev. Lett. 120, 161101 (2018).

[3] B. Bellazzini, M. Riembau, F. Riva, Phys. Rev. D 106, 105008 (2022).

[4] B. Bellazzini, G. Isabella, S. Ricossa, F. Riva, Phys. Rev. D 109, 024051 (2024). arXiv:2304.02550.

[5] S. Caron-Huot, D. Mazac, L. Rastelli, D. Simmons-Duffin, JHEP 2021 ,110 (2021).

Quantum chaos and statistical mechanics

The chaotic behaviour of classical nonlinear systems is a ubiquitous effect that refers to the unpredictability of their complex dynamics, a phenomenon known as the butterfly effect. In mathematical terms, this concept is characterised by what is known as the Lyapunov exponent, a quantity that expresses how quickly trajectories that start from close initial conditions diverge with time.

In quantum mechanics, it is difficult to find good diagnostics of chaos. This question has been the subject of intense debate since the early days of quantum mechanics. Recently, important results from high energy physics [1] have shown that quantum mechanics imposes a strict bound on the quantum Lyapunov exponent, a quantity which can be defined from the analysis of a suitable defined four-point (out-of-time-order) correlation function. This bound acts at the level of a universal ``Planckian" time scale $\hbar/T$, where T is the temperature of the system. This new effect, together with the observation that a toy model of disordered fermions, called the SYK model, saturates this bound, has aroused enormous interest in different fields, leaving however several open questions.

Researchers from IPhT and from the LPTENS have shown that this bound can be easily understood as a consequence of the quantum fluctuation-dissipation theorem (FDT), a fundamental result of statistical mechanics that links the linear response to a perturbation to the equilibrium thermal fluctuations [2].

While the quantum FDT is usually stated as a property in the frequency domain, for these purposes it has been crucial to study the constraints that it imposes on the dynamics in the time domain.

The name ``Planckian" evokes the idea of a shortest possible timescale in a quantum system and, in connection to this, different bounds on transport coefficients have been conjectured [3] — however no one has been able to prove a rigorous bound beyond the one on chaos. Finding a simple argument to bound the Lyapunov exponent leaves open the possibility to apply similar arguments at the level of other dynamical correlations, establishing possible consequences for their relaxation times.

The understanding of out-of-time order correlations have also inspired a series of works in which we have revisited the ansatz proposed for the Eigenstate Thermalisation Hypothesis [4,5] (ETH). This has stimulated interest in the community in order to characterise higher order correlation functions in this framework with finer detail and has disclosed connections between ETH and free probability [6].

[1] J. Maldacena, S. Shenker, D. Stanford, JHEP 2016, 106 (2016).
[2] S. Pappalardi, L. Foini, J. Kurchan, SciPost Phys. 12, 130 (2022).
[3] S. Hartnoll, A. Mackenzie, Rev. Mod. Phys. 94, 041002 (2022).
[4] M. Srednicki, Phys. Rev. E 50, 888 (1994).
[5] L. Foini, J. Kurchan, Phys. Rev. E 99, 042139 (2019).
[6] S. Pappalardi, L. Foini, J. Kurchan, Phys. Rev. Lett. 129, 170603 (2022).

Hydrodynamics of the box ball system, a cellular automaton with solitons

Understanding how macroscopic laws and large-scale properties emerge from the microscopic interactions between the constituents of a system is a major problem in statistical physics. Among the questions one can ask are: How hydrodynamic behaviors emerge? How currents react to external forces ? What is the probability to observe a given fluctuation away from the mean behavior? It is generally very challenging to connect the microscopic rules to these large-scale properties, and there are relatively few systems for which exact results can be obtained.
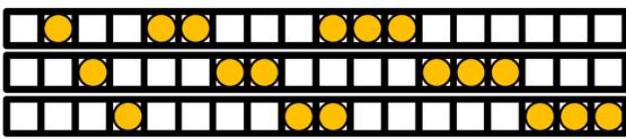
Figure 1: *From top to bottom: positions of particles ("balls") in the BBS model over three consecutive time steps. It illustrates that trains of consecutive balls are faster the longer they are.*

The "Box-ball system" (BBS) **[1]**, a particular cellular automaton, is such an example. The BBS consists of "balls" occupying "boxes" arranged on a line, with at most one ball per box. Although the balls move at each time step according to simple deterministic rules, the BBS presents a rich physics due to the fact that it contains objects called "solitons" (trains of consecutive balls) of all sizes and whose number is preserved over time.

Exploiting the integrability of the model, researchers from the IPhT and from the Tokyo University have obtained its hydrodynamic laws **[2]**, which describe at a coarse-grained level the dynamics of the system in terms of the soliton densities. Due to the large number of conserved quantities, the hydrodynamic description is in fact a generalized hydrodynamics (GHD) **[3]** and takes the form of a set coupled nonlinear equations for the evolution in space and time of the densities of solitons. These equations could be obtained and solved exactly in a number of cases, allowing to study various phenomena related to ballistic transport in this model. Due to its simplicity, the BBS offers a particularly simple framework to understand the emergence of hydrodynamics in an integrable model and to derive numerous exact results in this limit.
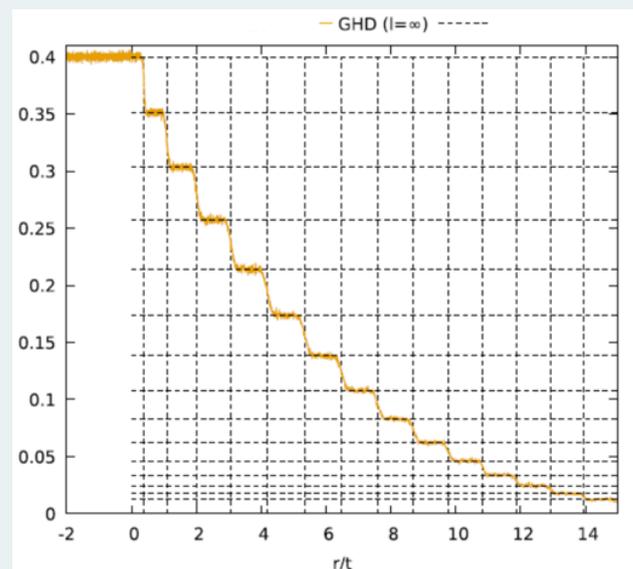
Figure 2: *Domain wall problem in the BBS. Ball density ρ at time t=500 and position r, plotted as a function the rescaled variable r/t. At time t=0 the ball density is ρ=0.4 for r<0 and ρ=0 for r>0. After some time the ball density develops a staircase structure, visible here, which originates from the presence of solitons with discrete velocities. The orange line is the result of numerical simulations while the black dashed lines represent the analytical solution of the GHD equations for the position and height of the density steps. Both are in very good agreement. It is also possible to describe analytically the smooth transition from one step to the next by including diffusive corrections to the GHD description.*

As an application, it has been possible to solve in details the out-of-equilibrium dynamics that follows after the system has been prepared in a domain wall state. This amounts to study the dynamics triggered by an inhomogeneous initial state with a different density of balls in the left half and in the right half of the system (figure 2). Several other quantities related to currents and their fluctuations have also been computed. These include the probability distribution of the number of balls passing through the origin during a time t, the long-time persistent current generated by a perturbation — called Drude weight —, as well as some correlation functions associated with soliton currents **[4]**.

[1] D. Takahashi, J. Satsuma, J. Phys. Soc. Jpn. 59, 3514 (1990).
[2] A. Kuniba, G. Misguich, V. Pasquier, J. Phys. A 53, 404001 (2020).
[3] B. Doyon, SciPost Phys. Lect. Notes 18 (2020).
[4] A. Kuniba, G. Misguich, V. Pasquier, J. Phys. A 55, 244006 (2022).

Kibble-Zurek phenomenon: from the early Universe to a spin chain
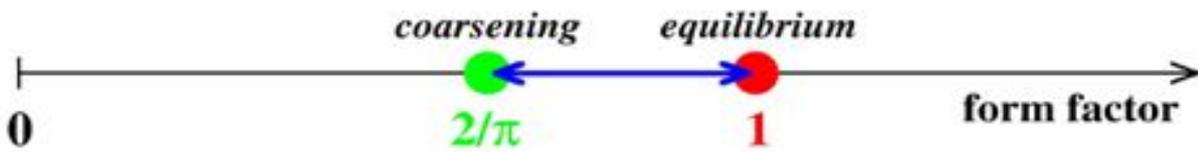
Figure 1: *The form factor (product of density of domain walls and magnetic susceptibility) provides a novel measure of the distance to equilibrium. Red symbol: unit equilibrium value. Green symbol: universal value in zero-temperature coarsening regime. Blue: range of form factors for very slow quenches.*

What happens when a system is cooled very slowly from a high-temperature phase through a critical point corresponding to a continuous phase transition? This question was addressed in 1976 by Kibble in the context of the cosmology of the primordial Universe. His motivation was to predict the density of relic topological defects (non-trivial field configurations such as monopoles or cosmic strings) that are left behind after the expanding and cooling Universe has undergone a continuous phase transition where the symmetry of fundamental interactions is lowered by the spontaneous breaking of the underlying gauge group. Kibble's approach was then extended to condensed-matter systems by Zurek. In both settings, the basic mechanism is that the critical slowing down associated with a continuous phase transition prevents the cooling system from staying close to thermal equilibrium. The ensuing Kibble-Zurek theory establishes scaling laws describing chiefly how the density of topological defects scales with the cooling rate. The subject has been thoroughly revisited by two members of IPhT by considering an exactly soluble one-dimensional model, namely a ferromagnetic chain consisting of classical Ising spins subjected to Glauber dynamics with an arbitrary time-varying temperature. The model has a second-order phase transition at zero temperature. The critical point can therefore be approached according to various kinds of time evolution of temperature (quenching scenarios or protocols). It however cannot be crossed, as negative temperatures are not physically accessible. The analytical solution of the model becomes much simpler in the low-temperature

scaling regime, where the relevant spatial and temporal scales are much larger than the microscopic ones, so that many observable quantities scale as powers of the correlation length of the system. A wealth of analytical results are derived and compared to the heuristic Kibble-Zurek theory. Two observables characterising the typical size of the growing ferromagnetic domains are considered on the same footing, namely the density of domain walls and the magnetic susceptibility. A form factor, defined as the dimensionless product of both observables, is proposed as a novel tool to measure the distance to instantaneous thermal equilibrium. A paradigmatic situation exhibiting scaling and universality is provided by everlasting quenches, during which temperature approaches zero very slowly. There, the form factor may take any value between two universal limits, corresponding to thermal equilibrium and to the coarsening regime following an instantaneous quench (a sudden drop from a very high temperature to zero temperature).

[1] C. Godrèche, J.-M. Luck, J . Phys. A 55 495001 (2020).

Electric dipole moment of quantum Hall spin waves revealed by interferometry techniques

In the quantum Hall regime, magnetic properties of the two-dimensional gas of electrons are deeply modified due to the flatness of the Landau levels. The total quenching of the kinetic energy allows stabilization of a fully saturated ferromagnetic state for odd integer factors. Such a state is exactly described by a single Slater determinant in the limit of negligible Landau level mixing. This is a situation where the Hartree-Fock approximation is exact. This phenomenon is known as « quantum Hall ferromagnetism ». On top of this simple many-body ground state there are collective excitations — spin waves or magnons — that enable the transport of magnetic moment or spin over macroscopic distances. In this peculiar magnet there is an entanglement of spin and charge dictated by the quantum Hall physics, so that any change in the spin texture modifies the charge distribution. This leads notably to the fact that spin waves carry an electric dipole moment.
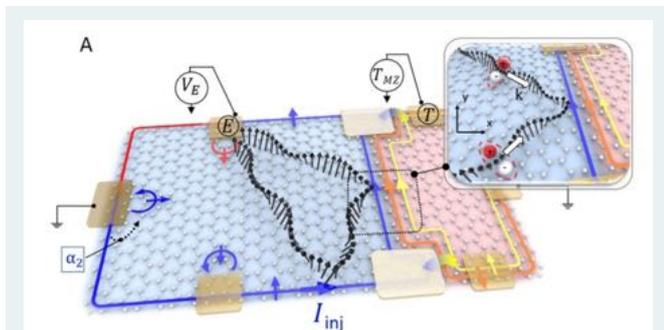
Figure 1: *The Mach-Zehnder interferometer fabricated from a graphene monolayer. Red and blue regions are the two sides of the P-N junction. The spin-wave modes emitted in the blue region interact with the electron current at the junction. The inset shows the microscopic detail of the interaction with the dipolar moments.*

This electric dipole moment has been revealed by electric measurements performed on a artificial nanofabricated device which is a Mach-Zehnder interferometer. Monolayer graphene is a convenient platform to manipulate electrons in the quantum Hall regime. Indeed it displays a very rich sequence of quantum Hall plateaus with lifting of spin and valley degeneracies. Gating such a sample allows to fabricate a junction between two regions of N and P character. In the N region, one spin-up channel circulates anticlockwise along the boundary, while in the P region two channels of opposite spins ($\uparrow, \downarrow$) circulate clockwise. By applying side gates at the intersections between the physical edge of the graphene device and the P-N interface, we can realize two valley splitters leading to coherent mixing of the copropagating but opposite-valley channels of the P-N interface. So, a Mach-Zehnder interferometer is formed at the P-N junction interface where the electronic quantum Hall edge modes replace light. Visibility and phase of the fringes can be then measured while varying the magnon flux impinging onto the P-N junction. A unique property of magnons in quantum Hall ferromagnets is that they carry an electric-dipole moment which is perpendicular to the direction of propagation. The interaction between the electric dipole moment of propagating magnons and the electrons propagating in one path of the Mach-Zehnder interferometer, together with the momentum transfer once spin-waves are reflected at the interferometer interface modifies the Aharonov-Bohm flux through the interferometer. There is thus a measurable phase shift due to the magnons. Dephasing by the magnons into the interferometer is found to depend on the sign of the magnon electric dipole moment. We have shown that the phase shift is related to the sign of this moment and the visibility loss depends exponentially on the total magnon current.

Detection and manipulation of spin waves based on their electric dipole moment opens the field for a new type of coherent magnon quantum circuits that will be electrostatically controlled. This work arises from a collaboration involving the experimental nanoelectronics group of SPEC laboratory of DRF/IRAMIS.

[1] A. Assouline et al., Nature Physics 17, 1369 (2021).

Quantum information: quantum key distribution and novel quantum processor architecture

Quantum Key Distribution stands as a cornerstone application within quantum communications. It serves as a cryptography protocol enabling two parties to share a cryptographic key. When combined with one-time pad, the key can be used to secure communications with provable security guarantees — guarantees that are obtained from a mathematical proof rooted in information theory and quantum physics principles.
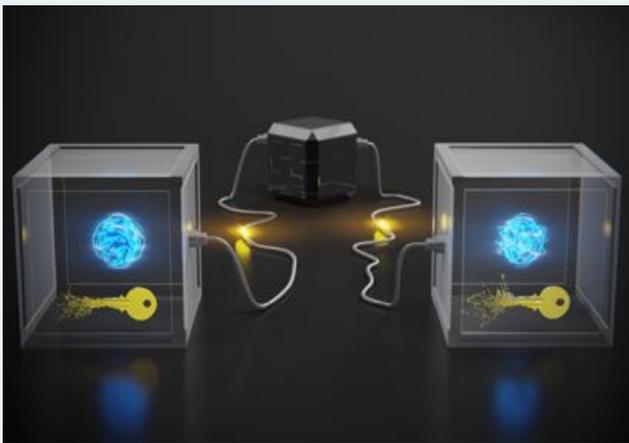
Figure 1: *Artistic representation of device-independent quantum key distribution (Graphics: Scixel/Enrique Sahagú).*

The security of existing quantum key distribution protocols relies however on assumptions on the functioning of quantum devices used to get the key. When these assumptions are not met due to imperfections or simplifications in the implementation, hacking becomes possible and compromises the security of the key. In order to reduce the vulnerability to these attacks, we provided the theoretical groundwork needed to demonstrate experimentally, for the first time, an approach to quantum key distribution that uses high-quality quantum entanglement to provide security guarantees which does not rely on assumption about the functioning of quantum devices used to get the key. The result has been published in Nature **[1]** and received news & views both in [Nature](#) and in [APS](#). This work was also cited by the Nobel Committee in the [Scientic background](#) supporting their decision to award the Nobel Prize in Physics 2022 to Alain Aspect, John F. Clauser and Anton Zeilinger. Very recently, we have also identified superconducting circuits as a

promising platform for an implementation of the new quantum key distribution scheme with improved key rates and longer distances **[2]**.

The standard approach for building a **quantum computer** consists in realizing a massive processor with millions of qubits. This raises significant engineering challenges in qubit integration and packaging, refrigerated space and cooling power.

Figure 2: *Artistic view of a quantum computer architecture with a 2D grid of qubits as the quantum processor, coupled with a quantum memory.*

We have considered an alternative architecture where a small processor is combined with a memory. As in a classical computer, the basic idea is to store all the information in a quantum memory and process the information a few qubits at a time. We have shown that this reduces the number of qubits in the processor by two orders of magnitude for performing large-scale algorithms. One additional order of magnitude is even achievable by choosing an appropriate error correction code. Details have been published in Physical Review Letters **[3]**. They received an editor's suggestion and a synopsis from [Physics](#).

[1] V. Zapatero et al., [NPJ Quantum Information 9, 10 (2023)](#).

[2] S. Storz et al., [Nature 617, 265 (2023)](#).

[3] E. Gouzien, N. Sangouard, [Phys. Rev. Lett. 127, 140503 (2021)](#).

An equation for the growth of cities

Vincent Verbavatz and Marc Barthelemy (IPhT) proposed a new equation, published in the journal Nature [1], to explain how city populations evolve over time.
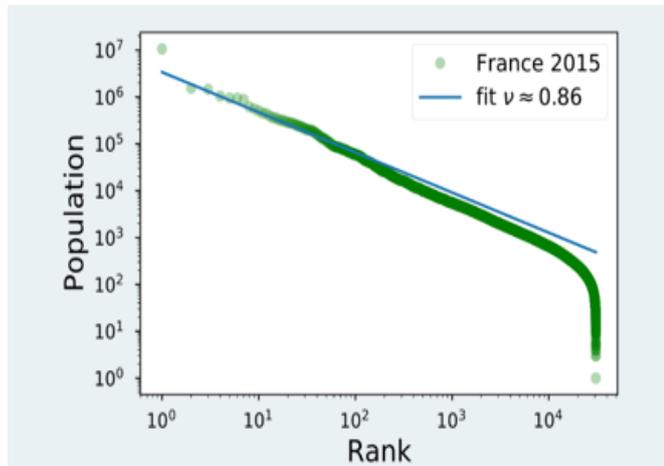
Figure 1: *Zipf plot for France (2015): population of cities versus their rank. The line is a power-law fit of the form* $P \sim r^{-\nu}$ *with exponent* $\nu = 0.86$.

One of the most debated questions in urban science is why some cities become megacities, while others stagnate or even disappear. Why did the small Gallic oppidum of Lutetia became the great metropolis that is Paris today, while a few hundred kilometers away, Autun, founded by Augustus as "Rome's sister", didn't exceed 20,000 inhabitants for 2,000 years? In most countries around the world, the urban population is in fact very unevenly distributed: a world city, a few large cities, a good number of medium-sized towns and many small towns. Mathematically, economic theory has until now described this distribution of urban populations within a country by a statistical law: the Zipf's law (see figure 1). Described in 1949 by Georges Zipf [2], this law stipulates that if we rank the cities of a country according to their population in descending order (the largest city therefore has rank $r = 1$), the population of a city is inversely proportional to its rank: $P \sim 1/r$ (so the most populous city in a country is generally twice as large as the second largest, etc.). This statistical regularity, observed in many countries and at many times, has been the subject of numerous studies for over a century. To explain such a distribution, the French economist Xavier Gabaix [3] proposed at the end 90s, that Zipf's law was the natural consequence of the randomness of births and migrations which led to the inevitable inequality of cities: some cities succeed, others don't. The problem seemed to have been solved, but the recent availability of large amounts of data allowed to test Zipf's law and showed that it is not always verified (see figure 1 for France). In reality, the distribution of urban populations is much more complex, and can vary over time. What's more, Gabaix's small everyday shocks are not enough to explain the great historical urban shocks: the gold rush, major epidemics, new towns, industrial decline [4]. By analyzing demographic and migration data for several countries and over several periods, Verbavatz and Barthelemy were able to quantify the different contributions to urban population evolution: the demographic balance (births and deaths), international migration, and inter-city migration (moves from one city to another within the same country). From these results, they were able to write a new dynamic equation describing the temporal evolution of a country's urban populations. They were then able to show that it is the major inter-city migration shocks that govern temporal variations in urban populations. These shocks are rare, but sufficiently important to change the destiny of cities, making them emerge or disappear: during the Gold Rush, San Francisco's population rose from just over 1,000 to 150,000 between 1850 and 1870, or in France, the population of Le Creusot increased more than tenfold between 1831 and 1856, with the arrival of the Schneider family.

Verbavatz and Barthelemy's work offers a new perspective on the fate of cities. In particular, it's the one-off but major waves of urban migration that explain why some cities emerge and others disappear. Ultimately, this equation carries an optimistic message: it shows that a city's destiny is not fixed and does not depend solely on its demography. The success of cities can be explained by external shocks, and urban policy and planning decisions therefore have a major role to play in enhancing a city's attractiveness, and can completely alter its evolutionary dynamics and future history.

[1] V. Verbavatz, M. Barthelemy, Nature 587, 397 (2020).

[2] G. K. Zipf, Human Behavior and the Principle of Least Effort (Addison-Wesley, 1949).

[3] X. Gabaix, Q. J. Econ. 114, 739 (1999).

[4] M. Batty, Nature 444, 592 (2006).

IPhT 60

Le Service de Physique Théorique (SPhT) was officially created on the 21st of February 1963 with ``the goal to study fundamental problems of physics related to experimental research conducted at the CEA''. This group, comprising some twenty theoreticians, had grown out of a much larger unit, *le Service de Physique Mathématique* that involved, from the very early years of the CEA, engineers and physicists working on nuclear reactors. The SPhT was headed by Claude Bloch, who was surrounded by prominent scientists such as Jacques Bros, Jacques des Cloizeaux, Henri Cornille, Cirano de Dominicis, Marcel Froissart, Michel Gaudin, Claude Itzykson, Maurice Jacob, Madan Lal Mehta, Albert Messiah — who gave the first lectures in France on Quantum Mechanics and wrote a celebrated treatise —, André Morel, Henri Navelet, and Raymond Stora.

On the 9th and 10th of November 2023, the IPhT (the name that the SPhT seamlessly took in 2008) proudly celebrated its 60th birthday during a two-days conference, *IPhT 60*, gathering various generations of scientists and administrative staff who contributed to the prestige and the creativity of our laboratory. We had the pleasure to reunite some of the founding scientists of the 1963 group, Roger Balian, Gilles Cohen-Tannoudji, Gilbert Mahoux, Pierre Moussa, George Ripka, and many of the senior physicists that built the fame of the lab during the 70's and the 80's with current and past members of the IPhT. It appeared clearly that our laboratory, with its very distinctive identity, its constant thrive for excellence, and its privileged working conditions, leaves an everlasting imprint on those who ever lived within its walls. This feeling of belonging to a unique family — of secretaries, researchers, computer engineers and other support staff — was emphasized by the exhibition of hundreds of photographs mixing generations, guests from all over the world, places and circumstances, recalling joyful and cherished memories. Another moving event was the screening in the Bloch amphitheater of the 1967 film about the SPhT, ``*Les Physiciens théoriciens*'' — with some of the featured physicists present in the audience — followed by a new movie, *"IPhT, une expérience théorique"*, made in 2023, on the present-day IPhT. The scientific program gave us an opportunity to highlight past and present research conducted at the IPhT. Starting with an historical survey by Roger Balian, who explained the instrumental role played by the CEA and the IPhT to rebuild fundamental physics in France after World War II, reminiscences of some major contributions on the renormalisation group, field theory and conformal models were told by Edouard Brézin, Jean Zinn-Justin and Jean-Bernard Zuber. Many talks were devoted to ongoing science, covering all subfields of theoretical physics represented at the IPhT, from cosmology to particle theory and strings, hard and soft condensed matter, mathematical and statistical physics. A particularly touching tribute was paid to our recently deceased colleagues, Jacques Bros, Henri Navelet, Michel Gaudin, and Jacques des Cloizeaux. Their pioneering works on S-Matrix theory, Regge-pole phenomenology, integrable systems, and polymers remain a major source of inspiration for contemporary and future research. Building on its tradition of excellence, thanks to its broad spectrum and its unique atmosphere, the IPhT has no other choice but to hold its rank in the future!

Web site of IPhT 60: https://indico.in2p3.fr/event/30681/

"IPhT une expérience théorique" is available on IPhT-TV@YouTube

The long tradition of Itzykson meetings

Claude Itzykson

After the tragic premature death of Claude Itzykson on May 22, 1995, a conference to honor his memory was organized. The title of the conference, which took place at L'Orme des Merisiers on June 5-7, 1996 was "The mathematical beauty of Physics". It was decided during the conference that it would be the first one in a series, though at the time we had no idea of the long term. The Itzykson meetings were born.

They have taken place ever since, with a single exception due to the pandemics. The first editions were centered around specific scientific interests of Claude, which were broad. However, over the years the themes have evolved and are now motivated only by recent scientific advances, covering a very large area of modern hard science. Even the ones that happen to fit with Claude's activities illustrate the very rapid evolution of theoretical physics.

Though a major fraction of the community has had no overlap with Claude's period of activity the international impact of both the name and the content of the meetings is outstanding. The success has been constant, and even such a long time after Claude passed away, his name is still able to gather scientific communities.

Though there are no formal rules imposed on the organizers, it emerged over the years that the meetings have always given promising young researchers the chance to give a talk alongside with the world leading experts. The equilibrium between local and international speakers, and a lasting focus on pedagogy are also among the notable strong points.

The meetings of the period of the evaluation were:

- *27ème rencontre Claude Itzykson* (31 Mai - 2 Juin 2023) Fluctuation far from equilibrium
  [Organizers: Kirone Mallick, Tomohiro Sasamoto].

- *26ème rencontre Claude Itzykson* (6-10 juin 2022) Black-hole microstructure IV
  [Organizers: Iosif Bena, Andrea Puhm, and Nick Warner].

- *25ème rencontre Claude Itzykson* (2-4 juin 2021) Many-Body Chaos, Scrambling and Thermalization in Interacting Quantum Systems
  [Organizers: Monica Guica, Marco Schirò, and Pierfrancesco Urbani].

- *24ème rencontre Claude Itzykson* (5-7 juin 2019) Effective Field Theory in Cosmology, Gravitation and Particle Physics
  [Organizers: Brando Bellazzini, John Joseph Carrasco, and Filippo Vernizzi]

- *23ème rencontre Claude Itzykson* (4-6 juin 2018) Statistical Physics of Disordered and Complex Systems: a Tribute to Cirano de Dominicis
  [Organizers: Giulio Biroli, Edouard Brézin, and Henri Orland].

They illustrate, even at first glance, the variety of topics covered by the event, but also the balance between summaries related to lasting pillars of our activities and timely contributions reviewing breakthroughs in leading-edge themes for which we are important stakeholders.

The series of Itzykson meetings is among the most visible highlights of the IPhT activities. We now look forward the 30th edition.

Black-Hole microstructure conferences

The microscopic description of black holes has been a challenge for more than forty years. General Relativity predicts that, for a given mass, charge and angular momentum, a black hole is unique, while Quantum Mechanics predicts that a black hole must have an enormous entropy, of order the black-hole horizon area expressed in Planck units. This means that the black hole at the center of the Milky Way must have about $e^{10^{90}}$ microstates.
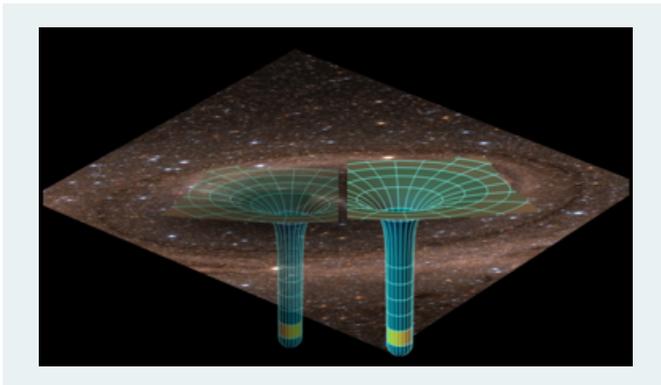
Classically, locking such a vast amount of information inside a black hole is not a problem. However, Quantum Mechanics also predicts that black holes evaporate slowly into a cloud of Hawking radiation, and since this radiation is generated just outside the horizon, it is subject to the uniqueness theorems of General Relativity, and is therefore featureless, thermal radiation. The Hawking process encodes none of the details of the vast number of black-hole microstates, and cannot encode anything about how the black hole formed. All this information is lost, and this vast discrepancy, the largest in all physics, violates the core principles of Quantum Mechanics, and lies at the root of many unsolved puzzles, of which the best known is Hawking's Information Paradox.

There are now quite a number of promising approaches to solving this problem and the primary goal of this conference series has been to bring together experts in these areas to identify synergies, engage in constructive criticism and resolve apparent conflicts. Initially, we only planned to have one or two such conferences, supported by Nick Warner's ERC Advanced Grant (which was hosted by the IPhT). However, the success of the first conferences, even though they were driven online by the coronavirus epidemic, has led us to continue this series as "in-person" meetings.

These conferences have played an important role in bringing together several communities of theoretical physicists, ranging from researchers working on string-theoretic constructions of black-hole microstructure, on holographic approaches to the information paradox, all the way to researchers working on experimental signatures of departures from General Relativity. While the core of this conference series has focussed on the string-inspired fuzzball proposal, each conference has had a day dedicated to possible future observations of black-hole microstructure, and an additional one-day focus on a topical theoretical proposal that could deeply inform the whole enterprise of modeling black-hole microstructure.

These meetings have opened an invaluable dialog between the formal-theoretical black-hole-physics community and the observation-based community that seeks to develop effective models, and characteristic signatures, of the microscopic structure that must emerge at the horizon scale if the information paradox is to be resolved. The discussions and collaborations that have emerged from these interactions provide the groundwork for seeking out near-horizon deviations from General Relativity in future observations of LIGO, LISA, and the Event Horizon Telescope.

More fundamentally, this work will also lead to a much deeper formulation of Quantum Gravity, going far beyond the conflicting paradigms of Quantum Mechanics and General Relativity.

- BH Microstructure VI: June 10-14, 2024
- BH Microstructure V: June 5-9, 2023
- BH Microstructure IV: June 6-10, 2022
- BH Microstructure III: June 7-11, 2021
- BH Microstructure II: December 9-11, 2020
- BH Microstructure I: June 8-12, 2020

Poincaré Seminar, le retour

The goal of the Poincaré Seminar is to provide up-to-date information about general topics of great interest in physics. Both the theoretical and experimental aspects of the topic are covered, generally with some historical background. Inspired by the Nicolas Bourbaki Seminar in mathematics, hence nicknamed "Bourbaphy", the Poincaré Seminar is regularly held at the Institut Henri Poincaré (IHP) in Paris, with written contributions prepared in advance. Particular care is devoted to the pedagogical nature of the presentations, so that they may be accessible to a large audience of scientists. The Seminar is supported by CEA, CNRS, and the Daniel Iagolnitzer Fundation, and managed by a committee, a number of whose members belong to IPhT.

The volume of the Poincaré Seminar Series, *Information Theory*, published in the Birkhäuser Series Progress in Mathematical Physics, corresponded to the twenty-third such seminar, held on November 17th, 2018 at IHP. Its aim was to provide a thorough description of information theory and some of its most active areas, in particular its relation to thermodynamics at the nanoscale and the Maxwell Demon, and the emergence of quantum computation and of its counterpart, quantum verification.

After a long break, largely due to the pandemic, a new session of the Séminaire Poincaré was held on December 16th, 2023, entitled *Quantum Gravity*. A focus was on deep mathematical advances in the field of random planar maps and their continuous limit, Liouville quantum gravity. On the physics side, recent breakthroughs in the theory of amplitudes in gravity were described.

[1] Poincaré Seminar website.
[2] *Information Theory*, Poincaré Seminar 2018, Birkhäuser.
    Information Theory, Poincaré Seminar 2018, articles.
[3] *Quantum Gravity*, Poincaré Seminar 2023, articles.

IPhT courses in theoretical physics
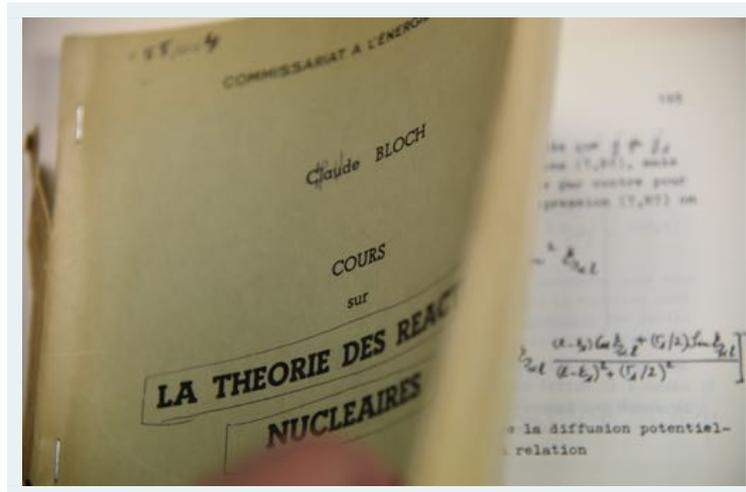
Following a long tradition that goes back to the first theoretical-physics courses given at the CEA Saclay by Messiah and Bloch since 1955, and to those given at the *Service de Physique Théorique* by Itzykson & Zuber, Brézin & Zinn-Justin…, theoretical-physics courses have been held regularly at the IPhT. As can be seen from the online course archive, 126 IPhT courses were given from 1996 to March 2024 by more than 100 lecturers.

Held by IPhT staff researchers or by invited experts, open to everyone, the IPhT courses typically consist of 4 to 6 two-hour lectures attended by graduate students and researchers from the Paris area. Attendance certificates issued to participating students are recognized by the local doctoral school, the EDPIF, for the mandatory training. Since 2021 the courses are also live broadcast on video conference.

The level of an IPhT course is decided on a case-by-case basis, ranging from pedagogical presentations of a standard, well-established subject to the latest advances in a rapidly evolving topic. Topics include traditional theoretical physics — mathematical physics, high-energy physics, cosmology, statistical physics, condensed matter, etc. — but may also extend to mathematics, computer science, biology.

Most of the courses are accompanied by lecture notes; review articles and books have been written following IPhT courses. Since November 2016, video recordings of the lectures are usually made available on the IPhT-TV YouTube channel.

In 2021 the IPhT started a collaboration with the prestigious open-access scientific journal *SciPost* to publish the lecture notes of the IPhT courses. This led to the *IPhT Lecture Notes Series*, part of *SciPost Physics Lecture Notes*. The first lecture notes of the series are in the process of being collected.

In the 2018—2023 period, 24 courses were held at IPhT:

- *Riemann surfaces*, B. Eynard (IPhT);
- *Asymptotic symmetries, black holes, and holography*, M. Guica (IPhT);
- *Unsupervised neural networks: from theory to systems biology*, R. Monasson (ENS);
- *Dark matter phenomenology*, M. Cirelli (LPTHE);
- *From Classical Gravity to Quantum Amplitudes,* Th. Damour (IHES);
- *Quench dynamics and relaxation in isolated integrable quantum spin chains*, M. Fagotti (LPTMS);
- *Black holes and microstate geometries,* N. Warner (USC, IPhT);
- *Parallel programming for physicists,* F. Gelis (IPhT) & G. Misguich (IPhT);
- *Lorentzian methods in conformal field theory*, S. Rychkov (IHES, ENS);
- *Topological Phases of Matter*, C. Bena (IPhT) & Th. Jolicoeur (IPhT);
- *Exploring High-Energy Physics with Jets*, G. Soyez (IPhT);
- *Celestial holography primer*, A. Puhm (CPhT, École Polytechnique);
- *The Analytic S-matrix*, A. Zhiboedov (CERN);
- *Resurgence Methods and Applications*, R. Schiappa (IST, ULisboa);
- *Gravitational waves in a nutshell*, M. Vallisneri (Caltech/JPL, IPhT);
- *Quantum chaos and eigenstate thermalization*, M. Srednicki (UCSB);
- *Introduction to Topological Recursion*, B. Eynard (IPhT);
- *Rough paths for physicists*, M. Bauer (IPhT);
- *The space of holographic CFTs*, E. Perlmutter (IPhT);
- *Advances in 2D holography*, L. Iliesiu (Stanford U);
- *Mathematical problems in Machine Learning*, A. Montanari (Stanford U);
- *Introduction to quantum integrability*, J. Lamers (IPhT);
- *Naturalness in QFT after the LHC*, R. T. D'Agnolo (IPhT);
- *The string worldsheet approach to AdS3/CFT2*, N. Kovensky (IPhT).

IPhT-TV: the IPhT YouTube channel

Launched in 2015, the IPhT-TV YouTube channel has become the main communication platform of the IPhT over the years.

With the purchase of the first video recording system for the IPhT seminar room, in 2016, video recordings of scientific seminars, outreach seminars, and lectures held at the IPhT began to be systematically uploaded to IPhT-TV.

In 2020, the IPhT made a significant investment to equip the seminar room with a new video recording, video conferencing and live streaming system, which was also capable of flawlessly and correctly capturing questions and comments from the audience, both in person and in the virtual room, thereby increasing external participation in the events organized by the institute.

Specifically, the channel is organized in several playlists related to the different weekly seminars of the institute, and to the conferences and the courses held at the IPhT (see the highlight on IPhT courses in this portfolio).

Today, with more than 650 videos, IPhT-TV serves the scientific community as a rich, open-access resource for anyone, student, researcher, or just curious, interested in seminars and courses at various levels in theoretical and mathematical physics, and their latest developments.
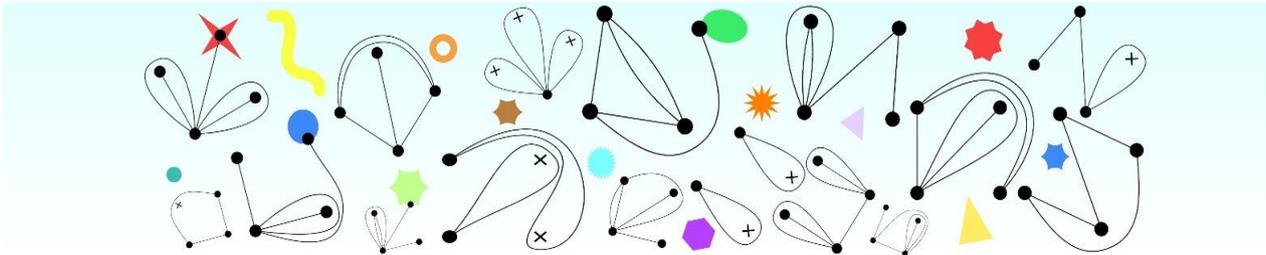
Institut de Physique Théorique de Saclay

Hcéres evaluation 2024

Self-evaluation report - January 2018 – December 2023

APPENDICES

Communications in conferences

PhD theses

Journal articles

Books

Données administratives
(tableau des données de caractérisation et de production des unités de recherche)

Communications in conferences

Authors	Title	Conference	City	Country	Year	HAL link
JAISWAL S., BLAIZOT J.-P., BHALERAO R. S., CHEN Z., JAISWAL A., YAN L.	Why are hydrodynamic theories applicable beyond the hydrodynamic regime?	30th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Houston	États-Unis	2023	https://hal.archives-ouvertes.fr/hal-04382160
SAMANTA R., BHATTA S., JIA J., LUZUM M., OLLITRAULT J.-Y.	Transverse momentum fluctuation in ultra-central Pb+Pb collision at the LHC	30th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Houston	États-Unis	2023	https://hal.archives-ouvertes.fr/hal-04396962
GELIS F., HAUKSSON S.	Study of a longitudinally expanding plasma with the 2PI effective action	30th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Houston	États-Unis	2023	https://hal.archives-ouvertes.fr/hal-04372746
BARATA J., BLAIZOT J.-P., MEHTAR-TANI Y.	Quantum to classical parton evolution in the QGP	30th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Houston	États-Unis	2023	https://hal.archives-ouvertes.fr/hal-04396924
LUZUM M., PICCHETTI J.-P., HIPPERT M., OLLITRAULT J.-Y.	Studying short-range nuclear correlations using relativistic heavy-ion collisions	30th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Houston	États-Unis	2023	https://hal.archives-ouvertes.fr/hal-04396944
GRAVIER J., BARTHELEMY M.	« Lois d'échelle » et dynamiques des activités urbaines dans une ville en croissance	4e Journée d'étude SoDUCo/BnF. Res(t)ituer les annuaires commerciaux et les évolutions de l'espace Parisien du XIXe siècle - Partager l'expérience et les ...	Paris	France	2023	https://hal.archives-ouvertes.fr/hal-04275430
GRAVIER J., BARTHELEMY M.	Exploitation des données Soduco : premiers éléments de l'évolution des activités parisiennes au fil du siècle	2e Journée d'étude SoDUCo/BnF. Res(t)ituer les adresses des almanachs et annuaires commerciaux parisiens du XIXe siècle. Un corpus de localisations urbaines à grande échelle	Paris	France	2022	https://hal.archives-ouvertes.fr/hal-03961814
GARDIM F. G., OLLITRAULT J.-Y.	Effective shear and bulk viscosities of the quark-gluon plasma: QCD versus heavy-ion data	29th International Conference on Ultra-relativistic Nucleus-Nucleus Collisions	Krakow	Pologne	2022	https://hal.archives-ouvertes.fr/hal-03758528
STRATAKIS D., MOKHOV N., PALMER M., PASTRONE N., RAUBENHEIMER T., ROGERS C., SCHULTE D., SHILTSEV V., TANG J., ...	A Muon Collider Facility for Physics Discovery	Snowmass 2021	Seattle	États-Unis	2022	https://hal.archives-ouvertes.fr/hal-03778315
BARTOSIK N., KRIZKA K., PAGAN GRISO S., AIMÉ C., APYAN A., AGASHE K., ALLANACH B.C., ANDREETTO P., ASADI P., MAHMOUD M. A. et al.	Simulated Detector Performance at the Muon Collider	Snowmass 2021	Seattle	États-Unis	2022	https://hal.archives-ouvertes.fr/hal-03778312
BLAIZOT J.-P.	Emergence of hydrodynamics in expanding relativistic plasmas	Excited QCD 2022	Sicily	Italie	2022	https://hal.archives-ouvertes.fr/hal-04236030
JINDARIANI S., MELONI F., AIME C., BARTOSIK N., BARZI E., BERTOLIN A., BRAGHIERI A., BUONINCONTRI L., CALZAFERRI S., ...	Promising Technologies and R&D Directions for the Future Muon Collider Detectors	Snowmass 2021	Seattle	États-Unis	2022	https://hal.archives-ouvertes.fr/hal-03778310
BETEA D., BOUTTIER J., WALSH H.	Multicritical random partitions	33st International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2021)	Ramat Gan	Israël	2022	https://hal.archives-ouvertes.fr/hal-03043379
D'ENTERRIA D., KLUTH S., ZANDERIGHI G., AYALA C., BENITEZ-RATHGEB M.A., BLUEMLEIN J., BOITO D., BRAMBILLA N., BRITZGER D., CAMARDA S. et al.	The strong coupling constant: State of the art and the decade ahead	Snowmass 2021	Seattle	États-Unis	2022	https://hal.archives-ouvertes.fr/hal-03629828
FENG J. L., KLING F., RENO M. H., ROJO J., SOLDIN D., ANCHORDOQUI L. A., BOYD J., ISMAIL A., HARLAND-LANG L., KELLY K. J. et al.	The Forward Physics Facility at the High-Luminosity LHC	Snowmass 2021	Seattle	États-Unis	2022	https://hal.archives-ouvertes.fr/hal-03616966
RIERA B., MAZE C., DEBERNARD S., PHILIPPOT A., GALAUP M., PANZOLI D., RENARD D., PETTINELLI B., EYNARD B.	Hybridization of automation practical courses	IFAC Symposium on Advances in Control Education (ACE)	Hamburg	Allemagne	2022	https://hal.archives-ouvertes.fr/hal-03961582
FOX P. J., KRIBS G. D., MURAYAMA H., ABOUBRAHIM A., AGRAWAL P., ALTMANNSHOFER W., BAER H., BANERJEE A., BARGER V., BATELL B. et al.	TF08 Snowmass Report: BSM Model Building	Snowmass 2021	Seattle	États-Unis	2022	https://hal.archives-ouvertes.fr/hal-03822977
BERLIN A., BELOMESTNYKH S., BLAS D., FROLOV D., BRADY A. J., BRAGGIO C., CARENA M., CERVANTES R., CHECCHIN M., CONTRERAS-MARTINEZ C., TITO D'AGNOLO R. et al.	Searches for New Particles, Dark Matter, and Gravitational Waves with SRF Cavities	Snowmass 2021	Seattle	États-Unis	2022	https://hal.archives-ouvertes.fr/hal-03630746
SARAO MANNELLI S., URBANI P.	Analytical Study of Momentum-Based Acceleration Methods in Paradigmatic High-Dimensional Non-Convex Problems	Advances in Neural Information Processing Systems, 2021	Virtual-only Conference	États-Unis	2021	https://hal.archives-ouvertes.fr/hal-04425461
CHATTERJEE S. S., PALAZZO A.	Resolving the NOvA and T2K tension in the presence of Neutrino Non-Standard Interactions	22nd International (ONLINE) Workshop on Neutrinos from Accelerators	Cagliari	Italie	2021	https://hal.archives-ouvertes.fr/hal-03559841
KOVENSKY N., POOLE A., SCHMITT A.	Predictions for neutron stars from holographic nuclear matter	33rd International (ONLINE) Workshop on High Energy Physics	Online	Russie	2021	https://hal.archives-ouvertes.fr/hal-03514098
VANHOVE P.	S-matrix approach to general gravity and beyond	55th Rencontres de Moriond on QCD and High Energy Interactions	Online	Italie	2021	https://hal.archives-ouvertes.fr/hal-03217625
BERLIN A., BRUGGEN M., BUCHMUELLER O., CHEN P., D'AGNOLO R. T., DENG R., ELLIS J.R., ELLIS S., FRANCHETTI G., IVANOV A., JOWETT J.M., KOBUSHKIN A.P., LEE S.Y., LISKE J., OIDE K., RAO S., WENNINGER J., WELLENZOHN M., ZANETTI M., ZIMMERMANN F.	Storage Rings and Gravitational Waves: Summary and Outlook	ARIES WP6 Workshop: Storage Rings and Gravitational Waves	Online	Suisse	2021	https://hal.archives-ouvertes.fr/hal-03235743
LOUAIL T., BARTHELEMY M.	A dominance tree approach to systems of cities	European Colloquium on Theoretical and Quantitative Geography 2021 (ECTQG'21)	Manchester	Royaume-Uni	2021	https://hal.archives-ouvertes.fr/hal-03495424
SALATI P., BOUDAUD M., DEROME L., GENOLINI Y., LAVALLE J., MAURIN D., SERPICO P. D.	New cosmic ray MIN-MED-MAX benchmark models for dark matter indirect signatures	ICRC 2021 - 37th International Cosmic Ray Conference - Dark Matter	Berlin	Allemagne	2021	https://hal.archives-ouvertes.fr/hal-03359022
DAS A., ELLIS S. A., SCHUSTER P. C., ZHOU K.	Direct Detection of Dark Asteroid	17th International Conference on Topics in Astroparticle and Underground Physics	Valencia	Espagne	2021	https://hal.archives-ouvertes.fr/hal-03591365
IOANNOU M., PEREIRA M. A., RUSCA D., GRUNENFELDER F., BOARON A., PERRENOUD M., ABBOTT A. A., SEKATSKI P., BANCAL J.-D., MARING N., ZBINDEN H., BRUNNER N.	Receiver-device-independent quantum key distribution	SPIE Photonics Europe 2022	Strasbourg	France	2021	https://hal.archives-ouvertes.fr/hal-03758740
SERENONE W. M., GRASSI F., HIRAYAMA R., OLLITRAULT J.-Y.	A method for computing cumulants in relativistic heavy-ion collisions	44th Brazilian Workshop on Nuclear Physics	Online	Brésil	2021	https://hal.archives-ouvertes.fr/hal-03823011
BRITTO R., JEHU G. R., ORTA A.	Proving the dimension-shift conjecture	15th International Symposium on Radiative Corrections: Applications of Quantum Field Theory to Phenomenology AND LoopFest XIX: Workshop on Radiative Corrections for the LHC and Future Colliders	Tallahassee	États-Unis	2021	https://hal.archives-ouvertes.fr/hal-03424321
CAUCAL P., IANCU E., MUELLER A., SOYEZ G.	Jet fragmentation function in heavy-ion collisions	10th International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions	Austin	États-Unis	2020	https://hal.archives-ouvertes.fr/hal-02946157
MIGNACCO F., KRZAKALA F., LU Y., ZDEBOROVA L.	The role of regularization in classification of high-dimensional noisy Gaussian mixture	International Conference on Machine Learning	Virtual event	France	2020	https://hal.archives-ouvertes.fr/cea-02529853
MIGNACCO F., KRZAKALA F., URBANI P., ZDEBOROVA L.	Dynamical mean-field theory for stochastic gradient descent in Gaussian mixture classification	Advances in Neural Information Processing Systems	Online	Canada	2020	https://hal.archives-ouvertes.fr/hal-02983444
STEFANO S. M., BIROLI G., CAMMAROTA C., KRZAKALA F., URBANI P., ZDEBOROVA L.	Complex Dynamics in Simple Neural Networks: Understanding Gradient Flow in Phase Retrieval	2020 Conference on Neural Information Processing Systems - NeurIPS 2020	Vancouver	Canada	2020	https://hal.archives-ouvertes.fr/hal-02983829
AFFOLTER N., GLICK M., PYLYAVSKYY P., RAMASSAMY S.	Vector-relation configurations and plabic graphs (extended abstract)	Proceedings of the 32nd Conference on Formal Power Series and Algebraic Combinatorics	Ramat Gan	Israël	2020	https://hal.archives-ouvertes.fr/hal-03364756
KOSTOV I.	The Octagon Form Factor in $\mathcal{N}=4$ SYM and Free Fermions	13th International Workshop on Lie Theory and Its Applications in Physics	Varna	Bulgarie	2019	https://hal.archives-ouvertes.fr/hal-03034768
NAPOLETANO D.	V and heavy flavour production: status and recent theoretical developments	7th Large Hadron Collider Physics Conference	Puebla	Mexique	2019	https://hal.archives-ouvertes.fr/hal-02309007
DUCLOUE B., IANCU E., MUELLER A.H., SOYEZ G., TRIANTAFYLLOPOULOS D.N.	Collinear resummations for the non-linear evolution in QCD at high energy	28th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Wuhan	Chine	2019	https://hal.archives-ouvertes.fr/hal-02475214
BONNEFOY G., DUDAS E., LUST S.	Weak gravity (and other conjectures) with broken supersymmetry	19th Hellenic School and Workshops on Elementary Particle Physics and Gravity	Corfu	Grèce	2019	https://hal.archives-ouvertes.fr/hal-02550054
GARDIM F. G., GRASSI F., ISHIDA P., LUZUM M., OLLITRAULT J.-Y.	p_T-dependent multiplicity fluctuations from PCA and initial conditions	28th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Wuhan	Chine	2019	https://hal.archives-ouvertes.fr/hal-02491254
JOLIVET F., FOURNIER C., TABARY J., ZDEBOROVA L., BRAMBILLA A.	Reconstruction itérative en tomographie à rayons X pour une géométrie inverse avec sources distribuées	XXVIIème coloque GRETSI	Lille	France	2019	https://hal.archives-ouvertes.fr/cea-02290895
AMOROSO S., AZZURRI P., BENDAVID J., BOTHMANN E., BRITZGER D., BROOKS H., BUCKLEY A., CALVETTI M., CHEN X., CHIESA M. et al.	Les Houches 2019: Physics at TeV Colliders: Standard Model Working Group Report	11th Les Houches Workshop on Physics at TeV Colliders	Les Houches	France	2019	https://hal.archives-ouvertes.fr/hal-02518059
CAUCAL P., IANCU E., SOYEZ G.	Nuclear effects on jet substructure observables at the LHC	28th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Wuhan	Chine	2019	https://hal.archives-ouvertes.fr/hal-02475365
GARDIM F. G., GIACALONE G., LUZUM M., OLLITRAULT J.-Y.	Effects of initial state fluctuations on the mean transverse momentum	28th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Wuhan	Chine	2019	https://hal.archives-ouvertes.fr/hal-02497871
ABREU S., BRITTO R., DUHR C., GARDI E., MATTHEW J.	Diagrammatic Coaction of Two-Loop Feynman Integrals	14th International Symposium on Radiative Corrections	Avignon	France	2019	https://hal.archives-ouvertes.fr/hal-02432657
ABREU S., DORMANS J., FEBRES CORDERO F., ITA H., PAGE B., SOTNIKOV V.	Analytic form of planar two-loop five-parton scattering amplitudes in QCD	54th Rencontres de Moriond on QCD and High Energy Interactions	La Thuile	Italie	2019	https://hal.archives-ouvertes.fr/hal-02870789
BENDLE D., BOEHM J., DECKER W., GEORGOUDIS A., PFREUNDT F.-J., RAHN M., ZHANG Y.	Module Intersection for the Integration-by-Parts Reduction of Multi-Loop Feynman Integrals	MathemAmplitudes 2019: Intersection Theory and Feynman Integrals	Padova	Italie	2019	https://hal.archives-ouvertes.fr/hal-02987491
TOLDO C.	Holographic duals of refined partition functions	19th Hellenic School and Workshops on Elementary Particle Physics and Gravity	Corfu	Grèce	2019	https://hal.archives-ouvertes.fr/hal-02550055
GIACALONE G., GELIS F., GUERRERO-RODRIGUEZ P., LUZUM M., MARQUET C., OLLITRAULT J.-Y.	Evolution of fluctuations in the initial state of heavy-ion collisions from RHIC to LHC	18th International Conference on Strangeness in Quark Matter	Bari	Italie	2019	https://hal.archives-ouvertes.fr/hal-02392932
BETEA D., BOUTTIER J., NEJJAR P., VULETIĆ M.	New edge asymptotics of skew Young diagrams via free boundaries	31st International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2019)	Ljubljana	Slovénie	2019	https://hal.archives-ouvertes.fr/hal-02049722
ABREU S., DORMANS J., FEBRES CORDERO F., ITA H., PAGE B.	Analytics from numerics: five-point QCD amplitudes at two loops	11th FCC-ee workshop	Geneva	Suisse	2019	https://hal.archives-ouvertes.fr/hal-02383010
BHALERAO R. S., GIACALONE G., GUERRERO-RODRIGUEZ P., LUZUM M., MARQUET C., OLLITRAULT J.-Y.	Relating eccentricity fluctuations to density fluctuations in heavy-ion collisions	25th Cracow Epiphany Conference on Advances in Heavy Ion Physics	Cracow	Pologne	2019	https://hal.archives-ouvertes.fr/hal-02088584
ABREU S., BRITTO R., DUHR C., GARDI E., MATTHEW J.	Generalized hypergeometric functions and intersection theory for Feynman integrals	14th International Symposium on Radiative Corrections	Avignon	France	2019	https://hal.archives-ouvertes.fr/hal-02431440
GELIS F.	Early stages of heavy-ion collisions	QCD on the light cone: from hadrons to heavy ions	Palaiseau	France	2018	https://hal.archives-ouvertes.fr/hal-02467283
CAUCAL P., IANCU E., MUELLER A. H., SOYEZ G.	Jet fragmentation in a dense QCD medium	13th Conference on Quark Confinement and the Hadron Spectrum	Maynooth	Irlande	2018	https://hal.archives-ouvertes.fr/hal-01952686
MULIAN Y.	Multi-particle production in proton-nucleus collisions at high energy	Diffraction and Low-x 2018	Reggio Calabria	Italie	2018	https://hal.archives-ouvertes.fr/hal-02448981
NAGLE J.L., ORJUELA KOOP J.	A Quasiparticle Transport Explanation for Collectivity in the Smallest of Collision Systems (p + p and e^+ e^-)	27th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Venice	Italie	2018	https://hal.archives-ouvertes.fr/hal-02058407
DUCLOUE B., HANNINEN H., LAPPI T., ZHU Y.	Factorization of the soft gluon divergence from the dipole picture deep inelastic scattering cross sections at next-to-leading order	9th International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions	Aix-Les-Bains	France	2018	https://hal.archives-ouvertes.fr/hal-02136284
IANCU E., TAELS P., WU B.	Jet quenching parameter in an expanding QCD plasma	9th International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions	Aix-Les-Bains	France	2018	https://hal.archives-ouvertes.fr/hal-01975068
DUCLOUE B., IANCU E., LAPPI T., MUELLER A.H., SOYEZ G., TRIANTAFYLLOPOULOS D.N., ZHU Y.	On the use of a running coupling in the calculation of forward hadron production at next-to-leading order	27th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Venice	Italie	2018	https://hal.archives-ouvertes.fr/hal-02058423
ZUMALACARREGUI M.	No LIGO Macho: Size matters, the conclusion stands	53rd Rencontres de Moriond on Cosmology	La Thuile	Italie	2018	https://hal.archives-ouvertes.fr/hal-02946216
GIACALONE G., MARQUET C.	Signature of gluon saturation in forward di-hadron correlations at the Large Hadron Collider	27th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Venice	Italie	2018	https://hal.archives-ouvertes.fr/hal-01856664
ROGLY R., GIACALONE G., OLLITRAULT J.-Y.	Geometric scaling in symmetric nucleus-nucleus collisions	27th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Venice	Italie	2018	https://hal.archives-ouvertes.fr/hal-02058436
DUCLOUE B., LAPPI T., MANTYSAARI H.	Forward rapidity isolated photon production in proton-nucleus collisions	27th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Venice	Italie	2018	https://hal.archives-ouvertes.fr/hal-02058263
SEDMIK R., BRAX P.	Status Report and first Light from Cannex: Casimir Force Measurements between flat parallel Plates	10th International Conference on Precision Physics of Simple Atomic Systems	Vienna	Autriche	2018	https://hal.archives-ouvertes.fr/hal-01975414
LAGOUARDE J.-P., BHATTACHARYA B. K., CREBASSOL P., GAMET P., BABU S. S., BOULET G., BRIOTTET X., BUDDHIRAJU K. M., ...	The Indian-French Trishna Mission: Earth Observation in the Thermal Infrared with High Spatio-Temporal Resolution	IGARSS 2018 - 2018 IEEE International Geoscience and Remote Sensing Symposium	Valencia	Espagne	2018	https://hal.archives-ouvertes.fr/hal-02390710
ABREU S., BRITTO R., DUHR C., GARDI E., MATTHEW J.	Coaction for Feynman integrals and diagrams	14th DESY Workshop on Elementary Particle Physics: Loops and Legs in Quantum Field Theory 2018	St Goar	Allemagne	2018	https://hal.archives-ouvertes.fr/hal-01861980
CITRON Z., DAINESE A., GROSSE-OETRINGHAUS J.F., JOWETT J.M., LEE Y.-J., WIEDEMANN U.A., WINN M., ANDRONIC A., BELLINI F., BRUNA E. et al.	Future physics opportunities for high-density QCD at the LHC with heavy-ion and proton beams	HL/HE-LHC Workshop	Geneva	Suisse	2018	https://hal.archives-ouvertes.fr/hal-01974840
DUCLOUE B.	Forward particle production in proton-nucleus collisions at NLO	13th Conference on Quark Confinement and the Hadron Spectrum	Maynooth	Irlande	2018	https://hal.archives-ouvertes.fr/hal-01959952

GIACALONE G.	Nonlinear coupling of flow harmonics in heavy-ion collisions	27th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Venice	Italie	2018	https://hal.archives-ouvertes.fr/hal-02058612
NAPOLETANO D.	Heavy quark mass effects in associated production	26th International Workshop on Deep Inelastic Scattering and Related Subjects	Port Island	Japon	2018	https://hal.archives-ouvertes.fr/hal-01863397
DUMITRU A., GELIS F., LAPPI T., MEHTAR-TANI Y.	Summary of Week VII	Probing Nucleons and Nuclei in High Energy Collisions	Seattle	États-Unis	2018	https://hal.archives-ouvertes.fr/hal-02892959
BLAIZOT J.-P., YAN L.	Fluid dynamics of out of equilibrium boost invariant plasmas	27th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Venice	Italie	2018	https://hal.archives-ouvertes.fr/hal-02058311
LEVI M.	Field theory for gravity at all scales	15th Marcel Grossmann Meeting on Recent Developments in Theoretical and Experimental General Relativity, Astrophysics, and Relativistic Field	Rome	Italie	2018	https://hal.archives-ouvertes.fr/hal-01990688
ESCOBEDO M. A., BLAIZOT J.-P.	Quantum and Classical Dynamics of Heavy Quarks in a Quark-Gluon Plasma	27th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Venice	Italie	2018	https://hal.archives-ouvertes.fr/hal-02058295
MULIAN Y.	Forward trijet production in proton-nucleus collisions	26th International Workshop on Deep Inelastic Scattering and Related Subjects	Port Island	Japon	2018	https://hal.archives-ouvertes.fr/hal-01863058
IANCU E., LAPPI T., TRIANTAFYLLOPOULOS D.	Small-x Physics in the Dipole Picture at NLO Accuracy	Probing Nucleons and Nuclei in High Energy Collisions	Seattle	États-Unis	2018	https://hal.archives-ouvertes.fr/hal-02892958
ETIENNE C., FIDANZA G., PETROVSKII A., DEVILLERS L., SCHMAUCH B.	CNN+LSTM Architecture for Speech Emotion Recognition with Data Augmentation	Workshop on Speech, Music and Mind 2018	Hyderabad	Inde	2018	https://hal.archives-ouvertes.fr/hal-02512926
LEVI M.	A public framework for Feynman calculations and post-Newtonian gravity	15th Marcel Grossmann Meeting on Recent Developments in Theoretical and Experimental General Relativity, Astrophysics, and Relativistic Field	Rome	Italie	2018	https://hal.archives-ouvertes.fr/hal-01952708
CAUCAL P., IANCU E., MUELLER A.H., SOYEZ G.	Adding vacuum branching to jet evolution in a dense medium	27th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions	Venice	Italie	2018	https://hal.archives-ouvertes.fr/hal-02058369
CAUCAL P., IANCU E., MUELLER A. H., SOYEZ G.	A new pQCD based Monte Carlo event generator for jets in the quark-gluon plasma	9th International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions	Aix-Les-Bains	France	2018	https://hal.archives-ouvertes.fr/hal-01974781
DUCLOUE B., HANNINEN H., LAPPI T., ZHU Y.	Factorization of the soft gluon divergence from the dipole picture deep inelastic scattering cross sections at next-to-leading order	26th International Workshop on Deep Inelastic Scattering and Related Subjects	Port Island	Japon	2018	https://hal.archives-ouvertes.fr/hal-01823294

PhD theses

Author	Title of the thesis	Date (defense)	HAL link
MAJUMDAR S.	Localization in open quantum systems	2023-11-16	https://hal.archives-ouvertes.fr/tel-04326573
LE N. D.	États de Hall quantique fractionnaire des systèmes de graphène	2023-06-28	https://hal.archives-ouvertes.fr/tel-04165540
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VALCARCE X.	Device-independent certification : quantum resources and quantum key distribution	2023-05-17	https://hal.archives-ouvertes.fr/tel-04132704
TAILLANTER E.	Réseaux complexes et trafic routier	2023-09-11	https://hal.archives-ouvertes.fr/tel-04275522
BOUDON A.	Self-interacting scalar field dark matter : From gravitational drag to gravitational wave predictions	2023-09-28	https://hal.archives-ouvertes.fr/tel-04266194
PARRA DE FREITAS H.	String Compactifications with Half-maximal Supersymmetry	2023-09-22	https://hal.archives-ouvertes.fr/tel-04234221
RIVA M. M.	Gravitational Bremsstrahlung in the Worldline Effective Field Theory Approach	2022-09-30	https://hal.archives-ouvertes.fr/tel-03895254
LI Y.	The physics of black-hole microstates : what is the fate of the horizon?	2022-06-02	https://hal.archives-ouvertes.fr/tel-03771341
VERBAVATZ V.	Modélisation des systèmes urbains	2022-07-07	https://hal.archives-ouvertes.fr/tel-03783602
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NIVESVIVAT R.	Solving two-dimensional conformal field theories using the bootstrap approach	2022-09-07	https://hal.archives-ouvertes.fr/tel-03871105
FRAIMAN B.	Exploring the landscape of heterotic string compactifications	2022-11-28	https://hal.archives-ouvertes.fr/tel-03934918
GRANS-SAMUELSSON L.	Non-unitary conformal field theories for geometrical problems : a lattice approach	2022-09-13	https://hal.archives-ouvertes.fr/tel-03859466
CHENG P.	Some aspects of B field and anomalies in string compactifications	2022-09-13	https://hal.archives-ouvertes.fr/tel-03870697
MOUGIAKAKOS S.	Scattering Amplitudes in effective gravitational theories	2021-12-09	https://hal.archives-ouvertes.fr/tel-03545509
VAZQUEZ-HOLM I. A.	Massive matter and the double copy : bootstrapping amplitudes in gauge and gravity theories	2021-09-06	https://hal.archives-ouvertes.fr/tel-03522506
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PINON S.	Study of edge phenomena through the use of impurities	2021-09-20	https://hal.archives-ouvertes.fr/tel-03376119
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ROBERTSON N.	Non-compact conformal field theory and lattice models - the open case	2020-06-16	https://hal.archives-ouvertes.fr/tel-02909756
AUBIN B.	Mean-field methods and algorithmic perspectives for high-dimensional machine learning	2020-12-16	https://hal.archives-ouvertes.fr/tel-03125117
CAUCAL P.	Jet evolution in a dense QCD medium	2020-09-04	https://hal.archives-ouvertes.fr/tel-03081993
GIACALONE G.	Question de forme : observer la déformation des noyaux atomiques aux collisionneurs des hautes énergies	2020-11-30	https://hal.archives-ouvertes.fr/tel-03185076
CHABROL L.	Théorie F en huit dimensions : une perspective de la Théorie des Champs Exceptionnels et de la Théorie des Cordes Hétérotique	2020-09-23	https://hal.archives-ouvertes.fr/tel-03015857
SCARLATELLA O.	Driven-Dissipative Quantum Many-Body Systems	2019-10-21	https://hal.archives-ouvertes.fr/tel-02420548
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HEIDMANN P.	Black-Hole Microstates in String Theory : Black is the Color but Smooth are the Geometries?	2019-06-27	https://hal.archives-ouvertes.fr/tel-02169793
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Journal articles

	Authors	Article title	Journal	Year	Vol.	Pages	HAL link	Group(s)
1	ABBARA A., BAKER A., KRZAKALA F., ZDEBOROVA L.	On the universality of noiseless linear estimation with respect to the measurement matrix	Journal of Physics A: Mathematical and Theoretical	2020	53	164001	https://hal.archives-ouvertes.fr/cea-02528193	C
2	ABREU L.M., KHEMCHANDANI K.P., MARTINEZ TORRES A., NAVARRA F.S., NIELSEN M.	Update on J/psi regeneration in a hadron gas	Phys.Rev.C	2018	97	044902	https://hal.archives-ouvertes.fr/hal-01763481	B
3	ABREU L.M., NAVARRA F.S., NIELSEN M., VASCONCELLOS A.L.	Z_b(10610) in a hadronic medium	European Physical Journal C: Particles and Fields	2018	78	752	https://hal.archives-ouvertes.fr/hal-01886215	B
4	ABREU S., BRITTO R., DUHR C., GARDI E., MATTHEW J.	The diagrammatic coaction beyond one loop	Journal of High Energy Physics	2021	10	131	https://hal.archives-ouvertes.fr/hal-03262632	B
5	ABREU S., BRITTO R., DUHR C., GARDI E., MATTHEW J.	From positive geometries to a coaction on hypergeometric functions	Journal of High Energy Physics	2020	02	122	https://hal.archives-ouvertes.fr/hal-02350159	B
6	ABREU S., DIXON L. J., HERRMANN E., PAGE B., ZENG M.	The two-loop five-point amplitude in N = 8 supergravity	Journal of High Energy Physics	2019	03	123	https://hal.archives-ouvertes.fr/hal-02008816	B
7	ABREU S., DIXON L. J., HERRMANN E., PAGE B., ZENG M.	The two-loop five-point amplitude in N =4 super-Yang-Mills theory	Physical Review Letters	2019	122	121603	https://hal.archives-ouvertes.fr/hal-01975366	B
8	ABREU S., DORMANS J., FEBRES CORDERO F., ITA H., KRAUS M., PAGE B., PASCUAL E., RUF M.S., SOTNIKOV V.	Caravel: A C++ framework for the computation of multi-loop amplitudes with numerical unitarity	Comput.Phys.Commun.	2021	267	108069	https://hal.archives-ouvertes.fr/hal-03143637	B
9	ABREU S., DORMANS J., FEBRES CORDERO F., ITA H., PAGE B.	Analytic form of planar two-loop five-gluon scattering amplitudes in QCD	Physical Review Letters	2019	122	082002	https://hal.archives-ouvertes.fr/hal-01965343	B
10	ABREU S., DORMANS J., FEBRES CORDERO F., ITA H., PAGE B., SOTNIKOV V.	Analytic Form of the Planar Two-Loop Five-Parton Scattering Amplitudes in QCD	JHEP	2019	05	084	https://hal.archives-ouvertes.fr/hal-02101692	B
11	ABREU S., FEBRES CORDERO F., ITA H., JAQUIER M., PAGE B., RUF M.S., SOTNIKOV V.	Two-Loop Four-Graviton Scattering Amplitudes	Physical Review Letters	2020	124	211601	https://hal.archives-ouvertes.fr/hal-02510583	B
12	ABREU S., ITA H., MORIELLO F., PAGE B., TSCHERNOW W., ZENG M.	Two-Loop Integrals for Planar Five-Point One-Mass Processes	Journal of High Energy Physics	2020	11	117	https://hal.archives-ouvertes.fr/hal-02628072	B
13	ACCETTURA C., ADAMS D., AGARWAL R., AHDIDA C., AIME C., AMAPANE N., AMORIM D., ANDREETTO P., ANULLI F., APPLEBY R., APRESYAN A., APYAN A. et al.	Towards a Muon Collider	European Physical Journal C: Particles and Fields	2023	83	864	https://hal.archives-ouvertes.fr/hal-04052296	B
14	ADAR R., MARKOVICH T., LEVY A., ORLAND H., ANDELMAN D.	Dielectric constant of ionic solutions: Combined effects of correlations and excluded volume	Journal of Chemical Physics	2018	149	054504	https://hal.archives-ouvertes.fr/cea-02924068	C
15	AFFOLTER N., GLICK M., PYLYAVSKYY P., RAMASSAMY S.	Vector-relation configurations and plabic graphs	Selecta Mathematica (New Series)	2023			https://hal.archives-ouvertes.fr/hal-02595570	A
16	AGHAEI N., PAWELKIEWICZ M.K., YAMAZAKI M.	Towards Super Teichmüller Spin TQFT	Adv.Theor.Math.Phys.	2022	26	245-294	https://hal.archives-ouvertes.fr/hal-02939979	A
17	AGORITSAS E., BIROLI G., URBANI P., ZAMPONI F.	Out-of-equilibrium dynamical mean-field equations for the perceptron model	Journal of Physics A: Mathematical and Theoretical	2018	51	085002	https://hal.archives-ouvertes.fr/cea-01682940	C
18	AJANI V., BALDI M., BARTHELEMY A., BOYLE A., BURGER P., CARDONE V.F., CHENG S., CODIS S., GIOCOLI C., HARNOIS-DERAPS J., HEYDENREICH S., KANSAL V. et al.	Euclid Preparation. XXVIII. Forecasts for 10 different higher-order weak lensing statistics	Astronomy and Astrophysics - A&A	2023	675	A120	https://hal.archives-ouvertes.fr/hal-03986111	B
19	AKRAMI Y., BRAX P., DAVIS A.-C., VARDANYAN V.	Neutron star merger GW170817 strongly constrains doubly coupled bigravity	Physical Review D	2018	97	124010	https://hal.archives-ouvertes.fr/hal-01768044	B
20	ALBACETE J. L., GIACALONE G., MARQUET C., MATAS M.	Forward dihadron back-to-back correlations in pA collisions	Physical Review D	2019	99	014002	https://hal.archives-ouvertes.fr/hal-01801915	B
21	ALBERT S., BIROLI G., LADIEU F., TOURBOT R., URBANI P.	Searching for the Gardner transition in glassy glycerol	Physical Review Letters	2021	126	028001	https://hal.archives-ouvertes.fr/hal-03228454	C
22	ALDAY F., ARGYRES P., LEMOS M., MARTONE M., RASTELLI L., TARONNA M., MUKHI S., CORDOVA L., HE Y., KRUCZENSKI M., VIEIRA P., POMONI E., BOURGET A. et al.	The Pollica perspective on the (super)-conformal world	Journal of Physics A: Mathematical and Theoretical	2021	54	303001	https://hal.archives-ouvertes.fr/hal-04239079	A
23	ALDAY L. F., CHESTER S. M., RAJ H.	M-theory on AdS_4\times S^7 at 1-loop and beyond	Journal of High Energy Physics	2022	11	091	https://hal.archives-ouvertes.fr/hal-03759830	A
24	ALDOUS D., BARTHELEMY M.	Optimal geometry of transportation networks	Physical Review E	2019	99	052303	https://hal.archives-ouvertes.fr/cea-02563985	C
25	ALEXANDROV A., CHAPUY G., EYNARD B., HARNAD J.	Weighted Hurwitz numbers and topological recursion	Commun.Math.Phys.	2020	375	237-305	https://hal.archives-ouvertes.fr/hal-01839691	A
26	ALEXANDROV A., CHAPUY G., EYNARD B., HARNAD J.	Fermionic approach to weighted Hurwitz numbers and topological recursion	Commun.Math.Phys.	2018	360	777-826	https://hal.archives-ouvertes.fr/hal-01797838	A
27	ALEXANDROV A., CHAPUY G., EYNARD B., HARNAD J.	Weighted Hurwitz numbers and topological recursion: An overview	J.Math.Phys.	2018	59	081102	https://hal.archives-ouvertes.fr/hal-01880881	A
28	ALTIERI A., ROY F., CAMMAROTA C., BIROLI G.	Properties of Equilibria and Glassy Phases of the Random Lotka-Volterra Model with Demographic Noise	Physical Review Letters	2021	126	258301	https://hal.archives-ouvertes.fr/hal-03374312	C
29	ALTIERI A., URBANI P., ZAMPONI F.	Microscopic Theory of Two-Step Yielding in Attractive Colloids	Physical Review Letters	2018	121		https://hal.archives-ouvertes.fr/hal-02323930	C
30	AMENDOLA L., APPLEBY S., AVGOUSTIDIS A., BACON D., BAKER T., BALDI M., BARTOLO N., BLANCHARD A., BONVIN C., BORGANI S., BRANCHINI E. et al.	Cosmology and fundamental physics with the Euclid satellite	Living Rev.Rel.	2018	21	2	https://hal.archives-ouvertes.fr/hal-01768170	B
31	ANASTASSOPOULOS V., AUNE S., BARTH K., BELOV A., BRAUNINGER H., CANTATORE G., CARMONA J.M., CASTEL J.F., CETIN S.A., CHRISTENSEN F. et al.	Improved Search for Solar Chameleons with a GridPix Detector at CAST	JCAP	2019	01	032	https://hal.archives-ouvertes.fr/hal-01861978	B
32	ANDERSEN J. E., BOROT G., CHARBONNIER S., DELECROIX V., GIACCHETTO A., LEWAŃSKI D., WHEELER C.	Topological recursion for Masur–Veech volumes	Journal of the London Mathematical Society	2022			https://hal.archives-ouvertes.fr/hal-03862253	A
33	ANNINOS D., DENEF F., MONTEN R., SUN Z.	Higher Spin de Sitter Hilbert Space	Journal of High Energy Physics	2019	10	071	https://hal.archives-ouvertes.fr/hal-02338249	A
34	ANOUS T., GUICA M.	A general definition of JT_a -- deformed QFTs	SciPost Physics	2021	10	096	https://hal.archives-ouvertes.fr/hal-02381953	A

#	Authors	Title	Journal	Year	Vol	Pages	URL	Cat
35	ANTENUCCI F., FRANZ S., URBANI P., ZDEBOROVA L.	On the glassy nature of the hard phase in inference problems	Physical Review X	2019	9	011020	https://hal.archives-ouvertes.fr/cea-01930645	C
36	ANTENUCCI F., KRZAKALA F., URBANI P., ZDEBOROVA L.	Approximate Survey Propagation for Statistical Inference	Journal of Statistical Mechanics: Theory and Experiment	2019	2019	023401	https://hal.archives-ouvertes.fr/cea-01933008	C
37	APRILE F., DRUMMOND J.M., PAUL H., SANTAGATA M.	The Virasoro-Shapiro amplitude in AdS_{5} × S^{5} and level splitting of 10d conformal symmetry	Journal of High Energy Physics	2021	11	109	https://hal.archives-ouvertes.fr/hal-03115867	A
38	APRUZZI F., BRUNO DE LUCA G., GNECCHI A., LO MONACO G., TOMASIELLO A.	On AdS_{7} stability	Journal of High Energy Physics	2020	07	033	https://hal.archives-ouvertes.fr/hal-02447868	A
39	APRUZZI F., BRUNO DE LUCA G., LO MONACO G., UHLEMANN C. F.	Non-supersymmetric AdS_{6} and the swampland	Journal of High Energy Physics	2021	12	187	https://hal.archives-ouvertes.fr/hal-03380642	A
40	ARDU M., DAVIDSON S., LAVIGNAC S.	Distinguishing models with $\mu \to e$ observables	Journal of High Energy Physics	2023	11	101	https://hal.archives-ouvertes.fr/hal-04204749	B
41	ARIAS TAMARGO G., BOURGET A., PINI A.	Discrete gauging and Hasse diagrams	SciPost Physics	2021	11	026	https://hal.archives-ouvertes.fr/hal-04239083	A
42	ARITA C., KRAPIVSKY P., MALLICK K.	Bulk diffusion in a kinetically constrained lattice gas	Journal of Physics A: Mathematical and Theoretical	2018	51	125002	https://hal.archives-ouvertes.fr/cea-02923442	C
43	ARKANI-HAMED N., D'AGNOLO R. T., KIM H.	Weak scale as a trigger	Physical Review D	2021	104	095014	https://hal.archives-ouvertes.fr/hal-03086826	B
44	ARON C., BIROLI G., CUGLIANDOLO L. F.	(Non) equilibrium dynamics: a (broken) symmetry of the Keldysh generating functional	SciPost Phys.	2018	4	008	https://hal.archives-ouvertes.fr/hal-01704169	C
45	ARUN K.G., BELGACEM E., BENKEL R., BERNARD L., BERTI E., BERTONE G., BESANCON M., BLAS D., BOHMER C. G., BRITO R., CALCAGNI G. *et al.*	New horizons for fundamental physics with LISA	Living Rev.Rel.	2022	25	4	https://hal.archives-ouvertes.fr/hal-03713249	B ; A
46	ASHKENAZI S., CHAKRABORTY S., MA Z., SHACHAR T.	Linear response of entanglement entropy to T\bar{T} in massive QFTs	Journal of High Energy Physics	2023	04	077	https://hal.archives-ouvertes.fr/hal-04011263	A
47	ASHMORE A., DE LA OSSA X., MINASIAN R., STRICKLAND-CONSTABLE C., SVANES E. E.	Finite deformations from a heterotic superpotential: holomorphic Chern-Simons and an L_\infty algebra	Journal of High Energy Physics	2018	10	179	https://hal.archives-ouvertes.fr/hal-01833761	A
48	ASHOURI A., MAHDAVIFAR S., MISGUICH G., VAHEDI J.	Concurrence and Quantum Discord in the Eigenstates of Chaotic and Integrable Spin Chains	Annalen der Physik	2020	532		https://hal.archives-ouvertes.fr/hal-04403646	C
49	ASSOULINE A., JO M., BRASSEUR P., WATANABE K., TANIGUCHI T., JOLICOEUR T., ROCHE P., GLATTLI D. C., KUMADA N., PARMENTIER F. D., ROULLEAU P.	Unveiling excitonic properties of magnons in a quantum Hall ferromagnet	Nature Physics	2021	17	1369	https://hal.archives-ouvertes.fr/hal-03278157	C
50	AUBIN B., LOUREIRO B., BAKER A., KRZAKALA F., ZDEBOROVA L.	Exact asymptotics for phase retrieval and compressed sensing with random generative priors	Proceedings of Machine Learning Research	2020	107	55–73	https://hal.archives-ouvertes.fr/cea-02529402	C
51	AUBIN B., MAILLARD A., BARBIER J., KRZAKALA F., MACRIS N., ZDEBOROVA L.	The committee machine: Computational to statistical gaps in learning a two-layers neural network	Advances in Neural Information Processing Systems	2018	31	3227-3238	https://hal.archives-ouvertes.fr/cea-01933130	C
52	AUBIN B., PERKINS W., ZDEBOROVA L.	Storage capacity in symmetric binary perceptrons	Journal of Physics A: Mathematical and Theoretical	2019	52	294003	https://hal.archives-ouvertes.fr/cea-02009773	C
53	AUCLAIR P., BACON D., BAKER T., BARREIRO T., BARTOLO N., BELGACEM E., BELLOMO N., BEN-DAYAN I., BERTACCA D., BESANCON M. *et al.*	Cosmology with the Laser Interferometer Space Antenna	Living Rev.Rel.	2023	26	5	https://hal.archives-ouvertes.fr/hal-03669190	B
54	AURELL E., DONVIL B., MALLICK K.	Large Deviations and Fluctuation Theorem for the Quantum Heat Current in the Spin-Boson Model	Physical Review E	2020	101	052116	https://hal.archives-ouvertes.fr/cea-02923402	C
55	AYYER A., BOUTTIER J., CORTEEL S., LINUSSON S., NUNZI F.	Bumping sequences and multispecies juggling	Advances in Applied Mathematics	2018	98	100-126	https://hal.archives-ouvertes.fr/hal-01141430	A
56	BABELON O., KOZLOWSKI K. K., PASQUIER V.	Baxter Operator and Baxter Equation for q-Toda and Toda_2 Chains	Reviews in Mathematical Physics	2018	30	1840003	https://hal.archives-ouvertes.fr/hal-01846841	A
57	BABELON O., KOZLOWSKI K., PASQUIER V.	Solution of Baxter equation for the q-Toda and Toda_2 chains by NLIE	SciPost Physics	2018	5	035	https://hal.archives-ouvertes.fr/cea-01787571	A
58	BABELON O., KOZLOWSKI K.K., PASQUIER V.	The Toda_2 chain	Lett.Math.Phys.	2019	109	225-241	https://hal.archives-ouvertes.fr/hal-01758065	A
59	BACCHINI F., MAYERSON D. R., RIPPERDA B., DAVELAAR J., OLIVARES H., HERTOG T., VERCNOCKE B.	Fuzzball Shadows: Emergent Horizons from Microstructure	Physical Review Letters	2021	127	171601	https://hal.archives-ouvertes.fr/hal-03191136	A
60	BACON R., MARY D., GAREL T., BLAIZOT J., MASEDA M., SCHAYE J., WISOTZKI L., CONSEIL S., BRINCHMANN J., LECLERCQ F., ABRIL-MELGAREJO V. *et al.*	The MUSE Extremely Deep Field: The cosmic web in emission at high redshift	Astronomy and Astrophysics - A&A	2021	647	A107	https://hal.archives-ouvertes.fr/hal-03174106	B
61	BAH I., BENA I., HEIDMANN P., LI Y., MAYERSON D. R.	Gravitational footprints of black holes and their microstate geometries	Journal of High Energy Physics	2021	10	138	https://hal.archives-ouvertes.fr/hal-03217517	A
62	BAH I., BONETTI F., MINASIAN R.	Discrete and higher-form symmetries in SCFTs from wrapped M5-branes	Journal of High Energy Physics	2021	03	196	https://hal.archives-ouvertes.fr/hal-02914510	A
63	BAH I., BONETTI F., MINASIAN R., NARDONI E.	M5-brane sources, holography, and Argyres-Douglas theories	Journal of High Energy Physics	2021	11	140	https://hal.archives-ouvertes.fr/hal-03262629	A
64	BAH I., BONETTI F., MINASIAN R., NARDONI E.	Holographic Duals of Argyres-Douglas Theories	Physical Review Letters	2021	127	211601	https://hal.archives-ouvertes.fr/hal-03260118	A
65	BAH I., BONETTI F., MINASIAN R., NARDONI E.	Anomalies of QFTs from M-theory and Holography	Journal of High Energy Physics	2020	01	125	https://hal.archives-ouvertes.fr/hal-02338373	A
66	BAH I., BONETTI F., MINASIAN R., NARDONI E.	Anomaly Inflow for M5-branes on Punctured Riemann Surfaces	Journal of High Energy Physics	2019	06	123	https://hal.archives-ouvertes.fr/hal-02136887	A
67	BAH I., BONETTI F., MINASIAN R., NARDONI E.	Class \mathcal{S} Anomalies from M-theory Inflow	Physical Review D	2019	99	086020	https://hal.archives-ouvertes.fr/hal-01965348	A
68	BAH I., BONETTI F., MINASIAN R., WECK P.	Anomaly Inflow Methods for SCFT Constructions in Type IIB	Journal of High Energy Physics	2021	02	116	https://hal.archives-ouvertes.fr/hal-02507683	A
69	BAHAMONDE S., BOHMER C. G., CARLONI S., COPELAND E. J., FANG W., TAMANINI N.	Dynamical systems applied to cosmology: dark energy and modified gravity	Phys.Rept.	2018	775-777	1-122	https://hal.archives-ouvertes.fr/hal-01945482	B
70	BAITY-JESI M., ACHARD-DE LUSTRAC A., BIROLI G.	Activated dynamics: An intermediate model between the random energy model and the p -spin model	Physical Review E	2018	98	012133	https://hal.archives-ouvertes.fr/cea-04540458	C
71	BAITY-JESI M., BIROLI G., CAMMAROTA C.	Activated Aging Dynamics and Effective Trap Model Description in the Random Energy Model	Journal of Statistical Mechanics: Theory and Experiment	2018	2018	013301	https://hal.archives-ouvertes.fr/cea-01682952	C
72	BAITY-JESI M., SAGUN L., GEIGER M., SPIGLER S., BEN AROUS G., CAMMAROTA C., LECUN Y., WYART M., BIROLI G.	Comparing dynamics: deep neural networks versus glassy systems	Journal of Statistical Mechanics: Theory and Experiment	2019	2019	124013	https://hal.archives-ouvertes.fr/hal-02569114	C

73	BAJNOK Z., GRANET E., JACOBSEN J. L., NEPOMECHIE R. I.	On Generalized Q-systems	Journal of High Energy Physics	2020	03	177	https://hal.archives-ouvertes.fr/hal-02383398	A
74	BAJNOK Z., JACOBSEN J. L., JIANG Y., NEPOMECHIE R. I., ZHANG Y.	Cylinder partition function of the 6-vertex model from algebraic geometry	Journal of High Energy Physics	2020	06	169	https://hal.archives-ouvertes.fr/hal-02504618	A ; C
75	BALDAUF T., CODIS S., DESJACQUES V., PICHON C.	Nonperturbative halo clustering from cosmological density peaks	Physical Review D	2021	103	083530	https://hal.archives-ouvertes.fr/hal-03115873	B
76	BALIAN R.	Cécile DeWitt-Morette	Physics today	2018	71	64-65	https://hal.archives-ouvertes.fr/cea-04543703	C
77	BALLESTEROS G., TAOSO M.	Primordial black hole dark matter from single field inflation	Physical Review D	2018	97	023501	https://hal.archives-ouvertes.fr/hal-01704904	B
78	BANCAL J.-D., GISIN N.	Nonlocal boxes for networks	Physical Review A	2021	104	052212	https://hal.archives-ouvertes.fr/hal-04207895	C
79	BANCAL J.-D., REDEKER K., SEKATSKI P., ROSENFELD W., SANGOUARD N.	Self-testing with finite statistics enabling the certification of a quantum network link	Quantum	2021	5	401	https://hal.archives-ouvertes.fr/hal-04207891	C
80	BANERJEE A., FERRAZ A., PEPIN C.	Pseudogap phase and fractionalization: Predictions for Josephson junction setup	Physical Review B	2022	106	024505	https://hal.archives-ouvertes.fr/cea-04212180	C
81	BANERJEE A., GRANDADAM M., FREIRE H., PEPIN C.	Strange metal from incoherent bosons	Physical Review B	2021	104	054513	https://hal.archives-ouvertes.fr/cea-02959526	C
82	BANERJEE A., HAURIE L., PEPIN C.	Proximity-induced charge density wave in a metallic system	Physical Review B	2023	107	115152	https://hal.archives-ouvertes.fr/cea-04208411	C
83	BANERJEE A., PEPIN C., GHOSAL A.	Charge, bond, and pair density wave orders in a strongly correlated system	Physical Review B	2022	105	134505	https://hal.archives-ouvertes.fr/cea-04212156	C
84	BARATA J., BLAIZOT J.-P., MEHTAR-TANI Y.	Quantum to classical parton dynamics in QCD media	Physical Review D	2023	108	014039	https://hal.archives-ouvertes.fr/hal-04111849	B
85	BARATA J., MEHTAR-TANI Y., SOTO-ONTOSO A., TYWONIUK K.	Medium-induced radiative kernel with the Improved Opacity Expansion	Journal of High Energy Physics	2021	09	153	https://hal.archives-ouvertes.fr/hal-03269648	B
86	BARAUSSE E., BERTI E., HERTOG T., HUGHES S. A., JETZER P., PANI P., SOTIRIOU T. P., TAMANINI N., WITEK H., YAGI K., YUNES N., ABDELSALHIN T., ACHUCARRO A. *et al.*	Prospects for Fundamental Physics with LISA	Gen.Rel.Grav.	2020	52	81	https://hal.archives-ouvertes.fr/hal-02475233	B ; A
87	BARBIER J., KRZAKALA F., MACRIS N., MIOLANE L., ZDEBOROVA L.	Optimal errors and phase transitions in high-dimensional generalized linear models	Proceedings of the National Academy of Sciences of the United States of America	2019	116	5451-5460	https://hal.archives-ouvertes.fr/cea-01614258	C
88	BARBOSA H., BARTHELEMY M., GHOSHAL G., JAMES C., LENORMAND M., LOUAIL T., MENEZES R., RAMASCO J., SIMINI F., TOMASINI M.	Human mobility: Models and applications	Physics Reports	2018	734	1-74	https://hal.archives-ouvertes.fr/halshs-01813382	C
89	BARTHELEMY A., BERNARDEAU F., CODIS S., UHLEMANN C.	Numerical complexity of the joint nulled weak-lensing probability distribution function	Physical Review D	2022	105	043537	https://hal.archives-ouvertes.fr/hal-03279058	B
90	BARTHELEMY A., CODIS S., BERNARDEAU F.	Probability distribution function of the aperture mass field with large deviation theory	Monthly Notices of the Royal Astronomical Society	2021	503	5204-5222	https://hal.archives-ouvertes.fr/hal-03098820	B
91	BARTHELEMY A., CODIS S., BERNARDEAU F.	Post-Born corrections to the one-point statistics of (CMB) lensing convergence obtained via large deviation theory	Monthly Notices of the Royal Astronomical Society	2020	494	3368-3382	https://hal.archives-ouvertes.fr/hal-02491233	B
92	BARTHELEMY M.	Class of models for random hypergraphs	Physical Review E	2022	106	064310	https://hal.archives-ouvertes.fr/cea-04372487	C
93	BARTHELEMY M.	The statistical physics of cities	Nature Reviews Physics	2019	1	406-415	https://hal.archives-ouvertes.fr/cea-02563999	C
94	BARTHELEMY M.	Tomography of scaling	Journal of the Royal Society Interface	2019	16	20190602	https://hal.archives-ouvertes.fr/cea-02564077	C
95	BARTHELEMY M.	Modeling cities	Comptes Rendus. Physique	2019	20	293-307	https://hal.archives-ouvertes.fr/cea-02564024	C
96	BARTHELEMY M.	Transitions in spatial networks	Comptes Rendus. Physique	2018	19	205-232	https://hal.archives-ouvertes.fr/cea-04360368	C
97	BASEILHAC P., BELLIARD S., CRAMPE N.	FRT presentation of the Onsager algebras	Letters in Mathematical Physics	2018	108	2189-2212	https://hal.archives-ouvertes.fr/hal-02154881	A
98	BASSO B., DIXON L. J., KOSOWER D. A., KRAJENBRINK A., ZHONG D.-L.	Fishnet four-point integrals: integrable representations and thermodynamic limits	Journal of High Energy Physics	2021	07	168	https://hal.archives-ouvertes.b/hal-03260073	B
99	BASSO B., FERRANDO G., KAZAKOV V., ZHONG D.-L.	Thermodynamic Bethe Ansatz for Biscalar Conformal Field Theories in Any Dimension	Physical Review Letters	2020	125		https://hal.archives-ouvertes.fr/hal-02935554	A
100	BAUER M.	A quantum 0-\infty law	Symmetry, Integrability and Geometry : Methods and Applications	2022	18	012	https://hal.archives-ouvertes.fr/cea-03750086	A
101	BAUER M., BERNARD D.	Stochastic spikes and strong noise limits of stochastic differential equations	Annales Henri Poincaré	2018	19	653–693	https://hal.archives-ouvertes.fr/cea-01626332	A
102	BAUER M., BERNARD D., BIANE P., HRUZA L.	Bernoulli Variables, Classical Exclusion Processes and Free Probability	Annales Henri Poincaré	2022			https://hal.archives-ouvertes.fr/hal-04245136	A
103	BAUER M., BERNARD D., JIN T.	Universal fluctuations around typicality for quantum ergodic systems	Physical Review E	2020	101	012115	https://hal.archives-ouvertes.fr/hal-02467282	A
104	BAUER M., BERNARD D., JIN T.	Equilibrium fluctuations in maximally noisy extended quantum systems	SciPost Physics	2019	6	045	https://hal.archives-ouvertes.fr/hal-02367770	A
105	BAUER M., BERNARD D., JIN T.	Monitoring continuous spectrum observables: the strong measurement limit	SciPost Physics	2018	5	037	https://hal.archives-ouvertes.fr/cea-01930252	A
106	BAUER M., CORNU F.	Thermal contact through a two-temperature kinetic Ising chain	Journal of Physics A General Physics (1968-1972)	2018	51	19	https://hal.archives-ouvertes.fr/cea-01930110	A
107	BAUER M., KRAPIVSKY P. L., MALLICK K.	Random walk through a fertile site	Physical Review E	2021	103	022114	https://hal.archives-ouvertes.fr/hal-04014567	A ; C
108	BAUER M., ZUBER J.-B.	On products of delta distributions and resultants	Symmetry, Integrability and Geometry : Methods and Applications	2020	16	083	https://hal.archives-ouvertes.fr/hal-02869757	A
109	BAUERNFEIND D., CAO X., STOUDENMIRE E. M., PARCOLLET O.	Minimally entangled typical thermal state algorithms for finite temperature Matsubara Green functions	Physical Review B	2022	105	195107	https://hal.archives-ouvertes.fr/hal-03678011	C
110	BAUTISTA Y. F.	Dynamics for Super-Extremal Kerr Binary Systems at {\cal O}(G^2)	Physical Review D	2023	108	084036	https://hal.archives-ouvertes.fr/hal-04080638	B
111	BAUTISTA Y. F., GUEVARA A., KAVANAGH C., VINESE J.	Scattering in Black Hole Backgrounds and Higher-Spin Amplitudes: Part II	Journal of High Energy Physics	2023	05	211	https://hal.archives-ouvertes.fr/hal-03924152	B

112	BECCARIA M., KORCHEMSKY G., TSEYTLIN A.	Non-planar corrections in orbifold/orientifold $\mathcal N=2$ superconformal theories from localization	Journal of High Energy Physics	2023	05	165	https://hal.archives-ouvertes.fr/hal-04076319	B
113	BECCARIA M., KORCHEMSKY G.P., TSEYTLIN A.A.	Exact strong coupling results in N=2 Sp(2N) superconformal gauge theory from localization	Journal of High Energy Physics	2023	01	037	https://hal.archives-ouvertes.fr/hal-03850669	B
114	BECCARIA M., KORCHEMSKY G.P., TSEYTLIN A.A.	Strong coupling expansion in $\mathbf{\mathcal N=2}$ superconformal theories and the Bessel kernel	Journal of High Energy Physics	2022	09	226	https://hal.archives-ouvertes.fr/hal-03759860	B
115	BECK S., HAMPEL A., PARCOLLET O., EDERER C., GEORGES A.	Charge self-consistent electronic structure calculations with dynamical mean-field theory using Quantum ESPRESSO, Wannier 90 and TRIQS	Journal of Physics: Condensed Matter	2022	34	235601	https://hal.archives-ouvertes.fr/hal-04262756	C
116	BELGACEM E., CALCAGNI G., CRISOSTOMI M., DALANG C., DIRIAN Y., EZQUIAGA J. M., FASIELLO M., FOFFA S., GANZ A., GARCIA-BELLIDO J. *et al.*	Testing modified gravity at cosmological distances with LISA standard sirens	JCAP	2019	07	024	https://hal.archives-ouvertes.fr/hal-02166562	B
117	BELITSKY A.V., KORCHEMSKY G.P.	Circular Wilson loop in N=2* super Yang-Mills theory at two loops and localization	Journal of High Energy Physics	2021	04	089	https://hal.archives-ouvertes.fr/hal-02542831	B
118	BELITSKY A.V., KORCHEMSKY G.P.	Crossing bridges with strong Szegő limit theorem	Journal of High Energy Physics	2021	04	257	https://hal.archives-ouvertes.fr/hal-02894376	B
119	BELITSKY A.V., KORCHEMSKY G.P.	Exact null octagon	Journal of High Energy Physics	2020	05	070	https://hal.archives-ouvertes.fr/hal-02283545	B
120	BELITSKY A.V., KORCHEMSKY G.P.	Octagon at finite coupling	Journal of High Energy Physics	2020	07	219	https://hal.archives-ouvertes.fr/hal-02518055	B
121	BELLAZZINI B., ELIAS MIRO J., RATTAZZI R., RIEMBAU M., RIVA F.	Positive moments for scattering amplitudes	Physical Review D	2021	104	036006	https://hal.archives-ouvertes.fr/hal-03011022	B
122	BELLAZZINI B., ISABELLA G., LEWANDOWSKI M., SGARLATA F.	Gravitational causality and the self-stress of photons	Journal of High Energy Physics	2022	05	154	https://hal.archives-ouvertes.fr/hal-03320914	B
123	BELLAZZINI B., ISABELLA G., RIVA M. M.	Classical vs Quantum Eikonal Scattering and its Causal Structure	Journal of High Energy Physics	2023	04	023	https://hal.archives-ouvertes.fr/hal-03851017	B
124	BELLAZZINI B., LEWANDOWSKI M., SERRA J.	Positivity of amplitudes, weak gravity conjecture, and modified gravity	Physical Review Letters	2019	123	251103	https://hal.archives-ouvertes.fr/hal-02051603	B
125	BELLAZZINI B., RIEMBAU M., RIVA F.	IR side of positivity bounds	Physical Review D	2022	106	105008	https://hal.archives-ouvertes.fr/hal-03850962	B
126	BELLAZZINI B., RIVA F.	New phenomenological and theoretical perspective on anomalous ZZ and Zγ processes	Physical Review D	2018	98	095021	https://hal.archives-ouvertes.fr/hal-01833788	B
127	BELLAZZINI B., RIVA F., SERRA J., SGARLATA F.	Massive higher spins: effective theory and consistency	Journal of High Energy Physics	2019	2019	189	https://hal.archives-ouvertes.fr/hal-04410123	B
128	BELLAZZINI B., RIVA F., SERRA J., SGARLATA F.	Beyond Positivity Bounds and the Fate of Massive Gravity	Physical Review Letters	2018	120	161101	https://hal.archives-ouvertes.fr/hal-01793209	B
129	BELLETETE J., GAINUTDINOV A.M., JACOBSEN J.L., SALEUR H., TAVARES T.S.	Topological defects in lattice models and affine Temperley-Lieb algebra	Commun.Math.Phys.	2023	400	1203-1254	https://hal.archives-ouvertes.fr/hal-01937645	A
130	BELLETETE J., SAINT-AUBIN Y.	On the computation of fusion over the affine Temperley–Lieb algebra	Nucl.Phys.B	2018	937	333-370	https://hal.archives-ouvertes.fr/hal-01921748	A
131	BELLIARD R., EYNARD B., RIBAULT S.	The geometry of Casimir W-algebras	SciPost Physics	2018	5		https://hal.archives-ouvertes.fr/hal-02359673	A
132	BELLIARD S., FARIBAULT A.	Ground state solutions of inhomogeneous Bethe equations	SciPost Physics	2018	4	030	https://hal.archives-ouvertes.fr/hal-01768125	A
133	BELLIARD S., SLAVNOV N. A., VALLET B.	Modified Algebraic Bethe Ansatz: Twisted XXX Case	SIGMA	2018	14	054	https://hal.archives-ouvertes.fr/hal-01774008	A
134	BELLIARD S., SLAVNOV N.A.	A note on $\mathfrak{gl}_2$-invariant Bethe vectors	Journal of High Energy Physics	2018	04	031	https://hal.archives-ouvertes.fr/hal-01730057	A
135	BELLIARD S., SLAVNOV N.A., VALLET B.	Scalar product of twisted XXX modified Bethe vectors	Journal of Statistical Mechanics: Theory and Experiment	2018	1809	093103	https://hal.archives-ouvertes.fr/hal-01815171	A
136	BELLINI E., BARREIRA A., FRUSCIANTE N., HU B., PEIRONE S., RAVERI M., ZUMALACARREGUI M., AVILEZ-LOPEZ A., BALLARDINI M., BATTYE R.A. *et al.*	Comparison of Einstein-Boltzmann solvers for testing general relativity	Physical Review D	2018	97	023520	https://hal.archives-ouvertes.fr/hal-01703774	B
137	BELLINI E., SAWICKI I., ZUMALACARREGUI M.	hi_class: Background Evolution, Initial Conditions and Approximation Schemes	JCAP	2020	02	008	https://hal.archives-ouvertes.fr/hal-02309039	B
138	BELTRAN JIMENEZ J., BETTONI D., BRAX P.	Charged dark matter and the H_0 tension	Physical Review D	2021	103	103505	https://hal.archives-ouvertes.fr/hal-02613212	B
139	BELTRAN JIMENEZ J., BETTONI D., BRAX P.	Inhomogeneous Hubble diagram from vector K-mouflage	Class.Quant.Grav.	2021	38	134001	https://hal.archives-ouvertes.fr/hal-03178541	B
140	BELTRAN JIMENEZ J., BETTONI D., BRAX P.	Screening away the H_0 tension	Int.J.Mod.Phys.D	2020	29	2043010	https://hal.archives-ouvertes.fr/hal-02914485	B
141	BENA I., BLABACK J., GRANA M., LUST S.	Algorithmically Solving the Tadpole Problem	Adv.Appl.Clifford Algebras	2022	32	7	https://hal.archives-ouvertes.fr/hal-03178515	A
142	BENA I., BLABACK J., GRANA M., LUST S.	The tadpole problem	Journal of High Energy Physics	2021	11	223	https://hal.archives-ouvertes.fr/hal-02999614	A
143	BENA I., BLABACK J., SAVELLI R., ZOCCARATO G.	The two faces of T-branes	Journal of High Energy Physics	2019	10	150	https://hal.archives-ouvertes.fr/hal-02144213	A
144	BENA I., BRODIE C., GRANA M.	D7 moduli stabilization: the tadpole menace	Journal of High Energy Physics	2022	01	138	https://hal.archives-ouvertes.fr/hal-03481824	A
145	BENA I., CEPLAK N., HAMPTON S., LI Y., TOULIKAS D., WARNER N. P.	Resolving Black-Hole Microstructure with New Momentum Carriers	JHEP	2022	10	033	https://hal.archives-ouvertes.fr/hal-03600455	A
146	BENA I., DE LUCA G. B., GRANA M., LO MONACO G.	Oh, wait, O8 de Sitter may be unstable!	Journal of High Energy Physics	2021	03	168	https://hal.archives-ouvertes.fr/hal-02981227	A
147	BENA I., DIAS O. J., HARTNETT G. S., NIEHOFF B. E., SANTOS J. E.	Holographic dual of hot Polchinski-Strassler quark-gluon plasma	Journal of High Energy Physics	2019	09	033	https://hal.archives-ouvertes.fr/hal-01801935	A
148	BENA I., DUDAS E., GRANA M., LO MONACO G., TOULIKAS D.	$\overline{\textrm{D}3}$-branes and gaugino condensation	Journal of High Energy Physics	2023	2023	19	https://hal.archives-ouvertes.fr/hal-03894893	A
149	BENA I., DUDAS E., GRANA M., LUST S.	Uplifting runaways	Fortschritte der Physik / Progress of Physics	2019	67	1800100	https://hal.archives-ouvertes.fr/hal-01886015	A
150	BENA I., DUDAS E., GRANA M., MONACO G. L., TOULIKAS D.	Bare-bones de Sitter vacua	Physical Review D	2023	108	L021901	https://hal.archives-ouvertes.fr/hal-03566023	A

151	BENA I., EPERON F., HEIDMANN P., WARNER N. P.	The Great Escape: Tunneling out of Microstate Geometries	JHEP	2021	04	112	https://hal.archives-ouvertes.fr/hal-02863141	A
152	BENA I., GIUSTO S., MARTINEC E. J., RUSSO R., SHIGEMORI M., TURTON D., WARNER N. P.	Asymptotically-flat supergravity solutions deep inside the black-hole regime	JHEP	2018	02	014	https://hal.archives-ouvertes.fr/hal-01704828	A
153	BENA I., GRANA M., KOVENSKY N., RETOLAZA A.	Kähler moduli stabilization from ten dimensions	Journal of High Energy Physics	2019	10	200	https://hal.archives-ouvertes.fr/hal-02290761	A
154	BENA I., GRANA M., KUPERSTEIN S., NTOKOS P., PETRINI M.	Fermionic and bosonic mass deformations of N=4 SYM and their bulk supergravity dual	Journal of High Energy Physics	2019	2019	149	https://hal.archives-ouvertes.fr/cea-01281703	A
155	BENA I., HAMPTON S. D., HOUPPE A., LI Y., TOULIKAS D.	The (amazing) Super-Maze	Journal of High Energy Physics	2023	03	237	https://hal.archives-ouvertes.fr/hal-03894994	A
156	BENA I., HEIDMANN P., MONTEN R., WARNER N. P.	Thermal Decay without Information Loss in Horizonless Microstate Geometries	SciPost Phys.	2019	7	063	https://hal.archives-ouvertes.fr/hal-02148880	A
157	BENA I., HEIDMANN P., TURTON D.	AdS_{2} holography: mind the cap	Journal of High Energy Physics	2018	12	028	https://hal.archives-ouvertes.fr/hal-01823329	A
158	BENA I., HOUPPE A., WARNER N. P.	Delaying the inevitable: tidal disruption in microstate geometries	JHEP	2021	02	103	https://hal.archives-ouvertes.fr/hal-02899146	A
159	BENA I., MARTINEC E. J., WALKER R., WARNER N. P.	Early Scrambling and Capped BTZ Geometries	JHEP	2019	04	126	https://hal.archives-ouvertes.fr/hal-01974797	A
160	BENA I., MAYERSON D. R.	Black Holes Lessons from Multipole Ratios	Journal of High Energy Physics	2021	03	114	https://hal.archives-ouvertes.fr/hal-02914506	A
161	BENA I., MAYERSON D. R.	Multipole Ratios: A New Window into Black Holes	Physical Review Letters	2020	125	221602	https://hal.archives-ouvertes.fr/hal-02892950	A
162	BENA I., PILCH K., WARNER N. P.	Brane-Jet Instabilities	JHEP	2020	10	091	https://hal.archives-ouvertes.fr/hal-02518087	A
163	BENA I., TYUKOV A.	BTZ Trailing Strings	Journal of High Energy Physics	2020	04	046	https://hal.archives-ouvertes.fr/hal-02416897	A
164	BENEVENTO G., RAVERI M., LAZANU A., BARTOLO N., LIGUORI M., BRAX P., VALAGEAS P.	K-mouflage Imprints on Cosmological Observables and Data Constraints	JCAP	2019	05	027	https://hal.archives-ouvertes.fr/hal-01909174	B
165	BENISTY D., BRAX P., DAVIS A.-C.	Stringent Pulsar Timing Bounds on Light Scalar Couplings to Matter	Physical Review D	2023	107	064049	https://hal.archives-ouvertes.fr/hal-03909119	B
166	BENISTY D., BRAX P., DAVIS A.-C.	Multi-scale Constraints on Scalar-Field couplings to Matter: The Geodetic and Frame-Dragging Effects	Physical Review D	2023	108	063031	https://hal.archives-ouvertes.fr/hal-04127853	B
167	BENJAMIN N., COLLIER S., FITZPATRICK A. L., MALONEY A., PERLMUTTER E.	Harmonic analysis of 2d CFT partition functions	Journal of High Energy Physics	2021	09	174	https://hal.archives-ouvertes.fr/hal-03315948	A
168	BENVENUTI S., GAROZZO I., LO MONACO G.	Monopoles and dualities in 3d \mathcal{N} = 2 quivers	Journal of High Energy Physics	2021	10	191	https://hal.archives-ouvertes.fr/hal-03115834	A
169	BENVENUTI S., GAROZZO I., LO MONACO G.	Sequential deconfinement in 3d \mathcal{N} = 2 gauge theories	Journal of High Energy Physics	2021	07	191	https://hal.archives-ouvertes.fr/hal-03107996	A
170	BENVENUTI S., LO MONACO G.	A toolkit for ortho-symplectic dualities	Journal of High Energy Physics	2023	09	002	https://hal.archives-ouvertes.fr/hal-03515261	A
171	BERGE J., BAUDIS L., BRAX P., CHIOW S.-W., CHRISTOPHE B., DORE O., FAYET P., HEES A., JETZER P., LAMMERZAHL C., LIST M., METRIS G., PERNOT-BORRAS M. et al.	The local dark sector: Probing gravitation's low-acceleration frontier and dark matter in the Solar System neighborhood	Experimental Astronomy	2021	51	1737-1766	https://hal.archives-ouvertes.fr/hal-03260692	B
172	BERGE J., BRAX P., METRIS G., PERNOT-BORRAS M., TOUBOUL P., UZAN J.-P.	MICROSCOPE Mission: first constraints on the violation of the weak equivalence principle by a light scalar dilaton	Physical Review Letters	2018	120	141101	https://hal.archives-ouvertes.fr/cea-01686662	B
173	BERGE J., BRAX P., PERNOT-BORRAS M., UZAN J.-P.	Interpretation of geodesy experiments in non-Newtonian theories of gravity	Class.Quant.Grav.	2018	35	234001	https://hal.archives-ouvertes.fr/hal-01861981	B
174	BERGE J., PERNOT-BORRAS M., UZAN J.-P., BRAX P., CHHUN R., METRIS G., RODRIGUES M., TOUBOUL P.	MICROSCOPE's constraint on a short-range fifth force	Class.Quant.Grav.	2022	39	204010	https://hal.archives-ouvertes.fr/hal-03143580	B
175	BERLIN A., BLAS D., TITO D'AGNOLO R., ELLIS S. A., HARNIK R., KAHN Y., SCHUTTE-ENGEL J.	Detecting high-frequency gravitational waves with microwave cavities	Physical Review D	2022	105	116011	https://hal.archives-ouvertes.fr/hal-03514919	B
176	BERLIN A., BLAS D., TITO D'AGNOLO R., ELLIS S. A., HARNIK R., KAHN Y., SCHUTTE-ENGEL J., WENTZEL M.	MAGO\,2.0: Electromagnetic Cavities as Mechanical Bars for Gravitational Waves	Physical Review D	2023	108	084058	https://hal.archives-ouvertes.fr/hal-04038992	B
177	BERLIN A., D'AGNOLO R. T., ELLIS S. A., NANTISTA C., NEILSON J., SCHUSTER P., TANTAWI S., TORO N., ZHOU K.	Axion Dark Matter Detection by Superconducting Resonant Frequency Conversion	Journal of High Energy Physics	2020	07	088	https://hal.archives-ouvertes.fr/hal-02431427	B
178	BERLIN A., D'AGNOLO R. T., ELLIS S. A., ZHOU K.	Heterodyne broadband detection of axion dark matter	Physical Review D	2021	104	L111701	https://hal.archives-ouvertes.fr/hal-02933925	B
179	BERLIN A., TITO D'AGNOLO R., ELLIS S. A., RADKOVSKI J. I.	Signals of Millicharged Dark Matter in Light-Shining-Through-Wall Experiments	Journal of High Energy Physics	2023	08	017	https://hal.archives-ouvertes.fr/tito-04106690	B
180	BERN Z., CARRASCO J. J., CHEN W.-M., EDISON A., JOHANSSON H., PARRA-MARTINEZ J., ROIBAN G.	Ultraviolet Properties of \mathcal N = 8 Supergravity at Five Loops	Physical Review D	2018	98	086021	https://hal.archives-ouvertes.fr/hal-01797110	A
181	BERN Z., CARRASCO J. J., CHIODAROLI M., JOHANSSON H., ROIBAN R.	The SAGEX Review on Scattering Amplitudes, Chapter 2: An Invitation to Color-Kinematics Duality and the Double Copy	J.Phys.A	2022	55	443003	https://hal.archives-ouvertes.fr/hal-03635379	A
182	BERN Z., KOSOWER D., PARRA-MARTINEZ J.	Two-loop n-point anomalous amplitudes in N=4 supergravity	Proc.Roy.Soc.Lond.A	2020	476	20190722	https://hal.archives-ouvertes.fr/hal-02147976	B
183	BERNARDEAU F.	Covariances of density probability distribution functions. Lessons from hierarchical models	Astronomy and Astrophysics - A&A	2022	663	A124	https://hal.archives-ouvertes.fr/hal-03727286	B
184	BERNASCHI M., BILLOIRE A., MAIORANO A., PARISI G., RICCI-TERSENGHI F.	Strong ergodicity breaking in aging of mean-field spin glasses	Proceedings of the National Academy of Sciences of the United States of America	2020	117	17522-17527	https://hal.archives-ouvertes.fr/cea-03197759	C
185	BERTRAND C., BAUERNFEIND D., DUMITRESCU P., MAČEK M., WAINTAL X., PARCOLLET O.	Quantum quasi Monte Carlo algorithm for out-of-equilibrium Green functions at long times	Physical Review B	2021	103	155104	https://hal.archives-ouvertes.fr/hal-03941975	C
186	BERTRAND C., FLORENS S., PARCOLLET O., WAINTAL X.	Reconstructing Nonequilibrium Regimes of Quantum Many-Body Systems from the Analytical Structure of Perturbative Expansions	Physical Review X	2019	9	041008	https://hal.archives-ouvertes.fr/hal-03942019	C
187	BERTRAND C., PARCOLLET O., MAILLARD A., WAINTAL X.	Quantum Monte Carlo algorithm for out-of-equilibrium Green's functions at long times	Physical Review B	2019	100	125129	https://hal.archives-ouvertes.fr/hal-03942022	C
188	BETEA D., BOUTILLIER C., BOUTTIER J., CHAPUY G., CORTEEL S., VULETIĆ M.	Perfect sampling algorithm for Schur processes	Markov Processes And Related Fields	2018	24	381-418	https://hal.archives-ouvertes.fr/hal-01023784	A
189	BETEA D., BOUTTIER J.	The periodic Schur process and free fermions at finite temperature	Mathematical Physics, Analysis and Geometry	2019	22		https://hal.archives-ouvertes.fr/hal-01849256	A

190	BETEA D., BOUTTIER J., NEJJAR P., VULETIĆ M.	The free boundary Schur process and applications I	Annales Henri Poincaré	2018	19	3663 - 3742	https://hal.archives-ouvertes.fr/hal-01619339	A
191	BETEA D., BOUTTIER J., WALSH H.	Multicritical Schur measures and higher-order analogues of the Tracy-Widom distribution	Mathematical Physics, Analysis and Geometry	2023	27		https://hal.archives-ouvertes.fr/hal-04162097	A
192	BHALERAO R. S., GIACALONE G., OLLITRAULT J.-Y.	Kurtosis of elliptic flow fluctuations	Phys.Rev.C	2019	99	014907	https://hal.archives-ouvertes.fr/hal-01937453	B
193	BHALERAO R. S., GIACALONE G., OLLITRAULT J.-Y.	Primordial non-Gaussianity in heavy-ion collisions	Phys.Rev.C	2019	100	014909	https://hal.archives-ouvertes.fr/hal-02116818	B
194	BIDZHIEV K., MISGUICH G., SALEUR H.	Out-of-equilibrium transport in the interacting resonant level model: Surprising relevance of the boundary sine-Gordon model	Physical Review B	2019	100	075157	https://hal.archives-ouvertes.fr/hal-02309012	C ; A
195	BIELLA A., SCHIRO M.	Many-body quantum Zeno effect and measurement-induced subradiance transition	Quantum	2021	5	528	https://hal.archives-ouvertes.fr/hal-03388410	C
196	BILLO M., FUCITO F., KORCHEMSKY G.P., LERDA A., MORALES J.-F.	Two-point correlators in non-conformal $\mathcal{N}$ = 2 gauge theories	Journal of High Energy Physics	2019	05	199	https://hal.archives-ouvertes.fr/hal-02016893	B
197	BILLOIRE A., FERNANDEZ L., MAIORANO A., MARINARI E., MARTIN-MAYOR V., MORENO-GORDO J., PARISI G., RICCI-TERSENGHI F., RUIZ-LORENZO J.	Dynamic variational study of chaos: spin glasses in three dimensions	Journal of Statistical Mechanics: Theory and Experiment	2018	2018	033302	https://hal.archives-ouvertes.fr/cea-03197787	C
198	BIROLI G., BUNIN G., CAMMAROTA C.	Marginally Stable Equilibria in Critical Ecosystems	New Journal of Physics	2018	20	083051	https://hal.archives-ouvertes.fr/cea-01682917	C
199	BIROLI G., CAMMAROTA C., TARJUS G., TARZIA M.	Random-field Ising-like effective theory of the glass transition. I. Mean-field models	Physical Review B: Condensed Matter and Materials Physics (1998-2015)	2018	98		https://hal.archives-ouvertes.fr/hal-02403876	C
200	BIROLI G., CAMMAROTA C., TARJUS G., TARZIA M.	Random field Ising-like effective theory of the glass transition. II. Finite-dimensional models	Physical Review B: Condensed Matter and Materials Physics (1998-2015)	2018	98		https://hal.archives-ouvertes.fr/hal-02403873	C
201	BIROLI G., GUIONNET A.	Large deviations for the largest eigenvalues and eigenvectors of spiked random matrices	Electronic Communications in Probability	2020	25		https://hal.archives-ouvertes.fr/hal-02337264	C
202	BIROLI G., URBANI P.	Liu-Nagel phase diagrams in infinite dimension	SciPost Physics	2018	4	020	https://hal.archives-ouvertes.fr/cea-01547327	C
203	BISSI A., FARDELLI G., GEORGOUDIS A.	Towards all loop supergravity amplitudes on AdS5×S5	Physical Review D	2021	104	L041901	https://hal.archives-ouvertes.fr/hal-02497814	B
204	BISSI A., FARDELLI G., GEORGOUDIS A.	All loop structures in supergravity amplitudes on AdS5 × S5 from CFT	Journal of Physics A: Mathematical and Theoretical	2021	54	324002	https://hal.archives-ouvertes.fr/hal-02999525	B
205	BJERRUM-BOHR N. E. J., DAMGAARD P. H., PLANTE L., VANHOVE P.	Classical gravity from loop amplitudes	Physical Review D	2021	104	026009	https://hal.archives-ouvertes.fr/hal-03210329	A
206	BJERRUM-BOHR N. J., DAMGAARD P. H., PLANTE L., VANHOVE P.	The amplitude for classical gravitational scattering at third Post-Minkowskian order	Journal of High Energy Physics	2021	08	172	https://hal.archives-ouvertes.fr/hal-03235698	A
207	BJERRUM-BOHR N., DAMGAARD P.H., PLANTE L., VANHOVE P.	The SAGEX Review on Scattering Amplitudes, Chapter 13: Post-Minkowskian expansion from Scattering Amplitudes	J.Phys.A	2022	55	443014	https://hal.archives-ouvertes.fr/hal-03630762	A
208	BJERRUM-BOHR N., PLANTE L., VANHOVE P.	Post-Minkowskian radial action from soft limits and velocity cuts	Journal of High Energy Physics	2022	03	071	https://hal.archives-ouvertes.fr/hal-03435187	A
209	BJERRUM-BOHR N.E., DAMGAARD P. H., FESTUCCIA G., PLANTE L., VANHOVE P.	General Relativity from Scattering Amplitudes	Physical Review Letters	2018	121	171601	https://hal.archives-ouvertes.fr/hal-01828000	A
210	BLAIZOT J.-P., DOMINGUEZ F.	Radiative corrections to the jet quenching parameter in dilute and dense media	Physical Review D	2019	99	054005	https://hal.archives-ouvertes.fr/hal-01990675	B
211	BLAIZOT J.-P., ESCOBEDO M. A.	Phenomenological study of quarkonium suppression and the impact of the energy gap between singlets and octets	Physical Review D	2021	104	054034	https://hal.archives-ouvertes.fr/hal-03325271	B
212	BLAIZOT J.-P., ESCOBEDO M. A.	Quantum and classical dynamics of heavy quarks in a quark-gluon plasma	Journal of High Energy Physics	2018	2018	034	https://hal.archives-ouvertes.fr/cea-01685189	B
213	BLAIZOT J.-P., ESCOBEDO M. A.	Approach to equilibrium of a quarkonium in a quark-gluon plasma	Physical Review D	2018	98	074007	https://hal.archives-ouvertes.fr/hal-01763452	B
214	BLAIZOT J.-P., PAWLOWSKI J. M., REINOSA U.	Functional renormalization group and 2PI effective action formalism	Annals Phys.	2021	431	168549	https://hal.archives-ouvertes.fr/hal-03171327	B
215	BLAIZOT J.-P., TANJI N.	Angular mode expansion of the Boltzmann equation in the small-angle approximation	Nucl.Phys.A	2019	992	121618	https://hal.archives-ouvertes.fr/hal-02108373	B
216	BLAIZOT J.-P., YAN L.	Analytical attractor for Bjorken flows	Phys.Lett.B	2021	820	136478	https://hal.archives-ouvertes.fr/hal-02894392	B
217	BLAIZOT J.-P., YAN L.	Attractor and fixed points in Bjorken flows	Phys.Rev.C	2021	104	055201	https://hal.archives-ouvertes.fr/hal-03276058	B
218	BLAIZOT J.-P., YAN L.	Emergence of hydrodynamical behavior in expanding ultra-relativistic plasmas	Annals Phys.	2020	412	167993	https://hal.archives-ouvertes.fr/hal-02108776	B
219	BLAIZOT J.-P., YAN L.	Fluid dynamics of out of equilibrium boost invariant plasmas	Physics Letters B	2018	780	283-286	https://hal.archives-ouvertes.fr/hal-01758563	B
220	BLANCHARD A., AUBOURG E., BRAX P., CASTENDER F. J., CODIS S., ESCOFFIER S., DOURNAC F., FERTE A., FINELLI F., FOSALBA P., GANGLER E. et al.	Gravitation and the Universe from large scale-structures: The GAUSS mission concept Mapping the cosmic web up to the reionization era	Experimental Astronomy	2021	51	1623-1640	https://hal.archives-ouvertes.fr/hal-03150572	B
221	BLANCHET L., FAYE G., LARROUTUROU F.	The quadrupole moment of compact binaries to the fourth post-Newtonian order: from source to canonical moment	Class.Quant.Grav.	2022	39	195003	https://hal.archives-ouvertes.fr/hal-03662773	B
222	BOBEV N., HERTOG T., HONG J., KARLSSON J., REYS V.	Microscopics of de Sitter entropy from precision holography	Phys.Rev.X	2023	13	041056	https://hal.archives-ouvertes.fr/hal-03875930	A
223	BOBEV N., HONG J., REYS V.	Holographic Thermal Observables and M2-branes	Journal of High Energy Physics	2023	12	054	https://hal.archives-ouvertes.fr/hal-04229307	A
224	BOBEV N., HONG J., REYS V.	Large N Partition Functions of 3d Holographic SCFTs	Journal of High Energy Physics	2023	08	119	https://hal.archives-ouvertes.fr/hal-04080017	A
225	BOHM J., JACOBSEN J. L., JIANG Y., ZHANG Y.	Geometric algebra and algebraic geometry of loop and Potts models	Journal of High Energy Physics	2022	05	068	https://hal.archives-ouvertes.fr/hal-03584438	A ; C
226	BOMBINI A., FARDELLI G.	Holographic entanglement entropy and complexity of microstate geometries	Journal of High Energy Physics	2020	06	181	https://hal.archives-ouvertes.fr/hal-02338367	A
227	BOMBINI A., GALLIANI A.	AdS$_{3}$ four-point functions from $\frac{1}{8}$ -BPS states	Journal of High Energy Physics	2019	06	044	https://hal.archives-ouvertes.fr/hal-02116554	A
228	BOMBINI A., PAPINI L.	General supersymmetric $\hbox {AdS}_5$ black holes with squashed boundary	European Physical Journal C: Particles and Fields	2019	79	515	https://hal.archives-ouvertes.fr/hal-02073534	A

229	BONETTI F., MINASIAN R., CAMELL V. V., WECK P.	Consistent truncations from the geometry of sphere bundles	Journal of High Energy Physics	2023	05	156	https://hal.archives-ouvertes.fr/hal-03924158	A
230	BONNEFOY Q., CIAMBELLI L., LUST D., LUST S.	Infinite Black Hole Entropies at Infinite Distances and Tower of States	Nucl.Phys.B	2020	958	115112	https://hal.archives-ouvertes.fr/hal-02441018	A
231	BONNEFOY Q., DUDAS E., LUST S.	On the weak gravity conjecture in string theory with broken supersymmetry	Nuclear Physics B	2019	947	114738	https://hal.archives-ouvertes.fr/cea-02316812	A
232	BOROT G., BOUTTIER J., DUPLANTIER B.	Nesting statistics in the O(n) loop model on random planar maps	Communications in Mathematical Physics	2023	404	1125–1229	https://hal.archives-ouvertes.fr/cea-01508774	A ; C
233	BOROT G., CHARBONNIER S., DELECROIX V., GIACCHETTO A., WHEELER C.	Around the Combinatorial Unit Ball of Measured Foliations on Bordered Surfaces	International Mathematics Research Notices	2022			https://hal.archives-ouvertes.fr/hal-03862251	A
234	BOROT G., DO N., KAREV M., LEWAńSKI D., MOSKOVSKY E.	Double Hurwitz numbers: polynomiality, topological recursion and intersection theory	Math.Ann.	2023	387	179-243	https://hal.archives-ouvertes.fr/hal-02483937	A
235	BOSCA V., FLEURY P., GARCIA-BELLIDO J.	Accurate modelling of extragalactic microlensing by compact objects	JCAP	2022	10	098	https://hal.archives-ouvertes.fr/hal-03669888	B
236	BOSE B., KOYAMA K., LEWANDOWSKI M., VERNIZZI F., WINTHER H. A.	Towards Precision Constraints on Gravity with the Effective Field Theory of Large-Scale Structure	JCAP	2018	04	063	https://hal.archives-ouvertes.fr/hal-01714215	B
237	BOSSARD G., KATMADAS S., TURTON D.	Two kissing bolts	Journal of High Energy Physics	2018	2018		https://hal.archives-ouvertes.fr/hal-02323898	A
238	BOSSARD G., LUST S.	Microstate geometries at a generic point in moduli space	General Relativity and Gravitation	2019	51		https://hal.archives-ouvertes.fr/hal-02323889	A
239	BOTHMANN E., SINGH CHAHAL G., HOCHE S., KRAUSE J., KRAUSS F., KUTTIMALAI S., LIEBSCHNER S., NAPOLETANO D., SCHONHERR M., SCHULZ H., SCHUMANN S., SIEGERT F.	Event Generation with Sherpa 2.2	SciPost Physics	2019	7	034	https://hal.archives-ouvertes.fr/hal-02153634	B
240	BOTTINELLI A., GHERARDI M., BARTHELEMY M.	Efficiency and shrinking in evolving networks	Journal of the Royal Society Interface	2019	16	20190101	https://hal.archives-ouvertes.fr/cea-02563959	C
241	BOUCHBINDER E., LERNER E., RAINONE C., URBANI P., ZAMPONI F.	Low-frequency vibrational spectrum of mean-field disordered systems	Physical Review B	2021	103	174202	https://hal.archives-ouvertes.fr/hal-03221246	C
242	BOUDON A., BOSE B., HUANG H., LOMBRISER L.	Baryogenesis through asymmetric Hawking radiation from primordial black holes as dark matter	Physical Review D	2021	103	083504	https://hal.archives-ouvertes.fr/hal-03011058	B
243	BOUDON A., BRAX P., VALAGEAS P.	Supersonic friction of a black hole traversing a self-interacting scalar dark matter cloud	Physical Review D	2023	108	103517	https://hal.archives-ouvertes.fr/hal-04179345	B
244	BOUDON A., BRAX P., VALAGEAS P.	Subsonic accretion and dynamical friction for a black hole moving through a self-interacting scalar dark matter cloud	Physical Review D	2022	106	043507	https://hal.archives-ouvertes.fr/hal-03662635	B
245	BOURGET A.	The Geometry of Quivers	Physical Sciences Forum	2023		42	https://hal.archives-ouvertes.fr/hal-04239070	A
246	BOURGET A., DANCER A., GRIMMINGER J. F., HANANY A., ZHONG Z.	Partial implosions and quivers	Journal of High Energy Physics	2022	07	049	https://hal.archives-ouvertes.fr/hal-03514371	A
247	BOURGET A., DANCER A., GRIMMINGER J., HANANY A., KIRWAN F., ZHONG Z.	Orthosymplectic implosions	Journal of High Energy Physics	2021	2021	12	https://hal.archives-ouvertes.fr/hal-04239085	A
248	BOURGET A., DANCER A., GRIMMINGER J., HANANY A., ZHONG Z.	Partial implosions and quivers	Journal of High Energy Physics	2022	2022	49	https://hal.archives-ouvertes.fr/hal-04239071	A
249	BOURGET A., GIACOMELLI S., GRIMMINGER J. F.	FI-flows of 3d N=4 Theories	Journal of High Energy Physics	2023	04	015	https://hal.archives-ouvertes.fr/hal-03998607	A
250	BOURGET A., GIACOMELLI S., GRIMMINGER J., HANANY A., SPERLING M., ZHONG Z.	S-fold magnetic quivers	Journal of High Energy Physics	2021	2021	54	https://hal.archives-ouvertes.fr/hal-04239098	A
251	BOURGET A., GRIMMINGER J. F.	Fibrations and Hasse diagrams for 6d SCFTs	Journal of High Energy Physics	2022	12	159	https://hal.archives-ouvertes.fr/hal-03815411	A
252	BOURGET A., GRIMMINGER J. F., HANANY A., KALVEKS R., SPERLING M., ZHONG Z.	A Tale of N Cones	Journal of High Energy Physics	2023	09	073	https://hal.archives-ouvertes.fr/hal-04061981	A
253	BOURGET A., GRIMMINGER J. F., HANANY A., KALVEKS R., ZHONG Z.	Higgs branches of U/SU quivers via brane locking	Journal of High Energy Physics	2022	08	061	https://hal.archives-ouvertes.fr/hal-03441742	A
254	BOURGET A., GRIMMINGER J. F., HANANY A., ZHONG Z.	The Hasse diagram of the moduli space of instantons	Journal of High Energy Physics	2022	08	283	https://hal.archives-ouvertes.fr/hal-03578942	A
255	BOURGET A., GRIMMINGER J. F., MARTONE M., ZAFRIR G.	Magnetic quivers for rank 2 theories	Journal of High Energy Physics	2022	03	208	https://hal.archives-ouvertes.fr/hal-03418727	A
256	BOURGET A., GRIMMINGER J., HANANY A., KALVEKS R., SPERLING M., ZHONG Z.	A tale of N cones	Journal of High Energy Physics	2023	2023	73	https://hal.archives-ouvertes.fr/hal-04239046	A
257	BOURGET A., GRIMMINGER J., HANANY A., KALVEKS R., SPERLING M., ZHONG Z.	Folding orthosymplectic quivers	Journal of High Energy Physics	2021	2021	70	https://hal.archives-ouvertes.fr/hal-04239081	A
258	BOURGET A., GRIMMINGER J., HANANY A., KALVEKS R., ZHONG Z.	Higgs branches of U/SU quivers via brane locking	Journal of High Energy Physics	2022	2022	61	https://hal.archives-ouvertes.fr/hal-04239075	A
259	BOURGET A., GRIMMINGER J., HANANY A., SPERLING M., ZHONG Z.	Branes, quivers, and the affine Grassmannian	Advanced Studies in Pure Mathematics	2023			https://hal.archives-ouvertes.fr/hal-04239092	A
260	BOURGET A., GRIMMINGER J., HANANY A., ZHONG Z.	The Hasse diagram of the moduli space of instantons	Journal of High Energy Physics	2022	2022	283	https://hal.archives-ouvertes.fr/hal-04239061	A
261	BOURGET A., GRIMMINGER J., MARTONE M., ZAFRIR G.	Magnetic quivers for rank 2 theories	Journal of High Energy Physics	2022	2022	208	https://hal.archives-ouvertes.fr/hal-04239077	A
262	BOUTTIER J., CARRANCE A.	Enumeration of planar constellations with an alternating boundary	The Electronic Journal of Combinatorics	2021	28	P3.21	https://hal.archives-ouvertes.fr/hal-03096096	A
263	BOUTTIER J., GUITTER E., MIERMONT G.	Bijective enumeration of planar bipartite maps with three tight boundaries, or how to slice pairs of pants	Annales Henri Lebesgue	2022	5	1035-1110	https://hal.archives-ouvertes.fr/hal-03203780	A ; C
264	BRANDHUBER A., BROWN G. R., CHEN G., DE ANGELIS S., GOWDY J., TRAVAGLINI G.	One-loop Gravitational Bremsstrahlung and Waveforms from a Heavy-Mass Effective Field Theory	Journal of High Energy Physics	2023	06	048	https://hal.archives-ouvertes.fr/hal-04047646	B
265	BRAUN A. P., FRAIMAN B., GRANA M., LUST S., PARRA DE FREITAS H.	Tadpoles and Gauge Symmetries	Journal of High Energy Physics	2023	08	134	https://hal.archives-ouvertes.fr/hal-04105013	A
266	BRAX P.	What makes the Universe accelerate? A review on what dark energy could be and how to test it	Rept.Prog.Phys.	2018	81	016902	https://hal.archives-ouvertes.fr/hal-01669703	B
267	BRAX P., BURGESS C., QUEVEDO F.	Light Axiodilatons: Matter Couplings, Weak-Scale Completions and Long-Distance Tests of Gravity	JCAP	2023	08	011	https://hal.archives-ouvertes.fr/hal-03936161	B

268	BRAX P., BURRAGE C.	Screening the Higgs portal	Physical Review D	2021	104	015011	https://hal.archives-ouvertes.fr/hal-03136702	B
269	BRAX P., BURRAGE C., CEMBRANOS J. A., VALAGEAS P.	Invisible dilaton	Physical Review D	2023	107	095015	https://hal.archives-ouvertes.fr/hal-04076305	B
270	BRAX P., BURRAGE C., DAVIS A.-C.	Laboratory constraints	International Journal of Modern Physics D	2018	27	1848009	https://hal.archives-ouvertes.fr/hal-01990671	B
271	BRAX P., CASAS S., DESMOND H., ELDER B.	Testing Screened Modified Gravity	Universe	2021	8	11	https://hal.archives-ouvertes.fr/hal-03531193	B
272	BRAX P., CEMBRANOS J. A., VALAGEAS P.	Fate of scalar dark matter solitons around supermassive galactic black holes	Physical Review D	2020	101	023521	https://hal.archives-ouvertes.fr/hal-02317278	B
273	BRAX P., CEMBRANOS J. A., VALAGEAS P.	K-essence scalar dark matter solitons around supermassive black holes	Physical Review D	2020	101	063510	https://hal.archives-ouvertes.fr/hal-02475294	B
274	BRAX P., CEMBRANOS J. A., VALAGEAS P.	Impact of kinetic and potential self-interactions on scalar dark matter	Physical Review D	2019	100	023526	https://hal.archives-ouvertes.fr/hal-02160795	B
275	BRAX P., CESPEDES S., DAVIS A.-C.	Signatures of graviton masses on the CMB	JCAP	2018	03	008	https://hal.archives-ouvertes.fr/hal-01730011	B
276	BRAX P., DAVIS A.-C.	Gravitational effects of disformal couplings	Physical Review D	2018	98	063531	https://hal.archives-ouvertes.fr/hal-01897217	B
277	BRAX P., DAVIS A.-C., ELDER B.	Hide and Seek: Screened Scalar Fields in Hydrogen and Muonium	Physical Review D	2023	107	044008	https://hal.archives-ouvertes.fr/hal-03759866	B
278	BRAX P., DAVIS A.-C., ELDER B.	Casimir Tests of Scalar-Tensor Theories	Physical Review D	2023	107	084025	https://hal.archives-ouvertes.fr/hal-03877949	B
279	BRAX P., DAVIS A.-C., ELDER B.	Muon g-2 and Screened Modified Gravity	Physical Review D	2022	106	044040	https://hal.archives-ouvertes.fr/hal-03433370	B
280	BRAX P., DAVIS A.-C., ELDER B., WONG L. K.	Constraining screened fifth forces with the electron magnetic moment	Physical Review D	2018	97	084050	https://hal.archives-ouvertes.fr/hal-01730039	B
281	BRAX P., DAVIS A.-C., KUNTZ A.	Disformally Coupled Scalar Fields and Inspiralling Trajectories	Physical Review D	2019	99	124034	https://hal.archives-ouvertes.fr/hal-02080681	B
282	BRAX P., DAVIS A.-C., MELVILLE S., WONG L. K.	Spin-orbit effects for compact binaries in scalar-tensor gravity	JCAP	2021	10	075	https://hal.archives-ouvertes.fr/hal-03315940	B
283	BRAX P., DAVIS A.-C., MELVILLE S., WONG L. K.	Spin precession as a new window into disformal scalar fields	JCAP	2021	03	001	https://hal.archives-ouvertes.fr/hal-03022680	B
284	BRAX P., FICHET S.	Scalar-Mediated Quantum Forces Between Macroscopic Bodies and Interferometry	Phys.Dark Univ.	2023	42	101294	https://hal.archives-ouvertes.fr/hal-03613399	B
285	BRAX P., FICHET S.	Quantum Chameleons	Physical Review D	2019	99	104049	https://hal.archives-ouvertes.fr/hal-01897247	B
286	BRAX P., FICHET S., PIGNOL G.	Bounding Quantum Dark Forces	Physical Review D	2018	97	115034	https://hal.archives-ouvertes.fr/cea-01687589	B
287	BRAX P., FICHET S., TANEDO P.	The Warped Dark Sector	Phys.Lett.B	2019	798	135012	https://hal.archives-ouvertes.fr/hal-02166506	B
288	BRAX P., FISCHER H., KADING C., PITSCHMANN M.	The environment dependent dilaton in the laboratory and the solar system	European Physical Journal C: Particles and Fields	2022	82	934	https://hal.archives-ouvertes.fr/hal-03630719	B
289	BRAX P., HEISENBERG L., KUNTZ A.	Unveiling the Galileon in a three-body system : scalar and gravitational wave production	JCAP	2020	05	012	https://hal.archives-ouvertes.fr/hal-02510645	B
290	BRAX P., KANETA K., MAMBRINI Y., PIERRE M.	Disformal dark matter	Physical Review D	2021	103	015028	https://hal.archives-ouvertes.fr/hal-03034751	B
291	BRAX P., KANETA K., MAMBRINI Y., PIERRE M.	Metastable Conformal Dark Matter	Physical Review D	2021	103	115016	https://hal.archives-ouvertes.fr/hal-03178503	B
292	BRAX P., LAZANU A.	Non-Gaussianity in DHOST inflation	Journal of Cosmology and Astroparticle Physics	2022	01	026	https://hal.archives-ouvertes.fr/hal-03378005	B
293	BRAX P., LAZANU A.	Scale-dependence in DHOST inflation	Journal of Cosmology and Astroparticle Physics	2021	08	061	https://hal.archives-ouvertes.fr/hal-03274015	B
294	BRAX P., OUAZZANI A.	Two-field Screening and its Cosmological Dynamics	Physical Review D	2023	108	063517	https://hal.archives-ouvertes.fr/hal-04171625	B
295	BRAX P., PITSCHMANN M.	Exact solutions to non-linear symmetron theory: one and two mirror systems	Physical Review D	2018	97	064015	https://hal.archives-ouvertes.fr/cea-01686571	B
296	BRAX P., VALAGEAS P.	Cosmological cancellation of the vacuum energy density	Physical Review D	2019	99	123506	https://hal.archives-ouvertes.fr/hal-02080684	B
297	BRAX P., VALAGEAS P.	Lyman-a power spectrum as a probe of modified gravity	JCAP	2019	01	049	https://hal.archives-ouvertes.fr/hal-01909257	B
298	BRAX P., VALAGEAS P.	Nonscreening of the cosmological background in K-mouflage modified gravity	Physical Review D	2018	98	083509	https://hal.archives-ouvertes.fr/hal-01833777	B
299	BRAX P., VALAGEAS P.	Self-acceleration in scalar-bimetric theories	Physical Review D	2018	97	103516	https://hal.archives-ouvertes.fr/cea-01686651	B
300	BRAX P., VALAGEAS P., CEMBRANOS J. A.	Nonrelativistic formation of scalar clumps as a candidate for dark matter	Physical Review D	2020	102	083012	https://hal.archives-ouvertes.fr/hal-02908368	B
301	BRAX P., VALAGEAS P., VANHOVE P.	New bounds on dark energy induced fifth forces	Physical Review D	2019	99	064010	https://hal.archives-ouvertes.fr/hal-02043515	B ; A
302	BRAX P., VALAGEAS P., VANHOVE P.	Dark R^2 at low energy	International Journal of Modern Physics A	2018	33	1845006	https://hal.archives-ouvertes.fr/hal-01982886	B ; A
303	BRAX P., VAN DE BRUCK C., DAVIS A.-C.	Swampland and screened modified gravity	Physical Review D	2020	101	083514	https://hal.archives-ouvertes.fr/hal-02403543	B
304	BRAX P., VAN DE BRUCK C., DI VALENTINO E., GIARE W., TROJANOWSKI S.	New Insight on Neutrino Dark Matter Interactions from Small-Scale CMB Observations	Monthly Notices of the Royal Astronomical Society	2023	527	L122-L126	https://hal.archives-ouvertes.fr/hal-04076262	B
305	BRAX P., VAN DE BRUCK C., DI VALENTINO E., GIARE W., TROJANOWSKI S.	Extended Analysis of Neutrino-Dark Matter Interactions with Small-Scale CMB Experiments	Phys.Dark Univ.	2023	42	101321	https://hal.archives-ouvertes.fr/hal-04103926	B
306	BRAX P., VAN DE BRUCK C., TROJANOWSKI S.	Cointeracting dark matter and conformally coupled light scalars	Physical Review D	2022	105	103015	https://hal.archives-ouvertes.fr/hal-03515271	B

307	BRETONNIERE H., KUCHNER U., HUERTAS-COMPANY M., MERLIN E., CASTELLANO M., TUCCILLO D., BUITRAGO F., CONSELICE C.J., BOUCAUD A. *et al.*	Euclid preparation. XXVI. The Euclid Morphology Challenge: Towards structural parameters for billions of galaxies	Astronomy and Astrophysics - A&A	2023	671	A102	https://hal.archives-ouvertes.fr/hal-03841727	B
308	BRITO C., IKEDA H., URBANI P., WYART M., ZAMPONI F.	Universality of jamming of nonspherical particles	Proceedings of the National Academy of Sciences of the United States of America	2018	115	11736-11741	https://hal.archives-ouvertes.fr/hal-02323912	C
309	BRITO R., JEHU G. R., ORTA A.	The dimension-shift conjecture for one-loop amplitudes	Journal of High Energy Physics	2021	04	276	https://hal.archives-ouvertes.fr/hal-03070623	B
310	BRITTO R., MIZERA S., RODRIGUEZ C., SCHLOTTERER O.	Coaction and double-copy properties of configuration-space integrals at genus zero	Journal of High Energy Physics	2021	05	053	https://hal.archives-ouvertes.fr/hal-03157121	B
311	BRODIE C. R., CONSTANTIN A., LUKAS A.	Flops, Gromov-Witten invariants and symmetries of line bundle cohomology on Calabi-Yau three-folds	J.Geom.Phys.	2022	171	104398	https://hal.archives-ouvertes.fr/hal-02987451	A
312	BRODIE C. R., CONSTANTIN A., LUKAS A., RUEHLE F.	Geodesics in the extended Kähler cone of Calabi-Yau threefolds	Journal of High Energy Physics	2022	03	024	https://hal.archives-ouvertes.fr/hal-03335441	A
313	BRODIE C. R., CONSTANTIN A., LUKAS A., RUEHLE F.	Swampland conjectures and infinite flop chains	Physical Review D	2021	104	046008	https://hal.archives-ouvertes.fr/hal-03203642	A
314	BRUSH M., LINDER E. V., ZUMALACARREGUI M.	No Slip CMB	JCAP	2019	01	029	https://hal.archives-ouvertes.fr/hal-01921724	B
315	BUCKLEY A., KVELLESTAD A., RAKLEV A., SCOTT P., VAN DEN ABEELE J., VAZQUEZ-HOLM I. A.	Xsec: the cross-section evaluation code	European Physical Journal C: Particles and Fields	2020	80	1106	https://hal.archives-ouvertes.fr/hal-02905272	A
316	BUFALINI D., IGURI S., KOVENSKY N.	A proof for string three-point functions in AdS_3	Journal of High Energy Physics	2023	02	246	https://hal.archives-ouvertes.fr/hal-03921045	A
317	BUFALINI D., IGURI S., KOVENSKY N., TURTON D.	Worldsheet computation of heavy-light correlators	Journal of High Energy Physics	2023	03	066	https://hal.archives-ouvertes.fr/hal-03846391	A
318	BUFALINI D., IGURI S., KOVENSKY N., TURTON D.	Worldsheet Correlators in Black Hole Microstates	Physical Review Letters	2022	129	121603	https://hal.archives-ouvertes.fr/hal-03632287	A
319	BUFALINI D., IGURI S., KOVENSKY N., TURTON D.	Black hole microstates from the worldsheet	Journal of High Energy Physics	2021	08	011	https://hal.archives-ouvertes.fr/hal-03229351	A
320	BUHOT J., MONTIEL X., GALLAIS Y., CAZAYOUS M., SACUTO A., LAPERTOT G., AOKI D., HUSSEY N., LACROIX C., PEPIN C., BURDIN S., MEASSON M.-A.	Anisotropic Kondo pseudogap in URu 2 Si 2	Physical Review B	2020	101	245103	https://hal.archives-ouvertes.fr/hal-03100787	C
321	BZOWSKI A., GNECCHI A., HERTOG T.	Interactions resolve state-dependence in a toy-model of AdS black holes	Journal of High Energy Physics	2018	06	167	https://hal.archives-ouvertes.fr/hal-01719606	A
322	BZOWSKI A., GUICA M.	The holographic interpretation of J \bar T-deformed CFTs	Journal of High Energy Physics	2019	01	198	https://hal.archives-ouvertes.fr/hal-01768124	A
323	BZOWSKI A., MCFADDEN P., SKENDERIS K.	Renormalised CFT 3-point functions of scalars, currents and stress tensors	Journal of High Energy Physics	2018	11	159	https://hal.archives-ouvertes.fr/hal-01815178	A
324	BZOWSKI A., MCFADDEN P., SKENDERIS K.	Renormalised 3-point functions of stress tensors and conserved currents in CFT	Journal of High Energy Physics	2018	11	153	https://hal.archives-ouvertes.fr/hal-01944917	A
325	CACCIARI M., FORTE S., NAPOLETANO D., SOYEZ G., STAGNITTO G.	Single-jet inclusive cross section and its definition	Physical Review D	2019	100	114015	https://hal.archives-ouvertes.fr/hal-02188436	B
326	CAI Y., YU B., JAYACHANDRAN P., BRUNNER N., SCARANI V., BANCAL J.-D.	Entanglement for any definition of two subsystems	Physical Review A	2021	103	052432	https://hal.archives-ouvertes.fr/hal-04207886	C
327	CALDARELLI G., ARCAUTE E., BARTHELEMY M., BATTY M., GERSHENSON C., HELBING D., MANCUSO S., MORENO Y., RAMASCO J., ROZENBLAT C., SANCHEZ A., FERNANDEZ-VILLACANAS J.	The role of complexity for digital twins of cities	Nature Computational Science	2023	3	374-381	https://hal.archives-ouvertes.fr/cea-04313418	C
328	CALETTI S., FEDKEVYCH O., MARZANI S., REICHELT D., SCHUMANN S., SOYEZ G., THEEUWES V.	Jet angularities in Z+jet production at the LHC	Journal of High Energy Physics	2021	07	076	https://hal.archives-ouvertes.fr/hal-03210372	B
329	CALTAGIRONE F., LELARGE M., MIOLANE L.	Recovering Asymmetric Communities in the Stochastic Block Model	IEEE Transactions on Network Science and Engineering	2018	5	237-246	https://hal.archives-ouvertes.fr/hal-01963866	C
330	CAMARENA D., MARRA V., SAKR Z., NESSERIS S., DA SILVA A., GARCIA-BELLIDO J., FLEURY P., LOMBRISER L., MARTINELLI M., MARTINS C., MIMOSO J. *et al.*	Euclid: Testing the Copernican principle with next-generation surveys	Astron.Astrophys.	2023	671	A68	https://hal.archives-ouvertes.fr/hal-03758826	B
331	CANAY M., DEL DUCA V.	One-loop impact factor for the emission of two gluons	Journal of High Energy Physics	2021	06	034	https://hal.archives-ouvertes.fr/hal-03197539	B
332	CANO P. A., GANCHEV B., MAYERSON D. R., RUIPEREZ A.	Black Hole Multipoles in Higher-Derivative Gravity	Journal of High Energy Physics	2022	12	120	https://hal.archives-ouvertes.fr/hal-03756383	A
333	CARLEO G., CIRAC I., CRANMER K., DAUDET L., SCHULD M., TISHBY N., VOGT-MARANTO L., ZDEBOROVA L.	Machine learning and the physical sciences	Rev.Mod.Phys.	2019	91	045002	https://hal.archives-ouvertes.fr/hal-02101667	C
334	CARRASCO J. J. M., LEWANDOWSKI M., PAVAO N. H.	The color-dual fate of N=4 supergravity	Physical Review Letters	2023	131	051601	https://hal.archives-ouvertes.fr/hal-03615585	A
335	CARRASCO J. J. M., PAVAO N. H.	Virtues of a symmetric-structure double copy	Physical Review D	2023	107	065005	https://hal.archives-ouvertes.fr/hal-03866306	A
336	CARRASCO J. J. M., RODINA L.	UV considerations on scattering amplitudes in a web of theories	Physical Review D	2019	100	125007	https://hal.archives-ouvertes.fr/hal-02302881	A
337	CARRASCO J. J. M., RODINA L., YIN Z., ZEKIOGLU S.	Simple encoding of higher derivative gauge and gravity counterterms	Physical Review Letters	2020	125	251602	https://hal.archives-ouvertes.fr/hal-02382004	A
338	CARRASCO J. J. M., RODINA L., ZEKIOGLU S.	Composing effective prediction at five points	Journal of High Energy Physics	2021	06	169	https://hal.archives-ouvertes.fr/hal-03217534	A
339	CARRASCO J. J. M., VAZQUEZ-HOLM I. A.	Loop-Level Double-Copy for Massive Quantum Particles	Physical Review D	2021	103	045002	https://hal.archives-ouvertes.fr/hal-02999559	A
340	CARRASCO J. J. M., VAZQUEZ-HOLM I. A.	Extracting Einstein from the loop-level double-copy	Journal of High Energy Physics	2021	11	088	https://hal.archives-ouvertes.fr/hal-03324394	A
341	CARRASCO J. J. M., KALLOSH R., LINDE A.	Cosmological Attractors and Initial Conditions for Inflation	Physical Review D	2018	92	063519	https://hal.archives-ouvertes.fr/cea-01690086	A
342	CARVALHO F., GONCALVES V.P., NAVARRA F.S., SPIERING D.	Exclusive vector meson photoproduction with a leading baryon in photon - hadron interactions at hadronic colliders	Physical Review D	2018	97	074002	https://hal.archives-ouvertes.fr/hal-01763556	B
343	CASPAR P., OUDOT E., SEKATSKI P., MARING N., MARTIN A., SANGOUARD N., ZBINDEN H., THEW R.	Local and scalable detection of genuine multipartite single-photon path entanglement	Quantum	2022	6	671	https://hal.archives-ouvertes.fr/hal-03469468	C

#	Authors	Title	Journal	Year	Vol	Pages	URL	
344	CASPAR P., VERBANIS E., OUDOT E., MARING N., SAMARA F., CALOZ M., PERRENOUD M., SEKATSKI P., MARTIN A., SANGOUARD N., ZBINDEN H., THEW R. T.	Heralded Distribution of Single-Photon Path Entanglement	Physical Review Letters	2020	125	110506	https://hal.archives-ouvertes.fr/cea-04414381	C
345	CASTELLANO A., FONT A., HERRAEZ A., IBANEZ L.E.	A gravitino distance conjecture	Journal of High Energy Physics	2021	08	092	https://hal.archives-ouvertes.fr/hal-03217513	A
346	CASTELLANO A., HERRAEZ A., IBANEZ L. E.	Towers and Hierarchies in the Standard Model from Emergence in Quantum Gravity	Journal of High Energy Physics	2023	10	172	https://hal.archives-ouvertes.fr/hal-03989098	A
347	CASTELLANO A., HERRAEZ A., IBANEZ L. E.	The Emergence Proposal in quantum gravity and the species scale	Journal of High Energy Physics	2023	06	047	https://hal.archives-ouvertes.fr/hal-03920021	A
348	CASTELLANO A., HERRAEZ A., IBANEZ L. E.	IR/UV mixing, towers of species and swampland conjectures	Journal of High Energy Physics	2022	08	217	https://hal.archives-ouvertes.fr/hal-03514348	A
349	CAUCAL P., IANCU E., MUELLER A.H., SOYEZ G.	Nuclear modification factors for jet fragmentation	Journal of High Energy Physics	2020	10	204	https://hal.archives-ouvertes.fr/hal-02739775	B
350	CAUCAL P., IANCU E., MUELLER A.H., SOYEZ G.	Vacuum-like jet fragmentation in a dense QCD medium	Physical Review Letters	2018	120	232001	https://hal.archives-ouvertes.fr/hal-01714134	B
351	CAUCAL P., IANCU E., SOYEZ G.	Jet radiation in a longitudinally expanding medium	Journal of High Energy Physics	2021	04	209	https://hal.archives-ouvertes.fr/hal-03086790	B
352	CAUCAL P., IANCU E., SOYEZ G.	Deciphering the z g distribution in ultrarelativistic heavy ion collisions	Journal of High Energy Physics	2019	10	273	https://hal.archives-ouvertes.fr/cea-02372758	B
353	CAUCAL P., SOTO-ONTOSO A., TAKACS A.	Dynamically groomed jet radius in heavy-ion collisions	Physical Review D	2022	105	114046	https://hal.archives-ouvertes.fr/hal-03477038	B
354	CAUCAL P., SOTO-ONTOSO A., TAKACS A.	Dynamical Grooming meets LHC data	Journal of High Energy Physics	2021	07	020	https://hal.archives-ouvertes.fr/hal-03186199	B
355	CAVAGLIA A., GROMOV N., LEVKOVICH-MASLYUK F.	Separation of variables in AdS/CFT: functional approach for the fishnet CFT	Journal of High Energy Physics	2021	06	131	https://hal.archives-ouvertes.fr/hal-03197543	C
356	ČEPLAK N.	Vector Superstrata	Journal of High Energy Physics	2023	08	047	https://hal.archives-ouvertes.fr/hal-03922242	A
357	ČEPLAK N., EMPARAN R., PUHM A., TOMAEVIĆ M.	The correspondence between rotating black holes and fundamental strings	Journal of High Energy Physics	2023	11	226	https://hal.archives-ouvertes.fr/hal-04161818	A
358	CEPLAK N., GIUSTO S., HUGHES M. R., RUSSO R.	Holographic correlators with multi-particle states	Journal of High Energy Physics	2021	09	204	https://hal.archives-ouvertes.fr/hal-03235675	A
359	CEPLAK N., HAMPTON S., LI Y.	Toroidal tidal effects in microstate geometries	Journal of High Energy Physics	2022	03	21	https://hal.archives-ouvertes.fr/hal-03268682	A
360	ČEPLAK N., HAMPTON S., WARNER N. P.	Linearizing the BPS Equations with Vector and Tensor Multiplets	JHEP	2023	03	145	https://hal.archives-ouvertes.fr/hal-03656418	A
361	CEPLAK N., HUGHES M. R.	The Regge limit of AdS_{3} holographic correlators with heavy states: towards the black hole regime	Journal of High Energy Physics	2021	07	021	https://hal.archives-ouvertes.fr/hal-03164411	A
362	CEPLAK N., VEGH D.	Pole-skipping and Rarita-Schwinger fields	Physical Review D	2021	103	106009	https://hal.archives-ouvertes.fr/hal-03115789	A
363	CHA P., WENTZELL N., PARCOLLET O., GEORGES A., KIM E.-A.	Linear resistivity and Sachdev-Ye-Kitaev (SYK) spin liquid behaviour in a quantum critical metal with spin-1/2 fermions	Proceedings of the National Academy of Sciences of the United States of America	2020	117	18341-18346	https://hal.archives-ouvertes.fr/cea-04541041	C
364	CHABANIER S., BOURNAUD F., DUBOIS Y., CODIS S., CHAPON D., ELBAZ D., PICHON C., BRESSAND O., DEVRIENDT J., GAVAZZI R., KRALJIC K., KIMM T. *et al.*	Formation of compact galaxies in the Extreme-Horizon simulation	Astronomy and Astrophysics - A&A	2020	643	L8	https://hal.archives-ouvertes.fr/cea-02988983	B
365	CHABROL L.	F-theory and Heterotic Duality, Weierstrass Models from Wilson lines	European Physical Journal C: Particles and Fields	2020	80	944	https://hal.archives-ouvertes.fr/hal-02383739	A
366	CHABROL L.	Geometry of $\mathbb{R}^{+}\times E_{3(3)}$ exceptional field theory and F-theory	Journal of High Energy Physics	2019	08	073	https://hal.archives-ouvertes.fr/hal-02008815	A
367	CHAKRABORTY D., MORICE C., PEPIN C.	Phase diagram of the underdoped cuprates at high magnetic field	Physical Review B	2018	97	214501	https://hal.archives-ouvertes.fr/cea-04221664	C
368	CHAKRABORTY S., GIVEON A., KUTASOV D.	Comments on Single-Trace T\bar T Holography	Journal of High Energy Physics	2023	06	018	https://hal.archives-ouvertes.fr/hal-04060377	A
369	CHAKRABORTY S., GOYKHMAN M.	Solvable time-like cosets and holography beyond AdS	Journal of High Energy Physics	2022	08	244	https://hal.archives-ouvertes.fr/hal-03648571	A
370	CHAKRABORTY S., HAMPTON S. D.	A 4d non-BPS NS-NS microstate	Journal of High Energy Physics	2023	09	099	https://hal.archives-ouvertes.fr/hal-04135607	A
371	CHAKRABORTY S., HASHIMOTO A.	Comments on the negative specific heat of the T\overline{T} deformed symmetric product CFT	Journal of High Energy Physics	2022	03	213	https://hal.archives-ouvertes.fr/hal-03559638	A
372	CHARBONNIER S., EYNARD B., DAVID F.	Large Strebel Graphs and (3,2) Liouville CFT	Annales Henri Poincaré	2018	19	1611-1645	https://hal.archives-ouvertes.fr/cea-01692054	A
373	CHARLES A. M., MAYERSON D. R.	Probing Black Hole Microstate Evolution with Networks and Random Walks	SciPost Physics	2020	8	077	https://hal.archives-ouvertes.fr/hal-01975387	A
374	CHARMOUSIS C., CRISOSTOMI M., GREGORY R., STERGIOULAS N.	Rotating Black Holes in Higher Order Gravity	Physical Review D	2019	100	084020	https://hal.archives-ouvertes.fr/hal-02080701	B
375	CHARMOUSIS C., CRISOSTOMI M., LANGLOIS D., NOUI K.	Perturbations of a rotating black hole in DHOST theories	Classical and Quantum Gravity	2019	36	235008	https://hal.archives-ouvertes.fr/hal-02188141	B
376	CHATTERJEE S. S., LAVIGNAC S., MIRANDA O.G., SANCHEZ GARCIA G.	Constraining Non-Standard Interactions with Coherent Elastic Neutrino-Nucleus Scattering at the European Spallation Source	Physical Review D	2023	107	055019	https://hal.archives-ouvertes.fr/hal-03773937	B
377	CHATTERJEE S. S., MIRANDA O.G., TORTOLA M., VALLE J.	Nonunitarity of the lepton mixing matrix at the European Spallation Source	Physical Review D	2022	106	075016	https://hal.archives-ouvertes.fr/hal-03456857	B
378	CHATTOPADHYAY C., BHALERAO R. S., OLLITRAULT J.-Y., PAL S.	Effects of initial-state dynamics on collective flow within a coupled transport and viscous hydrodynamic approach	Physical Review C	2018	97	034915	https://hal.archives-ouvertes.fr/cea-01613944	B
379	CHENG P., MELNIKOV I. V., MINASIAN R.	Flat equivariant gerbes: holonomies and dualities	Journal of High Energy Physics	2023	04	074	https://hal.archives-ouvertes.fr/hal-03736642	A
380	CHENG P., MINASIAN R., THEISEN S.	Anomalies as obstructions: from dimensional lifts to swampland	Journal of High Energy Physics	2022	01	068	https://hal.archives-ouvertes.fr/hal-03285214	A
381	CHERNYAK D., GAINUTDINOV A. M., JACOBSEN J. L., SALEUR H.	Algebraic Bethe ansatz for the open XXZ spin chain with non-diagonal boundary terms via U_q\mathfrak{sl}_2 symmetry	Symmetry, Integrability and Geometry : Methods and Applications	2023	19	046	https://hal.archives-ouvertes.fr/hal-03926582	A

382	CHERNYAK D., GAINUTDINOV A. M., SALEUR H.	$U_q\mathfrak{sl}_2$-invariant non-compact boundary conditions for the XXZ spin chain	Journal of High Energy Physics	2022	2022	016	https://hal.archives-ouvertes.fr/hal-03759954	A
383	CHEVALLIER D., TRIF M., DUTREIX C., GUIGOU M., QUAY C. H. L., APRILI M., BENA C.	Superconductor spintronics: modeling spin and charge accumulation in out-of-equilibrium NIS junctions subjected to Zeeman magnetic fields	New Journal of Physics	2018	20	013014	https://hal.archives-ouvertes.fr/hal-01716101	C
384	CHICHERIN D., KORCHEMSKY G. P.	The SAGEX Review on Scattering Amplitudes, Chapter 9: Integrability of Amplitudes in Fishnet Theories	J.Phys.A	2022	55	443010	https://hal.archives-ouvertes.fr/hal-03630774	B
385	CHICHERIN D., KORCHEMSKY G., SOKATCHEV E., ZHIBOEDOV A.	Energy correlations in heavy states	Journal of High Energy Physics	2023	11	134	https://hal.archives-ouvertes.fr/hal-04158425	B
386	CHOUTEAU T., TARRICONE S.	Recursion relation for Toeplitz determinants and the discrete Painlevé II hierarchy	Symmetry, Integrability and Geometry : Methods and Applications	2023			https://hal.archives-ouvertes.fr/hal-03897674	A
387	CHOWDHURY D., GEORGES A., PARCOLLET O., SACHDEV S.	Sachdev-Ye-Kitaev Models and Beyond: A Window into Non-Fermi Liquids	Rev.Mod.Phys.	2022	94	035004	https://hal.archives-ouvertes.fr/hal-03360959	C
388	CHUBUKOV A., EREMIN I., GALITSKI V., PEPIN C.	Special issue in memory of Prof. Konstantin B. Efetov: Editorial foreword	Annals of Physics	2023	456	169366	https://hal.archives-ouvertes.fr/cea-04505924	C
389	CLAEYS T., TARRICONE S.	On the integrable structure of deformed sine kernel determinants	Mathematical Physics, Analysis and Geometry	2023	27	3	https://hal.archives-ouvertes.fr/hal-04237606	A
390	COIMBRA A., MINASIAN R.	M-theoretic Lichnerowicz formula and supersymmetry	Journal of High Energy Physics	2019	10	036	https://hal.archives-ouvertes.fr/hal-02327737	A
391	COLLAZUOL V., GRANA M., HERRAEZ A.	E_{9} symmetry in the heterotic string on S^{1} and the weak gravity conjecture	Journal of High Energy Physics	2022	06	083	https://hal.archives-ouvertes.fr/hal-03613391	A
392	COLLAZUOL V., GRANA M., HERRAEZ A., PARRA DE FREITAS H.	Affine Algebras at Infinite Distance Limits in the Heterotic String	Journal of High Energy Physics	2023	07	036	https://hal.archives-ouvertes.fr/hal-03850718	A
393	COLLIER S., PERLMUTTER E.	Harnessing S-duality in $\mathcal{N}$ = 4 SYM & supergravity as SL(2, $\mathbb{Z}$)-averaged strings	Journal of High Energy Physics	2022	08	195	https://hal.archives-ouvertes.fr/hal-03546993	A
394	COMBERIATI F., DE LA CRUZ L.	Classical off-shell currents	Journal of High Energy Physics	2023	03	068	https://hal.archives-ouvertes.fr/hal-03926577	B
395	COQUET M., DU X., OLLITRAULT J.-Y., SCHLICHTING S., WINN M.	Transverse mass scaling of dilepton radiation off a quark-gluon plasma	Nucl.Phys.A	2023	1030	122579	https://hal.archives-ouvertes.fr/hal-03520944	B
396	COQUET M., DU X., OLLITRAULT J.-Y., SCHLICHTING S., WINN M.	Intermediate mass dileptons as pre-equilibrium probes in heavy ion collisions	Phys.Lett.B	2021	821	136626	https://hal.archives-ouvertes.fr/hal-03210378	B
397	CORDOVA L., HE Y., KRUCZENSKI M., VIEIRA P.	The O(N) S-matrix Monolith	Journal of High Energy Physics	2020	04	142	https://hal.archives-ouvertes.fr/hal-02338481	A
398	CORDOVA L., VIEIRA P.	Adding flavour to the S-matrix bootstrap	Journal of High Energy Physics	2018	12	063	https://hal.archives-ouvertes.fr/hal-01815169	A
399	CORNACCHIA E., MIGNACCO F., VEIGA R., GERBELOT C., LOUREIRO B., ZDEBOROVA L.	Learning curves for the multi-class teacher–student perceptron	Machine Learning: Science and Technology	2023	4	015019	https://hal.archives-ouvertes.fr/cea-04538628	C
400	CORNU F., HILHORST H., BAUER M.	New duality relation for the Discrete Gaussian SOS model on a torus	Journal of Statistical Mechanics: Theory and Experiment	2023			https://hal.archives-ouvertes.fr/hal-03861620	A
401	COUVREUR R., VERNIER E., JACOBSEN J. L., SALEUR H.	On truncations of the Chalker-Coddington model	Nuclear Physics B	2019	941	507-559	https://hal.archives-ouvertes.fr/hal-01891249	A
402	CREMINELLI P., LEWANDOWSKI M., TAMBALO G., VERNIZZI F.	Gravitational Wave Decay into Dark Energy	JCAP	2018	12	025	https://hal.archives-ouvertes.fr/hal-01880829	B
403	CREMINELLI P., TAMBALO G., VERNIZZI F., YINGCHAROENRAT V.	Dark-Energy Instabilities induced by Gravitational Waves	JCAP	2020	05	002	https://hal.archives-ouvertes.fr/hal-02382016	B
404	CREMINELLI P., TAMBALO G., VERNIZZI F., YINGCHAROENRAT V.	Resonant Decay of Gravitational Waves into Dark Energy	JCAP	2019	10	072	https://hal.archives-ouvertes.fr/hal-02171511	B
405	CREPIEUX A., PANGBURN E., HAURIE L., AWOGA O., BLACK-SCHAFFER A., SEDLMAYR N., PEPIN C., BENA C.	Superconductivity in monolayer and few-layer graphene: II. Topological edge states and Chern numbers	Physical Review B	2023	108	134515	https://hal.archives-ouvertes.fr/cea-04259581	C
406	CRISOSTOMI M., KOYAMA K.	Self-accelerating universe in scalar-tensor theories after GW170817	Physical Review D	2018	97	084004	https://hal.archives-ouvertes.fr/hal-01763397	B
407	CRISOSTOMI M., KOYAMA K.	Vainshtein mechanism after GW170817	Physical Review D	2018	97	021301	https://hal.archives-ouvertes.fr/hal-01704789	B
408	CRISOSTOMI M., KOYAMA K., LANGLOIS D., NOUI K., STEER D.A.	Cosmological evolution in DHOST theories	JCAP	2019	01	030	https://hal.archives-ouvertes.fr/hal-01921720	B
409	CRISOSTOMI M., LEWANDOWSKI M., VERNIZZI F.	Consistency relations for large-scale structure in modified gravity and the matter bispectrum	Physical Review D	2020	101	123501	https://hal.archives-ouvertes.fr/hal-02338486	B
410	CRISOSTOMI M., LEWANDOWSKI M., VERNIZZI F.	Vainshtein regime in scalar-tensor gravity: Constraints on degenerate higher-order scalar-tensor theories	Physical Review D	2019	100	024025	https://hal.archives-ouvertes.fr/hal-02097325	B
411	CRISTOFOLI A., BJERRUM-BOHR N. E. J., DAMGAARD P. H., VANHOVE P.	On Post-Minkowskian Hamiltonians in General Relativity	Physical Review D	2019	100	084040	https://hal.archives-ouvertes.fr/hal-02165253	A
412	CRISTOFOLI A., GONZO R., KOSOWER D. A., O'CONNELL D.	Waveforms from amplitudes	Physical Review D	2022	106	056007	https://hal.archives-ouvertes.fr/hal-03315388	B
413	CRONENBERG G., BRAX P., FILTER H., GELTENBORT P., JENKE T., PIGNOL G., PITSCHMANN M., THALHAMMER M., ABELE H.	Acoustic Rabi oscillations between gravitational quantum states and impact on symmetron dark energy	Nature Physics	2018	14	1022-1026	https://hal.archives-ouvertes.fr/hal-01902946	B
414	CSAKI C., D'AGNOLO R. T., GELLER M., ISMAIL A.	Crunching Dilaton, Hidden Naturalness	Physical Review Letters	2021	126	091801	https://hal.archives-ouvertes.fr/hal-02914531	B
415	CSAKI C., HUBISZ J., ISMAIL A., RIGO G., SGARLATA F.	a-Anomalous Interactions of the Holographic Dilaton	Physical Review D	2022	106	055004	https://hal.archives-ouvertes.fr/hal-03714727	B
416	CSAKI C., TITO D'AGNOLO R., GUPTA R. S., KUFLIK E., ROY T. S., RUHDORFER M.	On the Dynamical Origin of the \eta' Potential and the Axion Mass	JHEP	2023	10	139	https://hal.archives-ouvertes.fr/hal-04171358	B
417	CUSIN G., LEWANDOWSKI M., VERNIZZI F.	Nonlinear effective theory of dark energy	JCAP	2018	04	61	https://hal.archives-ouvertes.fr/cea-01697937	B
418	CUSIN G., LEWANDOWSKI M., VERNIZZI F.	Dark Energy and Modified Gravity in the Effective Field Theory of Large-Scale Structure	Journal of Cosmology and Astroparticle Physics	2018	2018	005	https://hal.archives-ouvertes.fr/cea-01697830	B
419	D'AGNOLO R. T., GROSSO G., PIERINI M., WULZER A., ZANETTI M.	Learning new physics from an imperfect machine	European Physical Journal C: Particles and Fields	2022	82	275	https://hal.archives-ouvertes.fr/hal-03477010	B
420	D'AGNOLO R. T., GROSSO G., PIERINI M., WULZER A., ZANETTI M.	Learning multivariate new physics	European Physical Journal C: Particles and Fields	2021	81	89	https://hal.archives-ouvertes.fr/hal-02447939	B
421	D'AGNOLO R. T., LIU D., RUDERMAN J. T., WANG P.-J.	Forbidden dark matter annihilations into Standard Model particles	Journal of High Energy Physics	2021	06	103	https://hal.archives-ouvertes.fr/hal-03115851	B

422	DAGNOLO R. T., NORTIER F., RIGO G., SESMA P.	The two scales of new physics in Higgs couplings	Journal of High Energy Physics	2023	2023	19	https://hal.archives-ouvertes.fr/cea-04242751	B
423	D'AGNOLO R. T., TERESI D.	Sliding Naturalness: New Solution to the Strong-CP and Electroweak-Hierarchy Problems	Physical Review Letters	2022	128	021803	https://hal.archives-ouvertes.fr/hal-03268799	B
424	DAMGAARD P. H., HANSEN E. R., PLANTE L., VANHOVE P.	Classical Observables from the Exponential Representation of the Gravitational S-Matrix	Journal of High Energy Physics	2023	09	183	https://hal.archives-ouvertes.fr/hal-04161886	A
425	DAMGAARD P. H., HANSEN E. R., PLANTE L., VANHOVE P.	The Relation Between KMOC and Worldline Formalisms for Classical Gravity	Journal of High Energy Physics	2023	2023	106	https://hal.archives-ouvertes.fr/hal-04208282	A
426	DAMGAARD P. H., PLANTE L., VANHOVE P.	On an exponential representation of the gravitational S-matrix	Journal of High Energy Physics	2021	11	213	https://hal.archives-ouvertes.fr/hal-03318840	A
427	DAMGAARD P. H., VANHOVE P.	Remodeling the effective one-body formalism in post-Minkowskian gravity	Physical Review D	2021	104	104029	https://hal.archives-ouvertes.fr/hal-03335453	A
428	D'AMICO G., MARINUCCI M., PIETRONI M., VERNIZZI F.	The large scale structure bootstrap: perturbation theory and bias expansion from symmetries	JCAP	2021	10	069	https://hal.archives-ouvertes.fr/hal-03364371	B
429	DANDEKAR R., KRAPIVSKY P. L., MALLICK K.	Dynamical fluctuations in the Riesz gas	Physical Review E : Statistical, Nonlinear, and Soft Matter Physics	2023	107	044129	https://hal.archives-ouvertes.fr/hal-03921114	C
430	DANDEKAR R., KUNDU A.	Mass fluctuations in random average transfer rrocess in open set-up	Journal of Statistical Mechanics: Theory and Experiment	2023	2023	013205	https://hal.archives-ouvertes.fr/cea-04478314	C
431	DANDEKAR R., MALLICK K.	Macroscopic fluctuations of a driven tracer in the symmetric exclusion process	Journal of Physics A: Mathematical and Theoretical	2022	55	435001	https://hal.archives-ouvertes.fr/cea-04478332	C
432	DANDEKAR R., RAJESH R., SUBASHRI V., ZABORONSKI O.	A Monte Carlo algorithm to measure probabilities of rare events in cluster-cluster aggregation	Computer Physics Communications	2023	288	108727	https://hal.archives-ouvertes.fr/cea-04478292	C
433	DAS A., ELLIS S. A., SCHUSTER P. C., ZHOU K.	Stellar shocks from dark matter asteroid impacts	Physical Review Letters	2022	128	021101	https://hal.archives-ouvertes.fr/hal-03273742	B
434	DAS S. R., HAMPTON S., LIU S.	Entanglement entropy and phase space density: lowest Landau levels and 1/2 BPS states	Journal of High Energy Physics	2022	06	046	https://hal.archives-ouvertes.fr/hal-03553931	A
435	DASGUPTA M., DREYER F. A., HAMILTON K., MONNI P. F., SALAM G. P., SOYEZ G.	Parton showers beyond leading logarithmic accuracy	Physical Review Letters	2020	125	052002	https://hal.archives-ouvertes.fr/hal-02507731	B
436	DASGUPTA M., GUZZI M., RAWLING J., SOYEZ G.	Top tagging : an analytical perspective	Journal of High Energy Physics	2018	09	170	https://hal.archives-ouvertes.fr/hal-01851159	B
437	DAVID F., JONSSON T.	Quantum random walk on a comb with infinite teeth	Journal of Physics A: Mathematical and Theoretical	2022	55	095304	https://hal.archives-ouvertes.fr/hal-03312496	A
438	DAVID F., SCOTT J.	Perturbing Isoradial Triangulations	Annales de l'Institut Henri Poincaré (D) Combinatorics, Physics and their Interactions	2021			https://hal.archives-ouvertes.fr/cea-03454466	A
439	DE BRUYNE B., MAJUMDAR S. N., ORLAND H., SCHEHR G.	Generating stochastic trajectories with global dynamical constraints	Journal of Statistical Mechanics: Theory and Experiment	2021	12		https://hal.archives-ouvertes.fr/hal-03534085	C
440	DEBASTIANI V.R., NAVARRA F.S.	A non-relativistic model for the [cc][\bar{c}\bar{c}] tetraquark	Chin.Phys.C	2019	43	013105	https://hal.archives-ouvertes.fr/hal-01974828	B
441	DEBIN B., DI FRANCESCO P., GUITTER E.	Arctic curves of the twenty-vertex model with domain wall boundaries	Journal of Statistical Physics	2020	179	33-89	https://hal.archives-ouvertes.fr/cea-02932213	A ; C
442	DEBIN B., GRANET E., RUELLE P.	Concavity analysis of the tangent method	Journal of Statistical Mechanics: Theory and Experiment	2019	2019	113107	https://hal.archives-ouvertes.fr/hal-04277322	A
443	DELANEY K. T., ORLAND H., FREDRICKSON G. H.	Numerical simulation of finite-temperature field theory for interacting bosons	Physical Review Letters	2020	124	070601	https://hal.archives-ouvertes.fr/hal-02504622	C
444	DELPY J., LIU S., NEVEU P., ROUSSY C., JOLICOEUR T., BRETENAKER F., GOLDFARB F.	Creation and dynamics of spin fluctuations in a noisy magnetic field	New Journal of Physics	2023	25	093055	https://hal.archives-ouvertes.fr/hal-04228063	C
445	DENICOL G. S., GALE C., JEON S., MONNAI A., SCHENKE B., SHEN C.	Net baryon diffusion in fluid dynamic simulations of relativistic heavy-ion collisions	Phys.Rev.C	2018	98	034916	https://hal.archives-ouvertes.fr/hal-01792222	B
446	DEPERSIN J., BARTHELEMY M.	From global scaling to the dynamics of individual cities	Proceedings of the National Academy of Sciences of the United States of America	2018	115	2317-2322	https://hal.archives-ouvertes.fr/cea-01626240	C
447	DERKACHOV S., FERRANDO G., OLIVUCCI E.	Mirror channel eigenvectors of the d-dimensional fishnets	Journal of High Energy Physics	2021	12	174	https://hal.archives-ouvertes.fr/hal-03341186	A
448	DESSERTAINE T., GODRECHE C., BOUCHAUD J.-P.	Occupation time of a renewal process coupled to a discrete Markov chain	Journal of Statistical Mechanics: Theory and Experiment	2022	2022	063204	https://hal.archives-ouvertes.fr/cea-04265975	C
449	DEV P. S. B., DI BARI P., GARBRECHT B., LAVIGNAC S., MILLINGTON P., TERESI D.	Flavor effects in leptogenesis	International Journal of Modern Physics A	2018	33	1842001	https://hal.archives-ouvertes.fr/hal-01730109	B
450	DI FRANCESCO P.	Arctic curves of the reflecting boundary six vertex and of the twenty vertex models	Journal of Physics A: Mathematical and Theoretical	2021	54	355201	https://hal.archives-ouvertes.fr/hal-04216441	A
451	DI FRANCESCO P.	Twenty Vertex Model and Domino Tilings of the Aztec Triangle	The Electronic Journal of Combinatorics	2021	28		https://hal.archives-ouvertes.fr/hal-04216437	A
452	DI FRANCESCO P., DUPLANTIER B., GOLINELLI O., GUITTER E.	Exponents for Hamiltonian paths on random bicubic maps and KPZ	Nuclear Physics B	2023	987	116084	https://hal.archives-ouvertes.fr/hal-03821510	A ; C
453	DI FRANCESCO P., GUITTER E.	Twenty-Vertex Model with Domain Wall Boundaries and Domino Tilings	The Electronic Journal of Combinatorics	2020	27	P2.13	https://hal.archives-ouvertes.fr/cea-02932251	A ; C
454	DI FRANCESCO P., GUITTER E.	The Arctic Curve for Aztec Rectangles with Defects via the Tangent Method	Journal of Statistical Physics	2019	176	639-678	https://hal.archives-ouvertes.fr/hal-04404664	A ; C
455	DI FRANCESCO P., GUITTER E.	A tangent method derivation of the arctic curve for q-weighted paths with arbitrary starting points	Journal of Physics A: Mathematical and Theoretical	2019	52	115205	https://hal.archives-ouvertes.fr/cea-02932285	A ; C
456	DI FRANCESCO P., GUITTER E.	Arctic curves for paths with arbitrary starting points: a tangent method approach	Journal of Physics A: Mathematical and Theoretical	2018	51	355201	https://hal.archives-ouvertes.fr/cea-02011867	A ; C
457	DI FRANCESCO P., KEDEM R.	Macdonald operators and quantum Q-systems for classical types	Progress in Mathematics	2021	340	163 - 199	https://hal.archives-ouvertes.fr/hal-04216448	A
458	DI FRANCESCO P., KEDEM R.	Difference equations for graded characters from quantum cluster algebra	Transformation Groups	2018	23	391–424	https://hal.archives-ouvertes.fr/cea-01251612	A
459	DI FRANCESCO P., LAPA M.	Arctic Curves In Path Models from The Tangent Method	Journal of Physics A: Mathematical and Theoretical	2018	51	155202	https://hal.archives-ouvertes.fr/cea-01692535	A
460	DI FRANCESCO P., SMIRNOV F.	OPE for XXX	Reviews in Mathematical Physics	2018	30	1840006	https://hal.archives-ouvertes.fr/hal-01639490	A
461	DI UBALDO G., PERLMUTTER E.	AdS_3/RMT_2 Duality	Journal of High Energy Physics	2023	12	179	https://hal.archives-ouvertes.fr/hal-04161876	A

462	DI UBALDO G., POLICASTRO G.	Ensemble averaging in JT gravity from entanglement in Matrix Quantum Mechanics	Journal of High Energy Physics	2023	07	122	https://hal.archives-ouvertes.fr/hal-03949446	A
463	DIET A., BARTHELEMY M.	Towards a classification of planar maps	Physical Review E	2018	98	062304	https://hal.archives-ouvertes.fr/cea-02563942	C
464	DIMA A., VERNIZZI F.	Vainshtein Screening in Scalar-Tensor Theories before and after GW170817: Constraints on Theories beyond Horndeski	Physical Review D	2018	97	101302	https://hal.archives-ouvertes.fr/hal-01807617	B
465	DIMITROV V., MAYERSON D. R., MIN V.	Real-time holography and hybrid WKB for BTZ wormholes	Journal of High Energy Physics	2022	06	076	https://hal.archives-ouvertes.fr/hal-03509667	A
466	DMYTRUK O., SCHIRO M.	Controlling topological phases of matter with quantum light	Communications Physics	2022	5	271	https://hal.archives-ouvertes.fr/hal-03864689	C
467	DOMINE L., GIACALONE G., LORCE C., MUNIER S., PEKAR S.	Gluon density fluctuations in dilute hadrons	Physical Review D	2018	98	114032	https://hal.archives-ouvertes.fr/hal-01909175	B
468	DREYER F. A., NECIB L., SOYEZ G., THALER J.	Recursive Soft Drop	Journal of High Energy Physics	2018	06	093	https://hal.archives-ouvertes.fr/hal-01774074	B
469	DREYER F. A., SALAM G. P., SOYEZ G.	The Lund Jet Plane	Journal of High Energy Physics	2018	12	064	https://hal.archives-ouvertes.fr/hal-01851158	B
470	DREYER F. A., SOYEZ G., TAKACS A.	Quarks and gluons in the Lund plane	Journal of High Energy Physics	2022	08	177	https://hal.archives-ouvertes.fr/hal-03513722	B
471	DRUMMOND J.M., PAUL H.	Two-loop supergravity on AdS_{5}×S^{5} from CFT	Journal of High Energy Physics	2022	08	275	https://hal.archives-ouvertes.fr/hal-03646574	A
472	DUCLOUE B., IANCU E., LAPPI T., MUELLER A.H., SOYEZ G., TRIANTAFYLLOPOULOS D.N., ZHU Y.	Use of a running coupling in the NLO calculation of forward hadron production	Physical Review D	2018	97	054020	https://hal.archives-ouvertes.fr/hal-01758644	B
473	DUCLOUE B., IANCU E., MUELLER A.H., SOYEZ G., TRIANTAFYLLOPOULOS D.N.	Non-linear evolution in QCD at high-energy beyond leading order	Journal of High Energy Physics	2019	04	081	https://hal.archives-ouvertes.fr/hal-02058526	B
474	DUCLOUE B., IANCU E., SOYEZ G., TRIANTAFYLLOPOULOS D.N.	HERA data and collinearly-improved BK dynamics	Phys.Lett.B	2020	803	135305	https://hal.archives-ouvertes.fr/hal-02447834	B
475	DUCLOUE B., LAPPI T., MANTYSAARI H.	Isolated photon production in proton-nucleus collisions at forward rapidity	Physical Review D	2018	97	054023	https://hal.archives-ouvertes.fr/hal-01758318	B
476	DUMITRESCU P. T., WENTZELL N., GEORGES A., PARCOLLET O.	Planckian metal at a doping-induced quantum critical point	Physical Review B	2022	105	L180404	https://hal.archives-ouvertes.fr/hal-03677048	C
477	DUPLANTIER B., GOLINELLI O., GUITTER E.	Hamiltonian cycles on bicolored random planar maps	Nuclear Physics B	2023	995	116335	https://hal.archives-ouvertes.fr/hal-04088530	C
478	DUPLANTIER B., GUTTMANN A. J.	Statistical Mechanics of Confined Polymer Networks	J.Statist.Phys.	2020	180	1061-1094	https://hal.archives-ouvertes.fr/hal-02886925	C
479	DUPLANTIER B., GUTTMANN A. J.	New scaling laws for self-avoiding walks: bridges and worms	Journal of Statistical Mechanics: Theory and Experiment	2019	1910	104010	https://hal.archives-ouvertes.fr/hal-02404144	C
480	DUPLANTIER B., HAN Y., NGUYEN C., ZINSMEISTER M.	Complex generalized integral means spectrum of drifted whole-plane SLE & LLE	Annales Henri Poincaré	2023	25	425–479	https://hal.archives-ouvertes.fr/cea-03706536	C
481	DUPLANTIER B., HO X. H., LE T. B., ZINSMEISTER M.	Logarithmic Coefficients and Generalized Multifractality of Whole-Plane SLE	Communications in Mathematical Physics	2018	359	823-868	https://hal.archives-ouvertes.fr/cea-04409263	C
482	DUPLANTIER B., MILLER J., SHEFFIELD S.	Liouville quantum gravity as a mating of trees	Asterisque	2021	427		https://hal.archives-ouvertes.fr/cea-01251995	C
483	DUTTA J., KHYLLEP W., TAMANINI N.	Dark energy with a gradient coupling to the dark matter fluid: cosmological dynamics and structure formation	JCAP	2018	01	038	https://hal.archives-ouvertes.fr/hal-01703839	B
484	ELDER B., VARDANYAN V., AKRAMI Y., BRAX P., DAVIS A.-C., DECCA R. S.	Classical symmetron force in Casimir experiments	Physical Review D	2020	101	064065	https://hal.archives-ouvertes.fr/hal-02431443	B
485	ELLIS S. A.	Premature black hole death of Population III stars by dark matter	JCAP	2022	05	025	https://hal.archives-ouvertes.fr/hal-03435210	B
486	ERPENBECK A., LIN W.-T., BLOMMEL T., ZHANG L., ISKAKOV S., BERNHEIMER L., NUNEZ-FERNANDEZ Y., COHEN G., PARCOLLET O., WAINTAL X., GULL E.	Tensor train continuous time solver for quantum impurity models	Physical Review B	2023	107	245135	https://hal.archives-ouvertes.fr/hal-04145376	C
487	ESER J., BLAIZOT J.-P.	S-wave pion-pion scattering lengths from nucleon-meson fluctuations	Physical Review D	2022	105	074031	https://hal.archives-ouvertes.fr/hal-03520937	B
488	ESPOSITO A., GERMANI D., GLIOTI A., POLOSA A. D., RATTAZZI R., TARQUINI M.	The role of the pion in the lineshape of the X(3872)	Phys.Lett.B	2023	847	138285	https://hal.archives-ouvertes.fr/hal-04179127	B
489	EYNARD B.	Combinatorial expression of the fundamental second kind differential on an algebraic curve	Annales de l'Institut Henri Poincaré (D) Combinatorics, Physics and their Interactions	2022	9	219-238	https://hal.archives-ouvertes.fr/hal-01871746	A
490	EZQUIAGA J. M., ZUMALACARREGUI M.	Dark Energy in light of Multi-Messenger Gravitational-Wave astronomy	Front.Astron.Space Sci.	2018	5	44	https://hal.archives-ouvertes.fr/hal-01861945	B
491	FAUGNO W. N., ZHAO T., BALRAM A. C., JOLICOEUR T., JAIN J. K.	Unconventional {\mathbb{Z}}_{n} parton states at {\nu}=7/3: Role of finite width	Physical Review B	2021	103	085303	https://hal.archives-ouvertes.fr/hal-03143589	C
492	FAUGNO W.N., JAIN J.K., BALRAM A. C.	Non-Abelian fractional quantum Hall state at 3/7 -filled Landau level	Phys.Rev.Res.	2020	2	033223	https://hal.archives-ouvertes.fr/hal-02917246	C
493	FERRANDO G., FRASSEK R., KAZAKOV V.	QQ-system and Weyl-type transfer matrices in integrable SO(2r) spin chains	Journal of High Energy Physics	2021	02	193	https://hal.archives-ouvertes.fr/hal-02933952	A
494	FERRARIO RAVASIO S., HAMILTON K., KARLBERG A., SALAM G. P., SCYBOZ L., SOYEZ G.	A parton shower with higher-logarithmic accuracy for soft emissions	Physical Review Letters	2023	131	161906	https://hal.archives-ouvertes.fr/hal-04179128	B
495	FERRERO E., FOINI L., GIAMARCHI T., KOLTON A., ROSSO A.	Creep motion of elastic interfaces driven in a disordered landscape	Annual Review of Condensed Matter Physics	2021	12	111-134	https://hal.archives-ouvertes.fr/cea-02524847	C
496	FLORIO A., GROSSI E., SOLOVIEV A., TEANEY D.	Dynamics of the O(4) critical point in QCD	Physical Review D	2022	105	054512	https://hal.archives-ouvertes.fr/hal-03436910	B
497	FOINI L., KURCHAN J.	Annealed averages in spin and matrix models	SciPost Physics	2022	12	080	https://hal.archives-ouvertes.fr/hal-03360638	C
498	FOINI L., KURCHAN J.	Eigenstate Thermalization and Rotational Invariance in Ergodic Quantum Systems	Physical Review Letters	2019	123	260601	https://hal.archives-ouvertes.fr/hal-02447858	C
499	FOLENA G., URBANI P.	Marginal stability of soft anharmonic mean field spin glasses	Journal of Statistical Mechanics: Theory and Experiment	2022	2022	053301	https://hal.archives-ouvertes.fr/hal-03667345	C
500	FONT A., FRAIMAN B., GRANA M., NUNEZ C. A., DE FREITAS H. P.	Exploring the landscape of heterotic strings on T^d	Journal of High Energy Physics	2020	10	194	https://hal.archives-ouvertes.fr/hal-02914500	A
501	FONT A., FRAIMAN B., GRANA M., NUNEZ C. A., PARRA DE FREITAS H.	Exploring the landscape of CHL strings on T^{d}	Journal of High Energy Physics	2021	08	095	https://hal.archives-ouvertes.fr/hal-03210377	A

502	FORTE S., GIANI T., NAPOLETANO D.	Fitting the b-quark PDF as a massive-b scheme: Higgs production in bottom fusion	European Physical Journal C: Particles and Fields	2019	79	609	https://hal.archives-ouvertes.fr/hal-02144196	B
503	FORTE S., NAPOLETANO D., UBIALI M.	Z boson production in bottom-quark fusion: a study of b-mass effects beyond leading order	European Physical Journal C: Particles and Fields	2018	78	932	https://hal.archives-ouvertes.fr/hal-01768132	B
504	FOSS S., KONSTANTOPOULOS T., MALLEIN B., RAMASSAMY S.	Estimation of the last passage percolation constant in a charged complete directed acyclic graph via perfect simulation	ALEA : Latin American Journal of Probability and Mathematical Statistics	2023	20	547-560	https://hal.archives-ouvertes.fr/hal-03364751	A
505	FRAIMAN B., DE FREITAS H. P.	Freezing of gauge symmetries in the heterotic string on T^{4}	Journal of High Energy Physics	2022	04	007	https://hal.archives-ouvertes.fr/hal-03467348	A
506	FRAIMAN B., DE FREITAS H. P.	Symmetry enhancements in 7d heterotic strings	Journal of High Energy Physics	2021	10	002	https://hal.archives-ouvertes.fr/hal-03273358	A
507	FRAIMAN B., GRANA M., NUNEZ C. A.	A new twist on heterotic string compactifications	Journal of High Energy Physics	2018	09	078	https://hal.archives-ouvertes.fr/hal-01815258	A
508	FRAIMAN B., PARRA DE FREITAS H.	Unifying the 6D $\mathcal{N}=(1,1)$ String Landscape	Journal of High Energy Physics	2023	02	204	https://hal.archives-ouvertes.fr/hal-03791490	A
509	FRANCESC P.	Arctic curves of the 20V model on a triangle	Journal of Physics A: Mathematical and Theoretical	2023	56	204001	https://hal.archives-ouvertes.fr/hal-04216436	A
510	FRANZ S., HWANG S., URBANI P.	Jamming in multilayer supervised learning models	Physical Review Letters	2019	123		https://hal.archives-ouvertes.fr/hal-02395521	C
511	FRANZ S., SCLOCCHI A., URBANI P.	Surfing on minima of isostatic landscapes: avalanches and unjamming transition	Journal of Statistical Mechanics: Theory and Experiment	2021		023208	https://hal.archives-ouvertes.fr/hal-03223882	C
512	FRANZ S., SCLOCCHI A., URBANI P.	Critical energy landscape of linear soft spheres	SciPost Physics	2020	9	160602	https://hal.archives-ouvertes.fr/hal-02908534	C
513	FRANZ S., SCLOCCHI A., URBANI P.	Critical jammed phase of the linear perceptron	Physical Review Letters	2019	123	115702	https://hal.archives-ouvertes.fr/hal-02292061	C
514	FU C.-H., VANHOVE P., WANG Y.	A Vertex Operator Algebra Construction of the Colour-Kinematics Dual numerator	Journal of High Energy Physics	2018	09	141	https://hal.archives-ouvertes.fr/hal-01833771	A
515	FUSY E., GUITTER E.	Maps of unfixed genus and blossoming trees	Advances in Applied Mathematics	2021	129	102208	https://hal.archives-ouvertes.fr/cea-03109970	C
516	GABARRA L., MANCINI C., MUNOZ L. R., RODIGHIERO G., SIRIGNANO C., SCODEGGIO M., TALIA M., DUSINI S., GILLARD W., GRANETT B., MAIORANO E. *et al.*	Euclid preparation. XXX. Performance assessment of the NISP Red-Grism through spectroscopic simulations for the Wide and Deep surveys	Astron.Astrophys.	2023	676	A34	https://hal.archives-ouvertes.fr/hal-04447271	B
517	GABRIE M., BARBIER J., KRZAKALA F., ZDEBOROVA L.	Blind calibration for compressed sensing: State evolution and an online algorithm	Journal of Physics A: Mathematical and Theoretical	2020			https://hal.archives-ouvertes.fr/cea-02529311	C
518	GABRIE M., MANOEL A., LUNEAU C., BARBIER J., MACRIS N., KRZAKALA F., ZDEBOROVA L.	Entropy and mutual information in models of deep neural networks	Journal of Statistical Mechanics: Theory and Experiment	2019	19	124014	https://hal.archives-ouvertes.fr/cea-01930228	C
519	GAINUTDINOV A., JACOBSEN J., SALEUR H.	A fusion for the periodic Temperley–Lieb algebra and its continuum limit	Journal of High Energy Physics	2018		117	https://hal.archives-ouvertes.fr/cea-01739633	A
520	GALAZO GARCIA R., BRAX P., VALAGEAS P.	Self-similar solutions for fuzzy dark matter	Physical Review D	2022	105	123528	https://hal.archives-ouvertes.fr/hal-03621349	B
521	GALLOTTI R., LOUF R., LUCK J.-M., BARTHELEMY M.	Tracking random walks	Journal of the Royal Society Interface	2018	15	20170776	https://hal.archives-ouvertes.fr/cea-01502139	C
522	GANCHEV B., GIUSTO S., HOUPPE A., RUSSO R.	\hbox {AdS}_3 holography for non-BPS geometries	European Physical Journal C: Particles and Fields	2022	82	217	https://hal.archives-ouvertes.fr/hal-03498908	A
523	GANCHEV B., GIUSTO S., HOUPPE A., RUSSO R., WARNER N. P.	Microstrata	JHEP	2023	10	163	https://hal.archives-ouvertes.fr/hal-04179230	A
524	GANCHEV B., HOUPPE A., WARNER N.	Q-balls meet fuzzballs: non-BPS microstate geometries	JHEP	2021	11	028	https://hal.archives-ouvertes.fr/hal-03315378	A
525	GANCHEV B., HOUPPE A., WARNER N. P.	New superstrata from three-dimensional supergravity	JHEP	2022	04	065	https://hal.archives-ouvertes.fr/hal-03380616	A
526	GANCHEV B., HOUPPE A., WARNER N. P.	Elliptical and purely NS superstrata	JHEP	2022	09	067	https://hal.archives-ouvertes.fr/hal-03736310	A
527	GANCHEV B., MAYERSON D. R.	On Supersymmetric Multipole Ratios	Journal of High Energy Physics	2023	02	160	https://hal.archives-ouvertes.fr/hal-03887317	A
528	GARCIA-GARCIA C., BELLINI E., FERREIRA P. G., TRAYKOVA D., ZUMALACARREGUI M.	Theoretical priors in scalar-tensor cosmologies: Thawing quintessence	Physical Review D	2020	101	063508	https://hal.archives-ouvertes.fr/hal-02404185	B
529	GARCIA-GARCIA C., LINDER E. V., RUIZ-LAPUENTE P., ZUMALACARREGUI M.	Dark energy from \alpha-attractors: phenomenology and observational constraints	JCAP	2018	08	022	https://hal.archives-ouvertes.fr/hal-01758492	B
530	GARCIA-GARCIA C., RUIZ-LAPUENTE P., ALONSO D., ZUMALACARREGUI M.	\alpha-attractor dark energy in view of next-generation cosmological surveys	JCAP	2019	07	025	https://hal.archives-ouvertes.fr/hal-02144217	B
531	GARDIM F. G., GIACALONE G., LUZUM M., OLLITRAULT J.-Y.	Thermodynamics of hot strong-interaction matter from ultrarelativistic nuclear collisions	Nature Phys.	2020	16	615-619	https://hal.archives-ouvertes.fr/hal-02302980	B
532	GARDIM F. G., GIACALONE G., OLLITRAULT J.-Y.	The mean transverse momentum of ultracentral heavy-ion collisions: A new probe of hydrodynamics	Phys.Lett.B	2020	809	135749	https://hal.archives-ouvertes.fr/hal-02340148	B
533	GARDIM F. G., GRASSI F., ISHIDA P., LUZUM M., OLLITRAULT J.-Y.	p_T-dependent particle number fluctuations from principal-component analyses in hydrodynamic simulations of heavy-ion collisions	Phys.Rev.C	2019	100	054905	https://hal.archives-ouvertes.fr/hal-02165503	B
534	GARDIM F. G., OLLITRAULT J.-Y.	Effective shear and bulk viscosities for anisotropic flow	Phys.Rev.C	2021	103	044907	https://hal.archives-ouvertes.fr/hal-02999538	B
535	GARREL C., PIERRE M., VALAGEAS P., ECKERT D., MARULLI F., VEROPALUMBO A., PACAUD F., CLERC N., SERENO M., UMETSU K. *et al.*	The XXL survey - XLVI. Forward cosmological analysis of the C1 cluster sample	Astronomy and Astrophysics - A&A	2022	663	A3	https://hal.archives-ouvertes.fr/hal-03376407	B
536	GEIGER M., SPIGLER S., D'ASCOLI S., SAGUN L., BAITY-JESI M., BIROLI G., WYART M.	Jamming transition as a paradigm to understand the loss landscape of deep neural networks	Physical Review E	2019	100	012115	https://hal.archives-ouvertes.fr/hal-02319300	C
537	GELIS F.	Some aspects of the theory of heavy ion collisions	Reports on Progress in Physics	2021	84	056301	https://hal.archives-ouvertes.fr/cea-04438577	B
538	GELIS F., TANJI N.	Gauge ambiguity of the quark spectrum in the Color Glass Condensate	Nucl.Phys.A	2019	990	199-219	https://hal.archives-ouvertes.fr/hal-02080690	B
539	GEORGE T., RAMASSAMY S.	Discrete dynamics in cluster integrable systems from geometric R-matrix transformations	Combinatorial Theory	2023	3		https://hal.archives-ouvertes.fr/hal-03815673	A
540	GERACE F., LOUREIRO B., KRZAKALA F., MEZARD M., ZDEBOROVA L.	Generalisation error in learning with random features and the hidden manifold model	Journal of Statistical Mechanics: Theory and Experiment	2021	2021	ML 2021	https://hal.archives-ouvertes.fr/cea-02529798	C

541	GHOSHAL A., NORTIER F.	Fate of the false vacuum in string-inspired nonlocal field theory	Journal of Cosmology and Astroparticle Physics	2022	2022	047	https://hal.archives-ouvertes.fr/hal-04258170	B
542	GIACALONE G.	Turning up and down strong magnetic fields in relativistic nuclear collisions	Phys.Lett.B	2020	811	135915	https://hal.archives-ouvertes.fr/hal-02886941	B
543	GIACALONE G.	Observing the deformation of nuclei with relativistic nuclear collisions	Physical Review Letters	2020	124	202301	https://hal.archives-ouvertes.fr/hal-02340271	B
544	GIACALONE G.	Constraining the quadrupole deformation of atomic nuclei with relativistic nuclear collisions	Phys.Rev.C	2020	102	024901	https://hal.archives-ouvertes.fr/hal-02613260	B
545	GIACALONE G.	Elliptic flow fluctuations in central collisions of spherical and deformed nuclei	Phys.Rev.C	2019	99	024910	https://hal.archives-ouvertes.fr/hal-01937770	B
546	GIACALONE G., GARDIM F., NORONHA-HOSTLER J., OLLITRAULT J.-Y.	Correlation between mean transverse momentum and anisotropic flow in heavy-ion collisions	Physical Review C	2021			https://hal.archives-ouvertes.fr/cea-02534929	B
547	GIACALONE G., GARDIM F., NORONHA-HOSTLER J., OLLITRAULT J.-Y.	Skewness of mean transverse momentum fluctuations in heavy-ion collisions	Physical Review C	2021			https://hal.archives-ouvertes.fr/cea-02558338	B
548	GIACALONE G., GUERRERO-RODRIGUEZ P., LUZUM M., MARQUET C., OLLITRAULT J.-Y.	Fluctuations in heavy-ion collisions generated by QCD interactions in the color glass condensate effective theory	Physical Review C	2019	100	024905	https://hal.archives-ouvertes.fr/cea-02042433	B
549	GIACALONE G., MAZELIAUSKAS A., SCHLICHTING S.	Hydrodynamic attractors, initial state energy and particle production in relativistic nuclear collisions	Physical Review Letters	2019	123	262301	https://hal.archives-ouvertes.fr/hal-02302749	B
550	GIACALONE G., NORONHA-HOSTLER J., LUZUM M., OLLITRAULT J.-Y.	Confronting hydrodynamic predictions with Xe-Xe data	Nuclear Physics A	2019	982	371-374	https://hal.archives-ouvertes.fr/cea-02006521	B
551	GIACALONE G., NORONHA-HOSTLER J., LUZUM M., OLLITRAULT J.-Y.	Hydrodynamic predictions for 5.44 TeV Xe+Xe collisions	Phys.Rev.C	2018	97	034904	https://hal.archives-ouvertes.fr/hal-01729996	B
552	GIACALONE G., SCHENKE B., SHEN C.	Observable signatures of initial state momentum anisotropies in nuclear collisions	Physical Review Letters	2020	125	192301	https://hal.archives-ouvertes.fr/hal-02905916	B
553	GIACALONE G., YAN L., OLLITRAULT J.-Y.	Nonlinear coupling of flow harmonics: Hexagonal flow and beyond	Phys.Rev.C	2018	97	054905	https://hal.archives-ouvertes.fr/hal-01758033	B
554	GIACCHETTO A., LEWAńSKI D., NORBURY P.	An intersection-theoretic proof of the Harer-Zagier formula	Algebraic Geometry	2023	10	130-147	https://hal.archives-ouvertes.fr/hal-03514489	A
555	GIGANTI C., LAVIGNAC S., ZITO M.	Neutrino oscillations: The rise of the PMNS paradigm	Prog.Part.Nucl.Phys.	2018	98	1-54	https://hal.archives-ouvertes.fr/hal-01669804	B
556	GIRAUD B.	Crise climatique et agences de l'eau	La jaune et la rouge [revue mensuelle de la société amicale des anciens élèves de l'Ecole Polytechnique]	2023	786	101	https://hal.archives-ouvertes.fr/cea-04432185	B
557	GIRAUD B.G., PESCHANSKI R.	Profile of a Galactic Spherical Cloud of Self-Gravitating Fermions	Phys.Scripta	2019	94	085003	https://hal.archives-ouvertes.fr/hal-01833743	B
558	GODRECHE C.	Poisson points, resetting, universality and the role of the last item	Journal of Physics A: Mathematical and Theoretical	2023	56	21LT01	https://hal.archives-ouvertes.fr/cea-04265947	C
559	GODRECHE C.	The Buffon needle problem for Lévy distributed spacings and renewal theory	Journal of Statistical Mechanics: Theory and Experiment	2022	2022	013203	https://hal.archives-ouvertes.fr/cea-04266013	C
560	GODRECHE C.	Comment on 'fluctuation-dominated phase ordering at a mixed order transition'	Journal of Physics A: Mathematical and Theoretical	2020	54	038001	https://hal.archives-ouvertes.fr/cea-04266092	C
561	GODRECHE C.	Condensation for random variables conditioned by the value of their sum	Journal of Statistical Mechanics: Theory and Experiment	2019	2019	063207	https://hal.archives-ouvertes.fr/cea-03043347	C
562	GODRECHE C., LUCK J.-M.	Survival probability of random walks and Lévy flights with stochastic resetting	Journal of Statistical Mechanics: Theory and Experiment	2022	2022	073201	https://hal.archives-ouvertes.fr/cea-03648077	C
563	GODRECHE C., LUCK J.-M.	The Glauber-Ising chain under low-temperature protocols	Journal of Physics A: Mathematical and Theoretical	2022	55	495001	https://hal.archives-ouvertes.fr/cea-04211364	C
564	GODRECHE C., LUCK J.-M.	Maximum and records of random walks with stochastic resetting	Journal of Statistical Mechanics: Theory and Experiment	2022	2022	ac6d60	https://hal.archives-ouvertes.fr/cea-03602002	C
565	GODRECHE C., LUCK J.-M.	Record statistics of integrated random walks and the random acceleration process	Journal of Statistical Physics	2021	186	1-32	https://hal.archives-ouvertes.fr/cea-04266000	C
566	GODRECHE C., LUCK J.-M.	On sequences of records generated by planar random walks	Journal of Physics A: Mathematical and Theoretical	2021	54	325003	https://hal.archives-ouvertes.fr/cea-04266081	C
567	GODRECHE C., LUCK J.-M.	Records for the moving average of a time series	Journal of Statistical Mechanics: Theory and Experiment	2020	2020	023201	https://hal.archives-ouvertes.fr/cea-02865416	C
568	GODRECHE C., LUCK J.-M.	Characterising the nonequilibrium stationary states of Ornstein-Uhlenbeck processes Nonequilibrium stationary states of Ornstein-Uhlenbeck processes	Journal of Physics A: Mathematical and Theoretical	2018	52	035002	https://hal.archives-ouvertes.fr/cea-02866539	C
569	GOLDT S., ADVANI M., SAXE A., KRZAKALA F., ZDEBOROVA L.	Dynamics of stochastic gradient descent for two-layer neural networks in the teacher–student setup	Journal of Statistical Mechanics: Theory and Experiment	2020	2020	124010	https://hal.archives-ouvertes.fr/hal-03289916	C
570	GOLDT S., MEZARD M., KRZAKALA F., ZDEBOROVA L.	Modelling the influence of data structure on learning in neural networks: the hidden manifold model	Physical Review X	2020	10	041044	https://hal.archives-ouvertes.fr/cea-02529246	C
571	GORSKY A., KAZAKOV V., LEVKOVICH-MASLYUK F., MISHNYAKOV V.	A Flow in the Forest	Journal of High Energy Physics	2023	03	067	https://hal.archives-ouvertes.fr/hal-03837693	C
572	GOUZIEN E., LABONTE L., ETESSE J., ZAVATTA A., TANZILLI S., D'AURIA V., PATERA G.	Hidden and detectable squeezing from microresonators	PHYSICAL REVIEW RESEARCH	2023	5		https://hal.archives-ouvertes.fr/hal-04536846	C
573	GOUZIEN E., RUIZ D., LE REGENT F.-M., GUILLAUD J., SANGOUARD N.	Computing 256-bit Elliptic Curve Logarithm in 9 Hours with 126133 Cat Qubits	Physical Review Letters	2023	131	040602	https://hal.archives-ouvertes.fr/hal-04013690	C
574	GOUZIEN E., SANGOUARD N.	Factoring 2048-bit RSA Integers in 177 Days with 13436 Qubits and a Multimode Memory	Physical Review Letters	2021	127		https://hal.archives-ouvertes.fr/hal-03358148	C
575	GRABNER D., GROMOV N., KAZAKOV V., KORCHEMSKY G.	Strongly \gamma-Deformed \mathcal{N}=4 Supersymmetric Yang-Mills Theory as an Integrable Conformal Field Theory	Physical Review Letters	2018	120	111601	https://hal.archives-ouvertes.fr/hal-01758325	B
576	GRANA M., GRIMM T. W., VAN DE HEISTEEG D., HERRAEZ A., PLAUSCHINN E.	The Tadpole Conjecture in Asymptotic Limits	Journal of High Energy Physics	2022	08	237	https://hal.archives-ouvertes.fr/hal-03652914	A
577	GRANA M., HERRAEZ A.	The Swampland Conjectures: A Bridge from Quantum Gravity to Particle Physics	Universe	2021	7	273	https://hal.archives-ouvertes.fr/hal-03286891	A
578	GRANA M., KOVENSKY N., RETOLAZA A.	Gaugino mass term for D-branes and Generalized Complex Geometry	Journal of High Energy Physics	2020	06	047	https://hal.archives-ouvertes.fr/hal-02491331	A
579	GRANA M., KOVENSKY N., TOULIKAS D.	Smearing and Unsmearing KKLT AdS Vacua	Journal of High Energy Physics	2023	03	015	https://hal.archives-ouvertes.fr/hal-03921056	A
580	GRANDADAM M., CHAKRABORTY D., MONTIEL X., PEPIN C.	Electronic spectral function in fractionalized pair density wave scenario	Physical Review B	2020	102	121104	https://hal.archives-ouvertes.fr/cea-04215570	C

#	Authors	Title	Journal	Year	Vol	Pages	URL	Cat
581	GRANDADAM M., CHAKRABORTY D., PEPIN C.	Fractionalizing a local pair density wave: a good "recipe" for opening a pseudo-gap	Journal of Superconductivity and Novel Magnetism	2020	33	2361-2368	https://hal.archives-ouvertes.fr/cea-04215580	C
582	GRANDADAM M., PEPIN C.	Pole structure of the electronic self-energy with coexistence of Charge order and Superconductivity	Physical Review B	2021	103	224507	https://hal.archives-ouvertes.fr/cea-04212190	C
583	GRANET E., BUDZYNSKI L., DUBAIL J., JACOBSEN J. L.	Inhomogeneous Gaussian free field inside the interacting arctic curve	Journal of Statistical Mechanics: Theory and Experiment	2019	2019	013102	https://hal.archives-ouvertes.fr/hal-02184291	A
584	GRANET E., JACOBSEN J. L.	On zero-remainder conditions in the Bethe ansatz	Journal of High Energy Physics	2020	03	178	https://hal.archives-ouvertes.fr/hal-02350381	A
585	GRANET E., JACOBSEN J. L., SALEUR H.	Analytic continuation of Bethe energies and application to the thermodynamic limit of the SL(2,\mathbb{C}) non-compact spin chains	Journal of High Energy Physics	2020	2020	69	https://hal.archives-ouvertes.fr/hal-02739947	A
586	GRANET E., JACOBSEN J. L., SALEUR H.	A distribution approach to finite-size corrections in Bethe Ansatz solvable models	Nuclear Physics B	2018	934	96-117	https://hal.archives-ouvertes.fr/hal-01851164	A
587	GRANET E., LYKKE JACOBSEN J., SALEUR H.	Spontaneous symmetry breaking in 2D supersphere sigma models and applications to intersecting loop soups	Journal of Physics A: Mathematical and Theoretical	2019	52	345001	https://hal.archives-ouvertes.fr/hal-01909243	A
588	GRANET E., LYKKE JACOBSEN J., SALEUR H.	Analytical results on the Heisenberg spin chain in a magnetic field	Journal of Physics A: Mathematical and Theoretical	2019	52	255302	https://hal.archives-ouvertes.fr/hal-02166546	A
589	GRANS-SAMUELSSON L., JACOBSEN J. L., NIVESVIVAT R., RIBAULT S., SALEUR H.	From combinatorial maps to correlation functions in loop models	SciPost Physics	2023	15	147	https://hal.archives-ouvertes.fr/cea-04405051	A
590	GRANS-SAMUELSSON L., JACOBSEN J. L., SALEUR H.	The action of the Virasoro algebra in quantum spin chains. I. The non-rational case	Journal of High Energy Physics	2021	02	130	https://hal.archives-ouvertes.fr/hal-02999579	A
591	GRANS-SAMUELSSON L., LIU L., HE Y., JACOBSEN J. L., SALEUR H.	The action of the Virasoro algebra in the two-dimensional Potts and loop models at generic Q	Journal of High Energy Physics	2020	10	109	https://hal.archives-ouvertes.fr/hal-02914449	A
592	GRANS-SAMUELSSON L., NIVESVIVAT R., JACOBSEN J. L., RIBAULT S., SALEUR H.	Global symmetry and conformal bootstrap in the two-dimensional O(n) model	SciPost Physics	2022	12	147	https://hal.archives-ouvertes.fr/hal-03433083	A
593	GROMOV N., KAZAKOV V., KORCHEMSKY G.	Exact Correlation Functions in Conformal Fishnet Theory	Journal of High Energy Physics	2019	08	123	https://hal.archives-ouvertes.fr/hal-01861863	B
594	GROMOV N., KAZAKOV V., KORCHEMSKY G., NEGRO S., SIZOV G.	Integrability of conformal fishnet theory	Journal of High Energy Physics	2018	2018	95	https://hal.archives-ouvertes.fr/hal-01700985	B
595	GROMOV N., LEVKOVICH-MASLYUK F., RYAN P.	Determinant form of correlators in high rank integrable spin chains via separation of variables	Journal of High Energy Physics	2021	05	169	https://hal.archives-ouvertes.fr/hal-03047657	C
596	GUICA M.	A definition of primary operators in J\bar T-deformed CFTs	SciPost Physics	2022	13	045	https://hal.archives-ouvertes.fr/hal-03520950	A
597	GUICA M.	Symmetries versus the spectrum of J\bar T-deformed CFTs	SciPost Physics	2021	10	065	https://hal.archives-ouvertes.fr/hal-03108048	A
598	GUICA M.	On correlation functions in J\bar T-deformed CFTs	J.Phys.A	2019	52	184003	https://hal.archives-ouvertes.fr/hal-02051074	A
599	GUICA M.	An integrable Lorentz-breaking deformation of two-dimensional CFTs	SciPost Physics	2018	5	048	https://hal.archives-ouvertes.fr/hal-01937820	A
600	GUICA M., MONTEN R.	Infinite pseudo-conformal symmetries of classical T \bar T, J \bar T and J T_a - deformed CFTs	SciPost Physics	2021	11	078	https://hal.archives-ouvertes.fr/hal-03034792	A
601	GUICA M., MONTEN R.	T\bar T and the mirage of a bulk cutoff	SciPost Physics	2021	10	024	https://hal.archives-ouvertes.fr/hal-02188322	A
602	GUILLEN A., OLLITRAULT J.-Y.	Fluid velocity from transverse momentum spectra	Phys.Rev.C	2021	103	064911	https://hal.archives-ouvertes.fr/hal-03107962	B
603	GUITTER E.	Statistics of the Voronoi cell perimeter in large bi-pointed maps	Journal of Statistical Mechanics: Theory and Experiment	2018	18	073409	https://hal.archives-ouvertes.fr/hal-01646351	C
604	GUITTER E.	Eulerian triangulations: two-point function and hull perimeter statistics	Annales de l'Institut Henri Poincaré (D) Combinatorics, Physics and their Interactions	2018			https://hal.archives-ouvertes.fr/hal-01335525	C
605	GUITTER E.	A universal law for Voronoi cell volumes in infinitely large maps	Journal of Statistical Mechanics: Theory and Experiment	2018	18	013205	https://hal.archives-ouvertes.fr/hal-01549001	C
606	GUO B., HAMPTON S.	A freely falling graviton in the D1D5 CFT	Journal of High Energy Physics	2023	05	135	https://hal.archives-ouvertes.fr/hal-03318659	A
607	GUO B., HAMPTON S.	The Dual of a Tidal Force in the D1D5 CFT	Journal of High Energy Physics	2023	07	149	https://hal.archives-ouvertes.fr/hal-03321151	A
608	GUO B., HAMPTON S. D.	Bootstrapping the effect of the twist operator in symmetric orbifold CFTs	Journal of High Energy Physics	2023	02	184	https://hal.archives-ouvertes.fr/hal-03697770	A
609	GUO B., HUGHES M. R., MATHUR S. D., MEHTA M.	Universal lifting in the D1-D5 CFT	Journal of High Energy Physics	2022	10	148	https://hal.archives-ouvertes.fr/hal-03765503	A
610	GUO B., MATHUR S. D.	Are there echoes of gravitational waves?	Int.J.Mod.Phys.D	2022	31	2242009	https://hal.archives-ouvertes.fr/hal-03687712	A
611	GUO B., MATHUR S. D.	Dynamical evolution in the D1D5 CFT	Journal of High Energy Physics	2022	12	107	https://hal.archives-ouvertes.fr/hal-03764456	A
612	HAHN M., LEWAńSKI D.	Wall-crossing and recursion formulae for tropical Jucys covers	Trans.Am.Math.Soc.	2020	373	4685-4711	https://hal.archives-ouvertes.fr/hal-02917235	A
613	HALLE A., NISHIMICHI T., TARUYA A., COLOMBI S., BERNARDEAU F.	Power spectrum response of large-scale structure in 1D and in 3D: tests of prescriptions for post-collapse dynamics	Monthly Notices of the Royal Astronomical Society	2020	499	1769-1787	https://hal.archives-ouvertes.fr/hal-02483889	B
614	HAMILTON K., MEDVES R., SALAM G., SCYBOZ L., SOYEZ G.	Colour and logarithmic accuracy in final-state parton showers	Journal of High Energy Physics	2021	2021	41	https://hal.archives-ouvertes.fr/hal-03070689	B
615	HARTARSKY I., BAITY-JESI M., RAVASIO R., BILLOIRE A., BIROLI G.	Maximum-energy records in glassy energy landscapes	Journal of Statistical Mechanics: Theory and Experiment	2019	2019		https://hal.archives-ouvertes.fr/hal-02275564	C
616	HASSANI F., ADAMEK J., KUNZ M., VERNIZZI F.	k-evolution: a relativistic N-body code for clustering dark energy	JCAP	2019	12	011	https://hal.archives-ouvertes.fr/hal-02411263	B
617	HATTA Y., IANCU E., MUELLER A.H., TRIANTAFYLLOPOULOS D.N.	Resumming double non-global logarithms in the evolution of a jet	Journal of High Energy Physics	2018	02	075	https://hal.archives-ouvertes.fr/hal-01714741	B
618	HAUKSSON S., IANCU E.	Jet polarisation in an anisotropic medium	Journal of High Energy Physics	2023	08	027	https://hal.archives-ouvertes.fr/hal-04039905	B
619	HE Y., GRANS-SAMUELSSON L., JACOBSEN J. L., SALEUR H.	Geometrical four-point functions in the two-dimensional critical Q-state Potts model: connections with the RSOS models	Journal of High Energy Physics	2020	2020	156	https://hal.archives-ouvertes.fr/hal-02504616	A
620	HE Y., JACOBSEN J. L., SALEUR H.	Geometrical four-point functions in the two-dimensional critical Q-state Potts model: The interchiral conformal bootstrap	Journal of High Energy Physics	2020	2020	019	https://hal.archives-ouvertes.fr/hal-02863081	A

621	HE Y., KRUCZENSKI M.	S-matrix bootstrap in 3+1 dimensions: regularization and dual convex problem	Journal of High Energy Physics	2021	08	125	https://hal.archives-ouvertes.fr/hal-03191151	A
622	HE Y., SALEUR H.	A note on the identity module in c=0 CFTs	SciPost Physics	2022	12	100	https://hal.archives-ouvertes.fr/hal-03355307	A
623	HECKELBACHER T., SACHS I., SKVORTSOV E., VANHOVE P.	Analytical evaluation of AdS_{4} Witten diagrams as flat space multi-loop Feynman integrals	Journal of High Energy Physics	2022	08	052	https://hal.archives-ouvertes.fr/hal-03559764	A
624	HECKELBACHER T., SACHS I., SKVORTSOV E., VANHOVE P.	Analytical evaluation of cosmological correlation functions	JHEP	2022	08	139	https://hal.archives-ouvertes.fr/hal-03656421	A
625	HEIDMANN P.	Bubbling the NHEK	Journal of High Energy Physics	2019	01	108	https://hal.archives-ouvertes.fr/hal-01945026	A
626	HEIDMANN P., HOUPPE A.	Solitonic Excitations in AdS_2	Journal of High Energy Physics	2023	07	186	https://hal.archives-ouvertes.fr/hal-03921043	A
627	HEIDMANN P., MAYERSON D. R., WALKER R., WARNER N. P.	Holomorphic Waves of Black Hole Microstructure	JHEP	2020	02	192	https://hal.archives-ouvertes.fr/hal-02383433	A
628	HEIDMANN P., MONDAL S.	The full space of BPS multicenter states with pure D-brane charges	Journal of High Energy Physics	2019	06	011	https://hal.archives-ouvertes.fr/hal-01914511	A
629	HEIDMANN P., WARNER N. P.	Superstratum Symbiosis	JHEP	2019	09	059	https://hal.archives-ouvertes.fr/hal-02088888	A
630	HELLER N., SAHAKIAN V.	Strongly coupled matrix theory and stochastic quantization: A new approach to holographic dualities	Physical Review D	2022	105	026012	https://hal.archives-ouvertes.fr/hal-03324499	A
631	HENN J. M., KORCHEMSKY G. P., MISTLBERGER B.	The full four-loop cusp anomalous dimension in \mathcal{N}=4 super Yang-Mills and QCD	Journal of High Energy Physics	2020	04	018	https://hal.archives-ouvertes.fr/hal-02409849	B
632	HEXNER D., URBANI P., ZAMPONI F.	Can a Large Packing be Assembled from Smaller Ones?	Physical Review Letters	2019	123		https://hal.archives-ouvertes.fr/hal-02323714	C
633	HIRAYAMA R., GRASSI F., SERENONE W. M., OLLITRAULT J.-Y.	Cumulants of conserved charges in hydrodynamic simulations	Phys.Rev.C	2023	107	024910	https://hal.archives-ouvertes.fr/hal-03656423	B
634	HO M., SEKATSKI P., TAN E.-Z., RENNER R., BANCAL J.-D., SANGOUARD N.	Noisy Preprocessing Facilitates a Photonic Realization of Device-Independent Quantum Key Distribution	Physical Review Letters	2020	124	230502	https://hal.archives-ouvertes.fr/hal-04207873	C
635	HOGERVORST M., TOLDO C.	Bounds on multiscalar CFTs in the \epsilon expansion	Journal of High Energy Physics	2021	04	068	https://hal.archives-ouvertes.fr/hal-03150584	A
636	HOGG N. B., FLEURY P., LARENA J., MARTINELLI M.	Measuring line-of-sight shear with Einstein rings: a proof of concept	Monthly Notices of the Royal Astronomical Society	2023	520	5982-6000	https://hal.archives-ouvertes.fr/hal-03833837	B
637	HOSSEINI S. M., TOLDO C., YAAKOV I.	Supersymmetric Rényi entropy and charged hyperbolic black holes	Journal of High Energy Physics	2020	07	131	https://hal.archives-ouvertes.fr/hal-02432668	A
638	HOUDAYER J., KOEHL P.	Stable evaluation of 3D Zernike moments for surface meshes	Algorithms	2022	15	406	https://hal.archives-ouvertes.fr/hal-03766657	C
639	HOUPPE A., WARNER N. P.	Supersymmetry and superstrata in three dimensions	JHEP	2021	08	133	https://hal.archives-ouvertes.fr/hal-03098900	A
640	HSIEH Y.-C., DELARUE M., ORLAND H., KOEHL P.	Analyzing the geometry and dynamics of viral structures: a review of computational approaches based on alpha shape theory, normal mode analysis, and Poisson–Boltzmann theories	Viruses	2023	15	1366	https://hal.archives-ouvertes.fr/pasteur-04129951	C
641	HUANG Y.-T., LIU J.-Y., RODINA L., WANG Y.	Carving out the Space of Open-String S-matrix	Journal of High Energy Physics	2021	04	195	https://hal.archives-ouvertes.fr/hal-02933958	B
642	IANCU E., MUELLER A., TRIANTAFYLLOPOULOS D., WEI S.	Probing gluon saturation via diffractive jets in ultra-peripheral nucleus-nucleus collisions	European Physical Journal C: Particles and Fields	2023	83	1078	https://hal.archives-ouvertes.fr/hal-04093542	B
643	IANCU E., MUELLER A.H., TRIANTAFYLLOPOULOS D.N.	Probing Parton Saturation and the Gluon Dipole via Diffractive Jet Production at the Electron-Ion Collider	Physical Review Letters	2022	128	202001	https://hal.archives-ouvertes.fr/hal-03500775	B
644	IANCU E., MUELLER A.H., TRIANTAFYLLOPOULOS D.N., WEI S.Y.	Gluon dipole factorisation for diffractive dijets	Journal of High Energy Physics	2022	10	103	https://hal.archives-ouvertes.fr/hal-03736533	B
645	IANCU E., MUELLER A.H., TRIANTAFYLLOPOULOS D.N., WEI S.Y.	Saturation effects in SIDIS at very forward rapidities	Journal of High Energy Physics	2021	07	196	https://hal.archives-ouvertes.fr/hal-03107926	B
646	IANCU E., MULIAN Y.	Dihadron production in DIS at NLO: the real corrections	Journal of High Energy Physics	2022	2023	121	https://hal.archives-ouvertes.fr/hal-03861739	B
647	IANCU E., MULIAN Y.	Forward dijets in proton-nucleus collisions at next-to-leading order: the real corrections	Journal of High Energy Physics	2021	03	005	https://hal.archives-ouvertes.fr/hal-02966415	B
648	IANCU E., MULIAN Y.	Forward trijet production in proton–nucleus collisions	Nucl.Phys.A	2019	985	66-127	https://hal.archives-ouvertes.fr/hal-01886134	B
649	IANCU E., TAELS P., WU B.	Jet quenching parameter in an expanding QCD plasma	Physics Letters B	2018	786	288-295	https://hal.archives-ouvertes.fr/hal-01833725	B
650	IGLOI F., MONTHUS C.	Strong disorder RG approach – a short review of recent developments	Eur.Phys.J.B	2018	91	290	https://hal.archives-ouvertes.fr/hal-01952677	C
651	IGURI S., KOVENSKY N.	On spectrally flowed local vertex operators in AdS_3	SciPost Physics	2022	13	115	https://hal.archives-ouvertes.fr/hal-03760774	A
652	IGURI S., KOVENSKY N., TORO J. H.	Spectral flow and string correlators in AdS_3 \times S^3 \times T^4	Journal of High Energy Physics	2023	2023	161	https://hal.archives-ouvertes.fr/hal-03862309	A
653	IGURI S., KOVENSKY N., TORO J. H.	Spectral flow and the exact AdS_3/CFT_2 chiral ring	Journal of High Energy Physics	2023	08	034	https://hal.archives-ouvertes.fr/hal-04092187	A
654	IKEDA H., URBANI P., ZAMPONI F.	Mean field theory of jamming of nonspherical particles	Journal of Physics A: Mathematical and Theoretical	2019	52	344001	https://hal.archives-ouvertes.fr/hal-02323692	C
655	IOANNOU M., PEREIRA M. A., RUSCA D., GRUNENFELDER F., BOARON A., PERRENOUD M., ABBOTT A., SEKATSKI P., BANCAL J.-D., MARING N., ZBINDEN H., BRUNNER N.	Receiver-Device-Independent Quantum Key Distribution	Quantum	2022	6	718	https://hal.archives-ouvertes.fr/hal-03251550	C
656	IOANNOU M., SEKATSKI P., ABBOTT A., ROSSET D., BANCAL J.-D., BRUNNER N.	Receiver-device-independent quantum key distribution protocols	New Journal of Physics	2022	24	063006	https://hal.archives-ouvertes.fr/hal-03441473	C
657	JACOBSEN J. L., RIBAULT S., SALEUR H.	Spaces of states of the two-dimensional O(n) and Potts models	SciPost Physics	2023	14	092	https://hal.archives-ouvertes.fr/hal-03774041	A
658	JAISWAL S., BLAIZOT J.-P., BHALERAO R. S., CHEN Z., JAISWAL A., YAN L.	From moments of the distribution function to hydrodynamics - the non-conformal case	Phys.Rev.C	2022	106	044912	https://hal.archives-ouvertes.fr/hal-03762974	B
659	JIMENEZ J. B., BETTONI D., BRAX P.	Polarisability and magnetisation of electrically K-mouflaged objects: the Born-Infeld ModMax case study	Journal of High Energy Physics	2023	02	009	https://hal.archives-ouvertes.fr/hal-03896960	B

660	JIN T., FERREIRA J., BAUER M., FILIPPONE M., GIAMARCHI T.	Semi-classical theory of quantum stochastic resistors	Phys.Rev.Res.	2023	5	013033	https://hal.archives-ouvertes.fr/hal-03726354	A
661	JIN Y., URBANI P., ZAMPONI F., YOSHINO H.	A stability-reversibility map unifies elasticity, plasticity, yielding, and jamming in hard sphere glasses	Science Advances	2018	4	eaat6387	https://hal.archives-ouvertes.fr/hal-02323879	C
662	JOHNSTON H., WESTBEEK D. S., WEIDE S., CHISARI N. E., DUBOIS Y., DEVRIENDT J., PICHON C.	Intrinsic correlations of galaxy sizes in a hydrodynamical cosmological simulation	Monthly Notices of the Royal Astronomical Society	2023	520	1541-1566	https://hal.archives-ouvertes.fr/hal-03808454	B
663	JOLICOEUR T., GOLINELLI O.	Physics of integer-spin antiferromagnetic chains: Haldane gaps and edge states	Comptes Rendus. Chimie	2019	22	445-451	https://hal.archives-ouvertes.fr/hal-02351489	C
664	JOLICOEUR T., TŐKE C., SODEMANN I.	The Quantum Hall ferroelectric helix in bilayer graphene	Physical Review B: Condensed Matter and Materials Physics (1998-2015)	2019	99		https://hal.archives-ouvertes.fr/hal-02123104	C
665	JOLIVET F., FOURNIER C., GARCIN M., ZDEBOROVA L., BRAMBILLA A.	An Alternating Projection-Image Domains Algorithm for Spectral CT	IEEE International Symposium on Biomedical Imaging	2020	2020	187-190	https://hal.archives-ouvertes.fr/cea-04538963	C
666	JOUCKEN F., BENA C., GE Z., QUEZADA-LOPEZ E. A., DUCASTELLE F., TANAGUSHI T., WATANABE K., VELASCO J.	Sublattice dependence and gate-tunability of midgap and resonant states induced by native dopants in Bernal-stacked bilayer graphene	Physical Review Letters	2021	127	106401	https://hal.archives-ouvertes.fr/hal-03414022	C
667	JOUCKEN F., BENA C., GE Z., QUEZADA-LOPEZ E., PINON S., KALADZHYAN V., TANIGUCHI T., WATANABE K., FERREIRA A., VELASCO J.	Direct Visualization of Native Defects in Graphite and Their Effect on the Electronic Properties of Bernal-Stacked Bilayer Graphene	Nano Letters	2021	21	7100-7108	https://hal.archives-ouvertes.fr/cea-04391542	C
668	KALADZHYAN V., BENA C.	Obtaining Majorana and other boundary modes from the metamorphosis of impurity-induced states: Exact solutions via the T-matrix	Physical Review B	2019	100	081106(R)	https://hal.archives-ouvertes.fr/cea-03196153	C
669	KALADZHYAN V., BENA C., SIMON P.	Topology from triviality	Physical Review B	2018	97	104512	https://hal.archives-ouvertes.fr/cea-03196169	C
670	KALADZHYAN V., JOUCKEN F., GE Z., QUEZADA-LOPEZ E., TANIGUCHI T., WATANABE K., VELASCO J., BENA C.	Quasiparticle interference patterns in bilayer graphene with trigonal warping	Physical Review B	2021	104	235425	https://hal.archives-ouvertes.fr/cea-04391543	C
671	KALADZHYAN V., PINON S., BARDARSON J., BENA C.	Exact lattice-model calculation of boundary modes for Weyl semimetals and graphene	New Journal of Physics	2020	22	103042	https://hal.archives-ouvertes.fr/cea-03196128	C
672	KALADZHYAN V., PINON S., JOUCKEN F., GE Z., QUEZADA-LOPEZ E., TANIGUCHI T., WATANABE K., VELASCO J., BENA C.	Surface states and quasiparticle interference in Bernal and rhombohedral graphite with and without trigonal warping	Physical Review B	2021	104	155418	https://hal.archives-ouvertes.fr/cea-04391548	C
673	KARTUN-GILES A., BARTHELEMY M., DETTMANN C.	Shape of shortest paths in random spatial networks	Physical Review E	2019	100	2315	https://hal.archives-ouvertes.fr/cea-02564008	C
674	KASER S., STRAND H., WENTZELL N., GEORGES A., PARCOLLET O., HANSMANN P.	Interorbital singlet pairing in Sr 2 RuO 4 : A Hund's superconductor	Physical Review B	2022	105	155101	https://hal.archives-ouvertes.fr/hal-04262732	C
675	KASIECZKA G., MARZANI S., SOYEZ G., STAGNITTO G.	Towards Machine Learning Analytics for Jet Substructure	Journal of High Energy Physics	2020	09	195	https://hal.archives-ouvertes.fr/hal-02908363	B
676	KATMADAS S., TOMASIELLO A.	Gauged supergravities from M-theory reductions	Journal of High Energy Physics	2018	04	048	https://hal.archives-ouvertes.fr/hal-01768114	A
677	KAYE J., BECK S., BARNETT A., VAN MUNOZ L., PARCOLLET O.	Automatic, high-order, and adaptive algorithms for Brillouin zone integration	SciPost Physics	2023	15	062	https://hal.archives-ouvertes.fr/cea-04540934	C
678	KAZAKOV V., LEVKOVICH-MASLYUK F.	Disc partition function of 2d R^{2} gravity from DWG matrix model	Journal of High Energy Physics	2022	01	190	https://hal.archives-ouvertes.fr/hal-03413196	C
679	KEHAGIAS A., LUST D., LUST S.	Swampland, Gradient Flow and Infinite Distance	Journal of High Energy Physics	2020	04	170	https://hal.archives-ouvertes.fr/hal-02338393	A
680	KIETHE J., TIMM L., LANDA H., KALINCEV D., MORIGI G., MEHLSTAUBLER T.E.	Finite-temperature spectrum at the symmetry-breaking linear to zigzag transition	Physical Review B	2021	103	104106	https://hal.archives-ouvertes.fr/hal-03115800	C
681	KIM M., MRAVLJE J., FERRERO M., PARCOLLET O., GEORGES A.	Spin-Orbit Coupling and Electronic Correlations in Sr2RuO4	Physical Review Letters	2018	120	126401	https://hal.archives-ouvertes.fr/hal-02363910	C
682	KIRKLEY A., BARBOSA H., BARTHELEMY M., GHOSHAL G.	From the betweenness centrality in street networks to structural invariants in random planar graphs	Nature Communications	2018	9	2501	https://hal.archives-ouvertes.fr/cea-01877724	C
683	KLOSS B., THOENNISS J., SONNER M., LEROSE A., FISHMAN M. T., STOUDENMIRE E., PARCOLLET O., GEORGES A., ABANIN D. A.	Equilibrium Quantum Impurity Problems via Matrix Product State Encoding of the Retarded Action	Phys.Rev.B	2023	108	205110	https://hal.archives-ouvertes.fr/hal-04170714	C
684	KOEHL P., DELARUE M., ORLAND H.	Physics approach to the variable-mass optimal-transport problem	Physical Review E	2021	103	012113	https://hal.archives-ouvertes.fr/pasteur-03267961	C
685	KOEHL P., DELARUE M., ORLAND H.	Simultaneous Identification of Multiple Binding Sites in Proteins: A Statistical Mechanics Approach	Journal of Physical Chemistry B	2021	125	5052-5067	https://hal.archives-ouvertes.fr/pasteur-03269759	C
686	KOEHL P., DELARUE M., ORLAND H.	Statistical Physics Approach to the Optimal Transport Problem	Physical Review Letters	2019	123	040603	https://hal.archives-ouvertes.fr/pasteur-02348869	C
687	KOEHL P., DELARUE M., ORLAND H.	Optimal transport at finite temperature	Physical Review E	2019	100	013310	https://hal.archives-ouvertes.fr/pasteur-02348884	C
688	KOEHL P., ORLAND H., DELARUE M.	Parameterizing Elastic Network Models to Capture the Dynamics of Proteins	Journal of Computational Chemistry	2021	42	1643-1661	https://hal.archives-ouvertes.fr/pasteur-03413465	C
689	KOEHL P., ORLAND H., DELARUE M.	Numerical Encodings of Amino Acids in Multivariate Gaussian Modeling of Protein Multiple Sequence Alignments	Molecules	2019	24	104	https://hal.archives-ouvertes.fr/pasteur-02170325	C
690	KORCHEMSKY G. P., ZHIBOEDOV A.	On the light-ray algebra in conformal field theories	Journal of High Energy Physics	2022	02	140	https://hal.archives-ouvertes.fr/hal-03377170	B
691	KORCHEMSKY G., SOKATCHEV E., ZHIBOEDOV A.	Generalizing event shapes: in search of lost collider time	Journal of High Energy Physics	2022	08	188	https://hal.archives-ouvertes.fr/hal-03285211	B
692	KORCHEMSKY G.P.	Energy correlations in the end-point region	Journal of High Energy Physics	2020	01	008	https://hal.archives-ouvertes.fr/hal-02144208	B
693	KORCHEMSKY G.P.	Exact scattering amplitudes in conformal fishnet theory	Journal of High Energy Physics	2019	08	028	https://hal.archives-ouvertes.fr/hal-01975049	B
694	KOSOWER D. A.	Direct Solution of Integration-by-Parts Systems	Physical Review D	2018	98	025008	https://hal.archives-ouvertes.fr/hal-01768016	B
695	KOSOWER D. A., MAYBEE B., O'CONNELL D.	Amplitudes, Observables, and Classical Scattering	Journal of High Energy Physics	2019	02	137	https://hal.archives-ouvertes.fr/hal-01952692	B
696	KOSOWER D. A., MONTEIRO R., O'CONNELL D.	The SAGEX Review on Scattering Amplitudes, Chapter 14: Classical Gravity from Scattering Amplitudes	J.Phys.A	2022	55	443015	https://hal.archives-ouvertes.fr/hal-03630769	B
697	KOSOWER D. A., PAGE B.	Universal decomposition of phase-space integrands	Physical Review D	2023	107	096006	https://hal.archives-ouvertes.fr/hal-03894356	B
698	KOSOWER D., POGEL S.	Yang–Mills All-Plus: Two Loops for the Price of One	Proceedings of Science	2021	1	031	https://hal.archives-ouvertes.fr/cea-04454418	B
699	KOSTOV I.	Light-cone limits of large rectangular fishnets	Journal of High Energy Physics	2023	03	156	https://hal.archives-ouvertes.fr/hal-03894975	A

700	KOSTOV I.	Two-dimensional massive integrable models on a torus	Journal of High Energy Physics	2022	09	119	https://hal.archives-ouvertes.fr/hal-03676244	A
701	KOSTOV I.	Effective Quantum Field Theory for the Thermodynamical Bethe Ansatz	Journal of High Energy Physics	2020	02	043	https://hal.archives-ouvertes.fr/hal-02392888	A
702	KOSTOV I., PETKOVA V. B.	Octagon with finite bridge: free fermions and determinant identities	Journal of High Energy Physics	2021	06	098	https://hal.archives-ouvertes.fr/hal-03157120	A
703	KOSTOV I., PETKOVA V. B., SERBAN D.	Determinant Formula for the Octagon Form Factor in N=4 Supersymmetric Yang-Mills Theory	Physical Review Letters	2019	122	231601	https://hal.archives-ouvertes.fr/hal-02080736	A
704	KOSTOV I., PETKOVA V. B., SERBAN D.	The Octagon as a Determinant	Journal of High Energy Physics	2019	11	178	https://hal.archives-ouvertes.fr/hal-02159728	A
705	KOSTOV I., SERBAN D., VU D.-L.	Boundary TBA, trees and loops	Nucl.Phys.B	2019	949	114817	https://hal.archives-ouvertes.fr/hal-01886241	A
706	KOVENSKY N., MICHALSKI G., SCHVELLINGER M.	1/N corrections to F_1 and F_2 structure functions of vector mesons from holography	Physical Review D	2019	99	046005	https://hal.archives-ouvertes.fr/hal-01897156	A
707	KOVENSKY N., POOLE A., SCHMITT A.	Phases of cold holographic QCD: baryons, pions and rho mesons	SciPost Physics	2023	15	162	https://hal.archives-ouvertes.fr/hal-04017326	A
708	KOVENSKY N., POOLE A., SCHMITT A.	Building a realistic neutron star from holography	Physical Review D	2022	105	034022	https://hal.archives-ouvertes.fr/hal-03436926	A
709	KOVENSKY N., SCHMITT A.	Isospin asymmetry in holographic baryonic matter	SciPost Physics	2021	11	029	https://hal.archives-ouvertes.fr/hal-03235667	A
710	KRAJNIK Ž., ILIEVSKI E., PROSEN T., PASQUIER V.	Anisotropic Landau-Lifshitz model in discrete space-time	SciPost Physics	2021	11	051	https://hal.archives-ouvertes.fr/cea-04525448	A
711	KRAJNIK Ž., SCHMIDT J., PASQUIER V., ILIEVSKI E., PROSEN T.	Exact Anomalous Current Fluctuations in a Deterministic Interacting Model	Physical Review Letters	2022	128	160601	https://hal.archives-ouvertes.fr/hal-03547651	A
712	KRALJIC K., LAIGLE C., PICHON C., PEIRANI S., CODIS S., SHIM J., CADIOU C., POGOSYAN D., ARNOUTS S., PIERI M., IRIč V., MORRISON S. S., ONORBE J., PEREZ-RAFOLS I., DALTON G.	Forecasts for WEAVE-QSO: 3D clustering and connectivity of critical points with Lyman-a tomography	Monthly Notices of the Royal Astronomical Society	2022	514	1359-1385	https://hal.archives-ouvertes.fr/hal-03540445	B
713	KRAPIVSKY P. L., LUCK J. M.	Jamming and metastability in one dimension: from the kinetically constrained Ising chain to the Riviera model	The European Physical Journal. Special Topics	2023	232	1703-1719	https://hal.archives-ouvertes.fr/cea-04211347	C
714	KRAPIVSKY P. L., LUCK J.M.	On multidimensional record patterns	Journal of Statistical Mechanics: Theory and Experiment	2020	2020	063205	https://hal.archives-ouvertes.fr/cea-02865360	C
715	KRAPIVSKY P. L., MALLICK K., SELS D.	Free bosons with a localized source	J.Stat.Mech.	2020	2006	063101	https://hal.archives-ouvertes.fr/hal-02894384	C
716	KRAPIVSKY P., LUCK J.	A renewal approach to configurational entropy in one dimension	Journal of Physics A: Mathematical and Theoretical	2023	56	255001	https://hal.archives-ouvertes.fr/cea-04211299	C
717	KRAPIVSKY P., LUCK J.	Coverage fluctuations in theater models	Journal of Statistical Mechanics: Theory and Experiment	2019	2019	063209	https://hal.archives-ouvertes.fr/hal-04408966	C
718	KRAPIVSKY P., LUCK J.M., MALLICK K.	Return probability of N fermions released from a 1D confining potential	Journal of Statistical Mechanics: Theory and Experiment	2019	2019	023103	https://hal.archives-ouvertes.fr/hal-04408951	C
719	KRAPIVSKY P., MALLICK K., SELS D.	Free Fermions with a Localized Source	Journal of Statistical Mechanics: Theory and Experiment	2019	2019	113108	https://hal.archives-ouvertes.fr/cea-02923417	C
720	KRAPIVSKY P.L., LUCK J.M., MALLICK K.	Quantum return probability of a system of N non-interacting lattice fermions	J.Stat.Mech.	2018	1802	023104	https://hal.archives-ouvertes.fr/hal-01730038	C
721	KRAUSS F., NAPOLETANO D.	Towards a fully massive five-flavor scheme	Physical Review D	2018	98	096002	https://hal.archives-ouvertes.fr/hal-01921665	B
722	KRUTYANSKIY V., CANTERI M., MERANER M., BATE J., KRCMARSKY V., SCHUPP J., SANGOUARD N., LANYON B. P.	A telecom-wavelength quantum repeater node based on a trapped-ion processor	Physical Review Letters	2023	130	213601	https://hal.archives-ouvertes.fr/hal-03833038	C
723	KRUTYANSKIY V., GALLI M., KRCMARSKY V., BAIER S., FIORETTO D.A., PU Y., MAZLOOM A., SEKATSKI P., CANTERI M., TELLER M., SCHUPP J., BATE J., MERANER M., SANGOUARD N., LANYON B.P., NORTHUP T.E.	Entanglement of trapped-ion qubits separated by 230 meters	Physical Review Letters	2023	130	050803	https://hal.archives-ouvertes.fr/hal-03777366	C
724	KULESZA A., MOTYKA L., SCHWARTLANDER D., STEBEL T., THEEUWES V.	Associated production of a top quark pair with a heavy electroweak gauge boson at NLO+NNLL accuracy	European Physical Journal C: Particles and Fields	2019	79	249	https://hal.archives-ouvertes.fr/hal-01975277	B
725	KUNIBA A., MISGUICH G., PASQUIER V.	Current correlations, Drude weights and large deviations in a box–ball system	Journal of Physics A: Mathematical and Theoretical	2022	55	244006	https://hal.archives-ouvertes.fr/cea-04150489	C ; A
726	KUNIBA A., MISGUICH G., PASQUIER V.	Generalized hydrodynamics in complete box-ball system for U_q(\widehat{sl}_n)	SciPost Physics	2021	10	095	https://hal.archives-ouvertes.fr/hal-03047646	C ; A
727	KUNIBA A., MISGUICH G., PASQUIER V.	Generalized hydrodynamics in box-ball system	Journal of Physics A: Mathematical and Theoretical	2020	53	404001	https://hal.archives-ouvertes.fr/hal-02550037	C ; A
728	KUNIBA A., PASQUIER V.	Quantum spin chains from Onsager algebras and reflection K-matrices	Nucl.Phys.B	2019	949	114792	https://hal.archives-ouvertes.fr/hal-02277883	A
729	KUNIBA A., PASQUIER V.	Matrix product solutions to the reflection equation from three dimensional integrability	J.Phys.A	2018	51	255204	https://hal.archives-ouvertes.fr/cea-01748629	A
730	KUNTZ A., PIAZZA F., VERNIZZI F.	Effective field theory for gravitational radiation in scalar-tensor gravity	Journal of Cosmology and Astroparticle Physics	2019	2019	052	https://hal.archives-ouvertes.fr/cea-02042587	B
731	LAFAY A., GAINUTDINOV A. M., JACOBSEN J. L.	Uq(sl3) web models: Locality, phase diagram and geometrical defects	Nuclear Physics B	2022	979	115789	https://hal.archives-ouvertes.fr/hal-03315296	A
732	LAFAY A., GAINUTDINOV A. M., JACOBSEN J. L.	U_q(\mathfrak{sl}_n) web models and \mathbb{Z}_n spin interfaces	Journal of Statistical Mechanics: Theory and Experiment	2021			https://hal.archives-ouvertes.fr/hal-03122299	A
733	LAIREZ P., VANHOVE P.	Algorithms for minimal Picard-Fuchs operators of Feynman integrals	Letters in Mathematical Physics	2023	113	37	https://hal.archives-ouvertes.fr/hal-03784522	A
734	LAMERS J., PASQUIER V., SERBAN D.	Spin-Ruijsenaars, q-Deformed Haldane–Shastry and Macdonald Polynomials	Commun.Math.Phys.	2022	393	61-150	https://hal.archives-ouvertes.fr/hal-02613210	A
735	LANDA H.	Singularities of Floquet scattering and tunneling	Physical Review A : Atomic, molecular, and optical physics [1990-2015]	2018	97		https://hal.archives-ouvertes.fr/hal-01795059	C
736	LANDA H., MISGUICH G.	Nonlocal correlations in noisy multiqubit systems simulated using matrix product operators	SciPost Physics Core	2023	6	037	https://hal.archives-ouvertes.fr/hal-03621347	C
737	LANDA H., SCHIRO M., MISGUICH G.	Multistability of Driven-Dissipative Quantum Spins	Physical Review Letters	2020	124		https://hal.archives-ouvertes.fr/hal-03059094	C

738	LANDA H., SCHIRO M., MISGUICH G.	Correlation-induced steady states and limit cycles in driven dissipative quantum systems	Physical Review B	2020	102		https://hal.archives-ouvertes.fr/hal-03059095	C
739	LANGLOIS D., MANCARELLA M., NOUI K., VERNIZZI F.	Mimetic gravity as DHOST theories	Journal of Cosmology and Astroparticle Physics	2019	02	036	https://hal.archives-ouvertes.fr/hal-01719629	B
740	LAVIGNAC S., MEDINA A. D.	Displaced Vertex signatures of a pseudo-Goldstone sterile neutrino	Journal of High Energy Physics	2021	01	151	https://hal.archives-ouvertes.fr/hal-02973237	B
741	LAZAROIU C. I., SHAHBAZI C.	Real pinor bundles and real Lipschitz structures	Asian J.Math.	2019	23	749-836	https://hal.archives-ouvertes.fr/hal-02564853	A
742	LAZAROIU C.I., SHAHBAZI C.S.	Generalized Einstein-Scalar-Maxwell theories and locally geometric U-folds	Rev.Math.Phys.	2018	30	1850012	https://hal.archives-ouvertes.fr/hal-01815315	A
743	LAZAROIU C.I., SHAHBAZI C.S.	Geometric U-folds in four dimensions	J.Phys.A	2018	51	015207	https://hal.archives-ouvertes.fr/hal-01669515	A
744	LE N. D., JOLICOEUR T.	Spin and valley ordering of fractional quantum Hall states in monolayer graphene	Physical Review B	2022	105	075203	https://hal.archives-ouvertes.fr/hal-03460830	C
745	LE N. D., JOLICOEUR T.	Competing Laughlin state and Wigner crystal in Bernal bilayer graphene	Physical Review B	2022	107	125129	https://hal.archives-ouvertes.fr/hal-04416844	C
746	LE TREUT G., KEPES F., ORLAND H.	A polymer model for the quantitative reconstruction of chromosome architecture from HiC and GAM data	Biophysical Journal	2018	115	2286-2294	https://hal.archives-ouvertes.fr/cea-04313472	C
747	LEE H. K., MA Y.-L., PAENG W.-G., RHO M.	Cusp in the symmetry energy, speed of sound in neutron stars and emergent pseudo-conformal symmetry	Mod.Phys.Lett.A	2022	37	2230003	https://hal.archives-ouvertes.fr/hal-03287208	B
748	LEGRAMANDI A., MACPHERSON N. T., MONACO G. L.	All $\mathcal{N}=(8,0)$ AdS$_3$ solutions in 10 and 11 dimensions	Journal of High Energy Physics	2021	05	263	https://hal.archives-ouvertes.fr/hal-03115799	A
749	LEKEU V., ZHANG Y.	Gravitational anomalies of fermionic higher-spin fields	Journal of High Energy Physics	2022	09	027	https://hal.archives-ouvertes.fr/hal-03693180	C ; A
750	LEKEU V., ZHANG Y.	On the quantisation and anomalies of antisymmetric tensor-spinors	Journal of High Energy Physics	2021	11	078	https://hal.archives-ouvertes.fr/hal-03354097	C ; A
751	LEVI M.	Effective Field Theories of Post-Newtonian Gravity: A comprehensive review	Rept.Prog.Phys.	2020	83	075901	https://hal.archives-ouvertes.fr/hal-01846836	B
752	LEVI M., MCLEOD A. J., VON HIPPEL M.	N^{3}LO gravitational quadratic-in-spin interactions at G^{4}	Journal of High Energy Physics	2021	07	116	https://hal.archives-ouvertes.fr/hal-02542864	B
753	LEVI M., MCLEOD A. J., VON HIPPEL M.	N^{3}LO gravitational spin-orbit coupling at order G^{4}	Journal of High Energy Physics	2021	07	115	https://hal.archives-ouvertes.fr/hal-02518083	B
754	LEVI M., MOUGIAKAKOS S., VIEIRA M.	Gravitational cubic-in-spin interaction at the next-to-leading post-Newtonian order	Journal of High Energy Physics	2021	01	036	https://hal.archives-ouvertes.fr/hal-02440023	B ; A
755	LEVKOVICH-MASLYUK F., PRETI M.	Exploring the ground state spectrum of γ-deformed N = 4 SYM	Journal of High Energy Physics	2022	06	146	https://hal.archives-ouvertes.fr/hal-02536124	C
756	LEWANDOWSKI M.	Violation of the consistency relations for large-scale structure with dark energy	JCAP	2020	08	044	https://hal.archives-ouvertes.fr/hal-02458771	B
757	LEWANDOWSKI M., SENATORE L.	An analytic implementation of the IR-resummation for the BAO peak	JCAP	2020	03	018	https://hal.archives-ouvertes.fr/hal-01921723	B
758	LI S., ORLAND H., ZANDI R.	Self consistent field theory of virus assembly	Journal of Physics: Condensed Matter	2018	30	144002	https://hal.archives-ouvertes.fr/cea-01708325	C
759	LI Y.	Black holes and the swampland: the deep throat revelations	Journal of High Energy Physics	2021	06	065	https://hal.archives-ouvertes.fr/hal-03150574	A
760	LI Y.-L., MA Y.-L., RHO M.	Nuclear Axial Currents from Scale-Chiral Effective Field Theory	Chin.Phys.C	2018	42	094102	https://hal.archives-ouvertes.fr/hal-01863655	B
761	LI Y.-L., MA Y.-L., RHO M.	Nonquenching of g_A in nuclei, Landau-Migdal fixed-point theory, and emergence of scale symmetry in dense baryonic matter	Phys.Rev.C	2018	98	044318	https://hal.archives-ouvertes.fr/hal-01774006	B
762	LIFSON A., SALAM G. P., SOYEZ G.	Calculating the primary Lund Jet Plane density	Journal of High Energy Physics	2020	10	170	https://hal.archives-ouvertes.fr/hal-02911925	B
763	LIM S.H., CARLSON J., LOIZIDES C., LONARDONI D., LYNN J.E., NAGLE J.L., KOOP O., OUELLETTE J.	Exploring New Small System Geometries in Heavy Ion Collisions	Phys.Rev.C	2019	99	044904	https://hal.archives-ouvertes.fr/hal-01975073	B
764	LINDEN N.-O., ZINGL M., HUBIG C., PARCOLLET O., SCHOLLWOCK U.	Imaginary-time matrix product state impurity solver in a real material calculation: Spin-orbit coupling in Sr_2RuO_4	Physical Review B	2020	101	041101	https://hal.archives-ouvertes.fr/cea-04541080	C
765	LIU J. T., MINASIAN R.	Higher-derivative couplings in string theory: five-point contact terms	Nucl.Phys.B	2021	967	115386	https://hal.archives-ouvertes.fr/hal-02447853	A
766	LIU J. T., MINASIAN R.	Higher-derivative couplings in string theory: five-point contact terms	Nuclear Physics B	2019	874	413-470	https://hal.archives-ouvertes.fr/cea-03109892	A
767	LIU J. T., MINASIAN R., SAVELLI R., SCHACHNER A.	Type IIB at eight derivatives: insights from Superstrings, Superfields and Superparticles	Journal of High Energy Physics	2022	08	267	https://hal.archives-ouvertes.fr/hal-03689887	A
768	LIU X.-H., MA Y.-L., RHO M.	Topology change and nuclear symmetry energy in compact-star matter	Phys.Rev.C	2019	99	055808	https://hal.archives-ouvertes.fr/hal-01952667	B
769	LLABRES E.	General solutions in Chern-Simons gravity and T\overline{T} -deformations	Journal of High Energy Physics	2021	01	039	https://hal.archives-ouvertes.fr/hal-02447949	A
770	LLINARES C., BRAX P.	Detecting Coupled Domain Walls in Laboratory Experiments	Physical Review Letters	2019	122	091102	https://hal.archives-ouvertes.fr/hal-01853852	B
771	LOPES CARDOSO G., KIDAMBI A., NAMPURI S., REYS V., ROSSELLO M.	The gravitational path integral for N=4 BPS black holes from black hole microstate counting	Annales Henri Poincare	2023	24	3305-3346	https://hal.archives-ouvertes.fr/hal-03876106	A
772	LORETI S., SER-GIACOMI E., ZISCHG A., KEILER M., BARTHELEMY M.	Local impacts on road networks and access to critical locations during extreme floods	Scientific Reports	2022	12	1552	https://hal.archives-ouvertes.fr/cea-04371312	C
773	LOUAIL T., BARTHELEMY M.	A dominance tree approach to systems of cities	Computers, Environment and Urban Systems	2022	97	101856	https://hal.archives-ouvertes.fr/hal-03593245	C
774	LOW I., RODINA L., YIN Z.	Double Copy in Higher Derivative Operators of Nambu-Goldstone Bosons	Physical Review D	2021	103	025004	https://hal.archives-ouvertes.fr/hal-02946176	B
775	LUCK J.-M.	An investigation of PT -symmetry breaking in tight-binding chains	Journal of Statistical Mechanics: Theory and Experiment	2022	2022	013302	https://hal.archives-ouvertes.fr/hal-04409012	C
776	LUCK J.-M.	Parrondo games as disordered systems	The European Physical Journal B: Condensed Matter and Complex Systems	2019	92	180	https://hal.archives-ouvertes.fr/hal-04408975	C
777	LUCK J.-M.	Scaling laws for weakly disordered 1D flat bands	Journal of Physics A: Mathematical and Theoretical	2019	52	205301	https://hal.archives-ouvertes.fr/hal-04408959	C

778	LUCK J.-M., MEHTA A.	Evolution of grammatical forms: some quantitative approaches	The European Physical Journal B: Condensed Matter and Complex Systems	2023	96	19	https://hal.archives-ouvertes.fr/cea-04211281	C
779	LUCK J.-M., MEHTA A.	On the coexistence of competing languages	The European Physical Journal B: Condensed Matter and Complex Systems	2020	93	73	https://hal.archives-ouvertes.fr/cea-02865237	C
780	LUZUM M., HIPPERT M., OLLITRAULT J.-Y.	Methods for systematic study of nuclear structure in high-energy collisions	Eur.Phys.J.A	2023	59	110	https://hal.archives-ouvertes.fr/hal-04019887	B
781	LV J.-P., DENG Y., JACOBSEN J. L., SALAS J., SOKAL A. D.	Duality and the universality class of the three-state Potts antiferromagnet on plane quadrangulations	Physical Review E : Statistical, Nonlinear, and Soft Matter Physics	2018	97	040104	https://hal.archives-ouvertes.fr/hal-01792224	A
782	LYKKE JACOBSEN J., JIANG Y., ZHANG Y.	Torus partition function of the six-vertex model from algebraic geometry	Journal of High Energy Physics	2019	03	152	https://hal.archives-ouvertes.fr/hal-01960385	C ; A
783	LYKKE JACOBSEN J., SALEUR H.	Bootstrap approach to geometrical four-point functions in the two-dimensional critical Q-state Potts model: A study of the s-channel spectra	Journal of High Energy Physics	2019	2019	084	https://hal.archives-ouvertes.fr/hal-01897182	A
784	MA Y.-L., LEE H. K., PAENG W.-G., RHO M.	Pseudoconformal equation of state in compact-star matter from topology change and hidden symmetries of QCD	Sci.China Phys.Mech.Astron.	2019	62	112011	https://hal.archives-ouvertes.fr/hal-01774302	B
785	MA Y.-L., NOWAK M. A., RHO M., ZAHED I.	Baryon as a Quantum Hall Droplet and the Cheshire Cat Principle	Physical Review Letters	2019	123	172301	https://hal.archives-ouvertes.fr/hal-02188095	B
786	MA Y.-L., RHO M.	Topology change, emergent symmetries and compact star matter	AAPPS Bull.	2021	31	16	https://hal.archives-ouvertes.fr/hal-03171320	B
787	MA Y.-L., RHO M.	Dichotomy of Baryons as Quantum Hall Droplets and Skyrmions: Topological Structure of Dense Matter	Symmetry	2021	13	1888	https://hal.archives-ouvertes.fr/hal-02959529	B
788	MA Y.-L., RHO M.	Towards the hadron–quark continuity via a topology change in compact stars	Prog.Part.Nucl.Phys.	2020	113	103791	https://hal.archives-ouvertes.fr/hal-02338401	B
789	MA Y.-L., RHO M.	Quenched g_A in Nuclei and Emergent Scale Symmetry in Baryonic Matter	Physical Review Letters	2020	125	142501	https://hal.archives-ouvertes.fr/hal-02491274	B
790	MA Y.-L., RHO M.	Pseudoconformal structure in dense baryonic matter	Physical Review D	2019	99	014034	https://hal.archives-ouvertes.fr/hal-01909237	B
791	MA Y.-L., RHO M.	Sound velocity and tidal deformability in compact stars	Physical Review D	2019	100	114003	https://hal.archives-ouvertes.fr/hal-01945148	B
792	MAČEK M., DUMITRESCU P., BERTRAND C., TRIGGS B., PARCOLLET O., WAINTAL X.	Quantum Quasi-Monte Carlo Technique for Many-Body Perturbative Expansions	Physical Review Letters	2020	125	047702	https://hal.fr/hal-03044608	C
793	MACPHERSON N. T., MONTERO J., PRINS D.	Mink _3\times S^3 solutions of type II supergravity	Nucl.Phys.B	2018	933	185-233	https://hal.archives-ouvertes.fr/hal-01833820	A
794	MAILLARD A., FOINI L., CASTELLANOS A. L., KRZAKALA F., MEZARD M., ZDEBOROVA L.	High-temperature expansions and message passing algorithms	Journal of Statistical Mechanics: Theory and Experiment	2019	2019	113301	https://hal.archives-ouvertes.fr/cea-02524865	C
795	MAJUMDAR S., FOINI L., GIAMARCHI T., ROSSO A.	Localization induced by spatially uncorrelated subohmic baths in one dimension	Physical Review B	2023	108	205138	https://hal.archives-ouvertes.fr/hal-04174919	C
796	MAJUMDAR S., FOINI L., GIAMARCHI T., ROSSO A.	Bath-induced phase transition in a Luttinger liquid	Physical Review B	2023	107	165113	https://hal.archives-ouvertes.fr/hal-04079507	C
797	MALEK E., VALL CAMELL V.	Consistent truncations around half-maximal AdS_{5} vacua of 11-dimensional supergravity	Class.Quant.Grav.	2022	39	075026	https://hal.archives-ouvertes.fr/hal-03115795	A
798	MALLICK K., PROLHAC S.	Brownian Bridges for Late Time Asymptotics of KPZ Fluctuations in Finite Volume	Journal of Statistical Physics	2018	173	322–361	https://hal.archives-ouvertes.fr/hal-01915293	C
799	MANNELLI S., BIROLI G., CAMMAROTA C., KRZAKALA F., URBANI P., ZDEBOROVA L.	Marvels and pitfalls of the Langevin algorithm in noisy high-dimensional inference	Physical Review X	2020	10	011057	https://hal.archives-ouvertes.fr/cea-02009687	C
800	MANNELLI S., BIROLI G., CAMMAROTA C., KRZAKALA F., ZDEBOROVA L.	Who is afraid of big bad minima? Analysis of gradient-flow in a spiked matrix-tensor model	Advances in Neural Information Processing Systems	2019	32	8676-8686	https://hal.archives-ouvertes.fr/cea-02529145	C
801	MANNELLI S., KRZAKALA F., URBANI P., ZDEBOROVA L.	Passed & Spurious: analysing descent algorithms and local minima in Spiked Matrix-Tensor Models	Proceedings of Machine Learning Research	2019		4333-4342	https://hal.archives-ouvertes.fr/cea-02009727	C
802	MARTINEC E. J., WARNER N. P.	The Harder They Fall, the Bigger They Become: Tidal Trapping of Strings by Microstate Geometries	JHEP	2021	04	259	https://hal.archives-ouvertes.fr/hal-02959539	A
803	MARTINELLI M., SCARCELLA F., HOGG N. B., KAVANAGH B. J., GAGGERO D., FLEURY P.	Dancing in the dark: detecting a population of distant primordial black holes	Journal of Cosmology and Astroparticle Physics	2022	2022	006	https://hal.archives-ouvertes.fr/hal-03676075	B
804	MARTINEZ J. G., FOUVRY J.-B., PICHON C.	Young stellar cluster dilution near supermassive black holes: the impact of Vector Resonant Relaxation on neighbour separation	Monthly Notices of the Royal Astronomical Society	2020	499	2714-2733	https://hal.archives-ouvertes.fr/hal-02939901	B
805	MARZANI S., REICHELT D., SCHUMANN S., SOYEZ G., THEEUWES V.	Fitting the Strong Coupling Constant with Soft-Drop Thrust	Journal of High Energy Physics	2019	11	179	https://hal.archives-ouvertes.fr/hal-02188139	B
806	MARZANI S., SCHUNK L., SOYEZ G.	The jet mass distribution after Soft Drop	European Physical Journal C: Particles and Fields	2018	78	96	https://hal.archives-ouvertes.fr/hal-01703749	B
807	MARZANI S., SOYEZ G., SPANNOWSKY M.	Looking inside jets: an introduction to jet substructure and boosted-object phenomenology	Lecture Notes in Physics	2019	958		https://hal.archives-ouvertes.fr/hal-02017016	B
808	MAYERSON D. R.	Fuzzballs and Observations	Gen.Rel.Grav.	2020	52	115	https://hal.archives-ouvertes.fr/hal-02999503	A
809	MAYERSON D. R., SHIGEMORI M.	Counting D1-D5-P microstates in supergravity	SciPost Physics	2021	10	018	https://hal.archives-ouvertes.fr/hal-02981290	A
810	MAYERSON D. R., WALKER R. A., WARNER N. P.	Microstate Geometries from Gauged Supergravity in Three Dimensions	JHEP	2020	10	030	https://hal.archives-ouvertes.fr/hal-02613211	A
811	MAZZOLO A., MONTHUS C.	On the Kemeny time for continuous-time reversible and irreversible Markov processes with applications to stochastic resetting and to conditioning towards forever-survival	Journal of Statistical Mechanics: Theory and Experiment	2023	2023	063204	https://hal.archives-ouvertes.fr/cea-04256164	C
812	MAZZOLO A., MONTHUS C.	Joint distribution of two local times for diffusion processes with the application to the construction of various conditioned processes	Journal of Physics A: Mathematical and Theoretical	2023	56	205004	https://hal.archives-ouvertes.fr/hal-04089692	C
813	MAZZOLO A., MONTHUS C.	Joint distribution of two local times for diffusion processes with the application to the construction of various conditioned processes	Journal of Physics A: Mathematical and Theoretical	2023	56	205004	https://hal.archives-ouvertes.fr/cea-04220684	C
814	MAZZOLO A., MONTHUS C.	Nonequilibrium diffusion processes via non-Hermitian electromagnetic quantum mechanics with application to the statistics of entropy production in the Brownian gyrator	Physical Review E	2023	107	014101	https://hal.archives-ouvertes.fr/hal-03998839	C
815	MAZZOLO A., MONTHUS C.	Conditioning diffusion processes with respect to the local time at the origin	Journal of Statistical Mechanics: Theory and Experiment	2022	2022	103207	https://hal.archives-ouvertes.fr/hal-03841252	C
816	MAZZOLO A., MONTHUS C.	Conditioning diffusion processes with killing rates	Journal of Statistical Mechanics: Theory and Experiment	2022	2022	083207	https://hal.archives-ouvertes.fr/hal-03769525	C
817	MAZZOLO A., MONTHUS C.	Conditioning two diffusion processes with respect to their first-encounter properties	Journal of Physics A: Mathematical and Theoretical	2022	55	305002	https://hal.archives-ouvertes.fr/hal-03769521	C

818	MEDVES R., SOTO-ONTOSO A., SOYEZ G.	Lund multiplicity in QCD jets	Journal of High Energy Physics	2023	04	104	https://hal.archives-ouvertes.fr/hal-03921030	B
819	MEDVES R., SOTO-ONTOSO A., SOYEZ G.	Lund and Cambridge multiplicities for precision physics	Journal of High Energy Physics	2022	10	156	https://hal.archives-ouvertes.fr/hal-03676248	B
820	MEESSEN P., MITSIOS D., ORTIN T.	Black hole chemistry, the cosmological constant and the embedding tensor	Journal of High Energy Physics	2022	12	155	https://hal.archives-ouvertes.fr/hal-03632174	A
821	MEHTA A., LUCK J.-M.	Hearings and mishearings: decrypting the spoken word	Advances in Complex Systems (ACS)	2020	23	2050008	https://hal.archives-ouvertes.fr/cea-03043289	C
822	MELNIKOV A., SEKATSKI P., SANGOUARD N.	Setting up experimental Bell test with reinforcement learning	Physical Review Letters	2020	125	160401	https://hal.archives-ouvertes.fr/cea-02955257	C
823	MELNIKOV I. V., MINASIAN R., SETHI S.	Spacetime supersymmetry in low-dimensional perturbative heterotic compactifications	Fortsch.Phys.	2018	66	1800027	https://hal.archives-ouvertes.fr/hal-01827847	A
824	MELOTTI P., RAMASSAMY S., THEVENIN P.	Cube moves for s-embeddings and α-realizations	Annales de l'Institut Henri Poincaré (D) Combinatorics, Physics and their Interactions	2023	10	781–817	https://hal.archives-ouvertes.fr/hal-02512557	A
825	MELOTTI P., RAMASSAMY S., THEVENIN P.	Points and lines configurations for perpendicular bisectors of convex cyclic polygons	The Electronic Journal of Combinatorics	2022	29	1-46	https://hal.archives-ouvertes.fr/hal-02518173	A
826	MERANER M., MAZLOOM A., KRUTYANSKIY V., KRCMARSKY V., SCHUPP J., FIORETTO D., SEKATSKI P., NORTHUP T., SANGOUARD N., LANYON B.	Indistinguishable photons from a trapped-ion quantum network node	Physical Review A : Atomic, molecular, and optical physics [1990-2015]	2020	102	052614	https://hal.archives-ouvertes.fr/cea-02438271	C
827	MERLIN E., CASTELLANO M., BRETONNIERE H., HUERTAS-COMPANY M., KUCHNER U., TUCCILLO D., BUITRAGO F., PETERSON J.R., CONSELICE C.J., CARO F. *et al.*	Euclid preparation. XXV. The Euclid Morphology Challenge: Towards model-fitting photometry for billions of galaxies	Astronomy and Astrophysics - A&A	2023	671	A101	https://hal.archives-ouvertes.fr/hal-03841758	B
828	MIAO Y., LAMERS J., PASQUIER V.	On the Q operator and the spectrum of the XXZ model at root of unity	SciPost Phys.	2021	11	067	https://hal.archives-ouvertes.fr/hal-03115844	A
829	MIGLIACCIO S., RIBAULT S.	The analytic bootstrap equations of non-diagonal two-dimensional CFT	Journal of High Energy Physics	2018	2018	169	https://hal.archives-ouvertes.fr/cea-01695664	A
830	MIGNACCO F., URBANI P.	The effective noise of stochastic gradient descent	Journal of Statistical Mechanics: Theory and Experiment	2022	2022	083405	https://hal.archives-ouvertes.fr/hal-03855441	C
831	MIGNACCO F., URBANI P., ZDEBOROVA L.	Stochasticity helps to navigate rough landscapes: comparing gradient-descent-based algorithms in the phase retrieval problem	Machine Learning: Science and Technology	2021	2	035029	https://hal.archives-ouvertes.fr/hal-03425821	C
832	MINASIAN R., PAPADIMITRIOU I., YI P.	Anomalies and supersymmetry	Physical Review D	2022	105	065005	https://hal.archives-ouvertes.fr/hal-03224803	A
833	MINASIAN R., STRICKLAND-CONSTABLE C., ZHANG Y.	On symmetries and dynamics of exotic supermultiplets	Journal of High Energy Physics	2021	01	174	https://hal.archives-ouvertes.fr/hal-02914525	A ; C
834	MISGUICH G., JOLICOEUR T.	DMRG study of FQHE systems in the open cylinder geometry	Journal of Physics: Conference Series	2021	1740	012043	https://hal.archives-ouvertes.fr/hal-03063745	C
835	MISGUICH G., JOLICOEUR T., MIZUSAKI T.	Bubble phase at $\nu = \frac{1}{3}$ for spinless hollow-core interaction	Physical Review B	2020	102	245107	https://hal.archives-ouvertes.fr/hal-03047799	C
836	MISGUICH G., PAVLOFF N., PASQUIER V.	Domain wall problem in the quantum XXZ chain and semiclassical behavior close to the isotropic point	SciPost Physics	2019	7		https://hal.archives-ouvertes.fr/hal-02295825	C ; A
837	MONNAI A.	Off-equilibrium corrections to energy and conserved charge densities in the relativistic fluid in heavy-ion collisions	Phys.Rev.C	2018	98	034902	https://hal.archives-ouvertes.fr/hal-01757988	B
838	MONTEN R., TOLDO C.	On the search for multicenter AdS black holes from M-theory	Journal of High Energy Physics	2022	02	009	https://hal.archives-ouvertes.fr/hal-03454546	A
839	MONTERO M., PARRA DE FREITAS H.	New Supersymmetric String Theories from Discrete Theta Angles	Journal of High Energy Physics	2023	01	091	https://hal.archives-ouvertes.fr/hal-03790720	A
840	MONTHUS C.	Large deviations for the Pearson family of ergodic diffusion processes involving a quadratic diffusion coefficient and a linear force	Journal of Statistical Mechanics: Theory and Experiment	2023	2023	083204	https://hal.archives-ouvertes.fr/hal-04180224	C
841	MONTHUS C.	Revisiting boundary-driven non-equilibrium Markov dynamics in arbitrary potentials via supersymmetric quantum mechanics and via explicit large deviations at various levels	Journal of Statistical Mechanics: Theory and Experiment	2023	2023	063206	https://hal.archives-ouvertes.fr/hal-04156986	C
842	MONTHUS C.	Large deviations for metastable states of Markov processes with absorbing states with applications to population models in stable or randomly switching environment	Journal of Statistical Mechanics: Theory and Experiment	2022	2022	013206	https://hal.archives-ouvertes.fr/hal-03585204	C
843	MONTHUS C.	Anomalous dynamical large deviations of local empirical densities and activities in the pure and in the random kinetically constrained East model	The European Physical Journal B: Condensed Matter and Complex Systems	2022	95	32	https://hal.archives-ouvertes.fr/hal-03585210	C
844	MONTHUS C.	Markov trajectories: Microcanonical Ensembles based on empirical observables as compared to Canonical Ensembles based on Markov generators	The European Physical Journal B: Condensed Matter and Complex Systems	2022	95	139	https://hal.archives-ouvertes.fr/hal-03769515	C
845	MONTHUS C.	Microcanonical conditioning of Markov processes on time-additive observables	Journal of Statistical Mechanics: Theory and Experiment	2022	2022	023207	https://hal.archives-ouvertes.fr/hal-03585225	C
846	MONTHUS C.	Inhomogeneous asymmetric exclusion processes between two reservoirs: large deviations for the local empirical observables in the mean-field approximation	Journal of Statistical Mechanics: Theory and Experiment	2021	2021	123205	https://hal.archives-ouvertes.fr/hal-03585215	C
847	MONTHUS C.	Properties of the simplest inhomogeneous and homogeneous Tree-Tensor-States for long-ranged quantum spin chains with or without disorder	Physica A: Statistical Mechanics and its Applications	2021	576	126040	https://hal.archives-ouvertes.fr/hal-03367002	C
848	MONTHUS C.	Inference of Markov models from trajectories via large deviations at level 2.5 with applications to random walks in disordered media	Journal of Statistical Mechanics: Theory and Experiment	2021	2021	063211	https://hal.archives-ouvertes.fr/hal-03367006	C
849	MONTHUS C.	Large deviations for Markov processes with stochastic resetting: analysis via the empirical density and flows or via excursions between resets	Journal of Statistical Mechanics: Theory and Experiment	2021	2021	033201	https://hal.archives-ouvertes.fr/hal-03367003	C
850	MONTHUS C.	Revisiting the Ruelle thermodynamic formalism for Markov trajectories with application to the glassy phase of random trap models	Journal of Statistical Mechanics: Theory and Experiment	2021	2021	063301	https://hal.archives-ouvertes.fr/hal-03367007	C
851	MONTHUS C.	Jump-drift and jump-diffusion processes: large deviations for the density, the current and the jump-flow and for the excursions between jumps	Journal of Statistical Mechanics: Theory and Experiment	2021	2021	083205	https://hal.archives-ouvertes.fr/hal-03367009	C
852	MONTHUS C.	Properties of the simplest inhomogeneous and homogeneous Tree-Tensor-States for Long-Ranged Quantum Spin Chains with or without disorder	Physica A: Statistical Mechanics and its Applications	2021			https://hal.archives-ouvertes.fr/cea-02571099	C
853	MONTHUS C.	Large deviations for the skew-detailed-balance lifted-Markov processes to sample the equilibrium distribution of the Curie–Weiss model	Journal of Statistical Mechanics: Theory and Experiment	2021	2021	103202	https://hal.archives-ouvertes.fr/hal-03377768	C
854	MONTHUS C.	Large deviations of the Lyapunov exponent in 2D matrix Langevin dynamics with applications to one-dimensional Anderson localization models	Journal of Statistical Mechanics: Theory and Experiment	2021	2021	033303	https://hal.archives-ouvertes.fr/hal-03367004	C
855	MONTHUS C.	Large deviations at various levels for run-and-tumble processes with space-dependent velocities and space-dependent switching rates	Journal of Statistical Mechanics: Theory and Experiment	2021	2021	083212	https://hal.archives-ouvertes.fr/hal-03367008	C
856	MONTHUS C.	Real-space renormalization for disordered systems at the level of large deviations	Journal of Statistical Mechanics: Theory and Experiment	2020	2020	013301	https://hal.archives-ouvertes.fr/hal-02994905	C

857	MONTHUS C.	Construction of Many-Body-Localized Models where all the eigenstates are Matrix-Product-States	J.Stat.Mech.	2020	2008	083301	https://hal.archives-ouvertes.fr/hal-02423754	C
858	MONTHUS C.	Explicit properties of the simplest inhomogeneous matrix-product-state including the Riemann metric of the MPS manifold	J.Stat.Mech.	2020	2002	023105	https://hal.archives-ouvertes.fr/hal-02504620	C
859	MONTHUS C.	Asymmetric scaling in large deviations for rare values bigger or smaller than the typical value	Journal of Statistical Mechanics: Theory and Experiment	2019	2019	093202	https://hal.archives-ouvertes.fr/hal-02321994	C
860	MONTHUS C.	Large deviations for the density and current in non-equilibrium-steady-states on disordered rings	Journal of Statistical Mechanics: Theory and Experiment	2019	2019	023206	https://hal.archives-ouvertes.fr/hal-02122813	C
861	MONTHUS C.	Revisiting classical and quantum disordered systems from the unifying perspective of large deviations	The European Physical Journal B: Condensed Matter and Complex Systems	2019	92	149	https://hal.archives-ouvertes.fr/hal-02322039	C
862	MONTHUS C.	Multifractality in the generalized Aubry–André quasiperiodic localization model with power-law hoppings or power-law Fourier coefficients	Fractals	2019	27	1950007	https://hal.archives-ouvertes.fr/hal-02322451	C
863	MONTHUS C.	Statistical physics of long dynamical trajectories for a system in contact with several thermal reservoirs	Journal of Physics A: Mathematical and Theoretical	2019	52	485001	https://hal.archives-ouvertes.fr/hal-02350406	C
864	MONTHUS C.	Large deviations for dynamical fluctuations of open Markov processes, with application to random cascades on trees	Journal of Physics A: Mathematical and Theoretical	2019	52	025001	https://hal.archives-ouvertes.fr/hal-02122803	C
865	MONTHUS C.	Microscopic fluctuation theory (mFT) for interacting Poisson processes	Journal of Physics A: Mathematical and Theoretical	2019	52	135003	https://hal.archives-ouvertes.fr/hal-02122791	C
866	MONTHUS C.	Strong disorder renormalization for the dynamics of many-body-localized systems: iterative elimination of the fastest degree of freedom via the Floquet expansion	Journal of Physics A: Mathematical and Theoretical	2018	51	275302	https://hal.archives-ouvertes.fr/hal-02322499	C
867	MONTHUS C.	Topological phase transitions in random Kitaev \alpha-chains	Journal of Physics A: Mathematical and Theoretical	2018	51	465301	https://hal.archives-ouvertes.fr/hal-02122826	C
868	MONTHUS C.	Even and odd normalized zero modes in random interacting Majorana models respecting the parity P and the time-reversal-symmetry T	Journal of Physics A: Mathematical and Theoretical	2018	51	265303	https://hal.archives-ouvertes.fr/hal-01817913	C
869	MONTHUS C.	On the simplest scale invariant tree-tensor-states preserving the quantum symmetries of the antiferromagnetic XXZ chain	J.Phys.A	2018	51	095301	https://hal.archives-ouvertes.fr/hal-01714219	C
870	MONTHUS C.	Strong disorder real-space renormalization for the many-body-localized phase of random Majorana models	J.Phys.A	2018	51	115304	https://hal.archives-ouvertes.fr/hal-01724998	C
871	MONTHUS C.	Many-body-localization: strong disorder perturbative approach for the local integrals of motion	Journal of Physics A: Mathematical and Theoretical	2018	51	195301	https://hal.archives-ouvertes.fr/hal-02322422	C
872	MONTHUS C., MAZZOLO A.	Conditioned diffusion processes with an absorbing boundary condition for finite or infinite horizon	Physical Review E	2022	106	044117	https://hal.archives-ouvertes.fr/hal-03814086	C
873	MORICE C., CHAKRABORTY D., MONTIEL X., PEPIN C.	Pseudo-spin skyrmions in the phase diagram of cuprate superconductors	Journal of Physics: Condensed Matter	2018	30	295601	https://hal.archives-ouvertes.fr/cea-04259699	C
874	MORICE C., CHAKRABORTY D., PEPIN C.	Collective mode in the SU(2) theory of cuprates	Physical Review B	2018	98	224514	https://hal.archives-ouvertes.fr/cea-04215617	C
875	MORIN-DUCHESNE A., JACOBSEN J. L.	Logarithmic correlation functions for critical dense polymers on the cylinder	SciPost Physics	2019	7	040	https://hal.archives-ouvertes.fr/hal-02279088	A
876	MORIN-DUCHESNE A., JACOBSEN J. L.	Two-point boundary correlation functions of dense loop models	SciPost Physics	2018	4	034	https://hal.archives-ouvertes.fr/hal-01833673	A
877	MOUGIAKAKOS S., RIVA M. M., VERNIZZI F.	Gravitational Bremsstrahlung with Tidal Effects in the Post-Minkowskian Expansion	Physical Review Letters	2022	129	121101	https://hal.archives-ouvertes.fr/hal-03652949	B ; A
878	MOUGIAKAKOS S., RIVA M. M., VERNIZZI F.	Gravitational Bremsstrahlung in the post-Minkowskian effective field theory	Physical Review D	2021	104	024041	https://hal.archives-ouvertes.fr/hal-03164363	B ; A
879	MOUGIAKAKOS S., VANHOVE P.	Schwarzschild-Tangherlini metric from scattering amplitudes in various dimensions	Physical Review D	2021	103	026001	https://hal.archives-ouvertes.fr/hal-02972009	A
880	MOUTENET A., SETH P., FERRERO M., PARCOLLET O.	Cancellation of vacuum diagrams and the long-time limit in out-of-equilibrium diagrammatic quantum Monte Carlo	Physical Review B	2019	100	085125	https://hal.archives-ouvertes.fr/hal-02363918	C
881	MURULANE K., KARATAGLIDIS S., GIRAUD B.G.	Symmetries induced by strong local potentials	Int.J.Mod.Phys.E	2023	32	2350044	https://hal.archives-ouvertes.fr/hal-03908144	B
882	MUSSO M., CADIOU C., PICHON C., CODIS S., KRALJIC K., DUBOIS Y.	How does the cosmic web impact assembly bias?	Monthly Notices of the Royal Astronomical Society	2018	476	4	https://hal.archives-ouvertes.fr/hal-01856985	B
883	NADLINGER D.P., DRMOTA P., NICHOL B.C., ARANEDA G., MAIN D., SRINIVAS R., LUCAS D.M., BALLANCE C.J., IVANOV K., TAN E.-Z., SEKATSKI P., URBANKE R.L., RENNER R., SANGOUARD N., BANCAL J.-D.	Device-Independent Quantum Key Distribution	Nature	2022	607	682-686	https://hal.archives-ouvertes.fr/hal-03762988	C
884	NAGLE J.L., ZAJC W.A.	Assessing saturation physics explanations of collectivity in small collision systems with the IP-Jazma model	Phys.Rev.C	2019	99	054908	https://hal.archives-ouvertes.fr/hal-01861871	B
885	NAPOLETANO D., SOYEZ G.	Computing N-subjettiness for boosted jets	Journal of High Energy Physics	2018	12	031	https://hal.archives-ouvertes.fr/hal-01885877	B
886	NEMKOV N., RIBAULT S.	Analytic conformal bootstrap and Virasoro primary fields in the Ashkin-Teller model	SciPost Physics	2021	11	089	https://hal.archives-ouvertes.fr/hal-03456677	A
887	NIVESVIVAT R.	Global symmetry and conformal bootstrap in the two-dimensional Q-state Potts model	SciPost Physics	2023	14	155	https://hal.archives-ouvertes.fr/hal-03687584	A
888	NIVESVIVAT R., RIBAULT S.	Logarithmic CFT at generic central charge: from Liouville theory to the Q-state Potts model	SciPost Physics	2021	10	021	https://hal.archives-ouvertes.fr/hal-02912000	A
889	NORTIER F.	Exorcizing Ghosts from the Vacuum Spectra in String-Inspired Nonlocal Tachyon Condensation	Acta Phys.Polon.B	2023	54	9-A4	https://hal.archives-ouvertes.fr/hal-04179144	B
890	NORTIER F.	Extra Dimensions and Fuzzy Branes in String-inspired Nonlocal Field Theory	Acta Physica Polonica B	2023	54	6-A2	https://hal.archives-ouvertes.fr/hal-03531063	B
891	NOVICHKOV P.P., PENEDO J.T., PETCOV S.T.	Modular flavour symmetries and modulus stabilisation	Journal of High Energy Physics	2022	03	149	https://hal.archives-ouvertes.fr/hal-03533860	B
892	NUMASAWA T., TSIARES I.	Universal dynamics of heavy operators in boundary CFT_{2}	Journal of High Energy Physics	2022	08	156	https://hal.archives-ouvertes.fr/hal-03578944	A
893	OCHIROV A., PAGE B.	Multi-Quark Colour Decompositions from Unitarity	Journal of High Energy Physics	2019	10	058	https://hal.archives-ouvertes.fr/hal-02290764	B
894	OLLITRAULT J.-Y.	Measures of azimuthal anisotropy in high-energy collisions	Eur.Phys.J.A	2023	59	236	https://hal.archives-ouvertes.fr/hal-04196993	B
895	OSATO K., NISHIMICHI T., BERNARDEAU F., TARUYA A.	Perturbation theory challenge for cosmological parameters estimation: Matter power spectrum in real space	Physical Review D	2019	99	063530	https://hal.archives-ouvertes.fr/hal-01914513	B

896	OSATO K., NISHIMICHI T., TARUYA A., BERNARDEAU F.	Perturbation theory challenge for cosmological parameters estimation II.: Matter power spectrum in redshift space	Physical Review D	2023	108	123541	https://hal.archives-ouvertes.fr/hal-04103924	B
897	OSATO K., NISHIMICHI T., TARUYA A., BERNARDEAU F.	Implementing spectra response function approaches for fast calculation of power spectra and bispectra	Physical Review D	2021	104	103501	https://hal.archives-ouvertes.fr/hal-03312507	B
898	OTTEN D., ROY A., HASSLER F.	Dynamical structure factor in the non-Abelian phase of the Kitaev honeycomb model in the presence of quenched disorder	Physical Review B	2019	99	035137	https://hal.archives-ouvertes.fr/hal-01998919	A
899	OZAWA M., BERTHIER L., BIROLI G., ROSSO A., TARJUS G.	A random critical point separates brittle and ductile yielding transitions in amorphous materials	Proceedings of the National Academy of Sciences of the United States of America	2018		6656	https://hal.archives-ouvertes.fr/hal-01825140	C
900	PABLOS D., SOTO-ONTOSO A.	Pushing forward jet substructure measurements in heavy-ion collisions	Physical Review D	2023	107	094003	https://hal.archives-ouvertes.fr/hal-03836837	B
901	PACE F., BATTYE R., BELLINI E., LOMBRISER L., VERNIZZI F., BOLLIET B.	Comparison of different approaches to the quasi-static approximation in Horndeski models	JCAP	2021	06	017	https://hal.archives-ouvertes.fr/hal-03047623	B
902	PAGE B., PITTAU R.	NNLO final-state quark-pair corrections in four dimensions	European Physical Journal C: Particles and Fields	2019	79	361	https://hal.archives-ouvertes.fr/hal-02123275	B
903	PANGBURN E., BANERJEE A., FREIRE H., PEPIN C.	Incoherent transport in a model for the strange metal phase: Memory-matrix formalism	Phys.Rev.B	2023	107	245109	https://hal.archives-ouvertes.fr/hal-03972547	C
904	PANGBURN E., HAURIE L., CREPIEUX A., AWOGA O., BLACK-SCHAFFER A., PEPIN C., BENA C.	Superconductivity in monolayer and few-layer graphene. I. Review of possible pairing symmetries and basic electronic properties	Physical Review B	2023	108	134514	https://hal.archives-ouvertes.fr/cea-04391551	C
905	PANGBURN E., HAURIE L., CREPIEUX A., AWOGA O., SEDLMAYR N., BLACK-SCHAFFER A., PEPIN C., BENA C.	Superconductivity in monolayer and few-layer graphene. III. Impurity-induced subgap states and quasiparticle interference patterns	Physical Review B	2023	108	134516	https://hal.archives-ouvertes.fr/cea-04391581	C
906	PANO Y., PUHM A., TREVISANI E.	Symmetries in Celestial CFT_d	JHEP	2023	07	076	https://hal.archives-ouvertes.fr/hal-04017321	A
907	PAPPALARDI S., FOINI L., KURCHAN J.	Eigenstate Thermalization Hypothesis and Free Probability	Physical Review Letters	2022	129	170603	https://hal.archives-ouvertes.fr/hal-03662787	C
908	PAPPALARDI S., FOINI L., KURCHAN J.	Quantum bounds and fluctuation-dissipation relations	SciPost Physics	2022	12	130	https://hal.archives-ouvertes.fr/hal-03394432	C
909	PARK C., LEE J., KIM J., JEONG D., PICHON C., GIBSON B. K., SNAITH O. N., SHIN J., KIM Y., DUBOIS Y., FEW C. G.	Formation and Morphology of the First Galaxies in the Cosmic Morning	The Astrophysical Journal	2022	937		https://hal.archives-ouvertes.fr/insu-03839648	B
910	PARRA DE FREITAS H.	New Supersymmetric String Moduli Spaces from Frozen Singularities	Journal of High Energy Physics	2023	01	170	https://hal.archives-ouvertes.fr/hal-03790722	A
911	PASSIAS A., PRINS D.	On AdS_3 solutions of Type IIB	Journal of High Energy Physics	2020	05	048	https://hal.archives-ouvertes.fr/hal-02350170	A
912	PASSIAS A., PRINS D., TOMASIELLO A.	A massive class of $\mathcal{N} = 2$ AdS_4 IIA solutions	Journal of High Energy Physics	2018	10	071	https://hal.archives-ouvertes.fr/hal-01801849	A
913	PAUL H., PERLMUTTER E., RAJ H.	Integrated Correlators in $\mathcal{N}=4$ SYM via SL$(2,\mathbb{Z})$ Spectral Theory	Journal of High Energy Physics	2023	01	149	https://hal.archives-ouvertes.fr/hal-03791499	A
914	PAUL H., PERLMUTTER E., RAJ H.	Exact Large Charge in $\mathcal{N}=4$ SYM and Semiclassical String Theory	Journal of High Energy Physics	2023	08	078	https://hal.archives-ouvertes.fr/hal-04060491	A
915	PAUL H., SANTAGATA M.	Genus-one open string amplitudes on AdS_5$\times$S^3 from CFT	JHEP	2023	12	057	https://hal.archives-ouvertes.fr/hal-04237460	A
916	PEPIN C., CHAKRABORTY D., GRANDADAM M., SARKAR S.	Fluctuations and the Higgs Mechanism in Underdoped Cuprates	Ann.Rev.Condensed Matter Phys.	2020	11	301-323	https://hal.archives-ouvertes.fr/hal-02187680	C
917	PEPIN M., CHRISTIANSEN P., MUNIER S., OLLITRAULT J.-Y.	Multiplicity fluctuations and correlations in 5.02 TeV p+Pb collisions at zero impact parameter	Physical Review C	2023	107	024902	https://hal.archives-ouvertes.fr/hal-03773538	B
918	PERNOT-BORRAS M., BERGE J., BRAX P., UZAN J.-P.	Fifth force induced by a chameleon field on nested cylinders	Physical Review D	2020	101	124056	https://hal.archives-ouvertes.fr/hal-02564612	B
919	PERNOT-BORRAS M., BERGE J., BRAX P., UZAN J.-P.	General study of chameleon fifth force in gravity space experiments	Physical Review D	2019	100	084006	https://hal.archives-ouvertes.fr/hal-02283498	B
920	PERNOT-BORRAS M., BERGE J., BRAX P., UZAN J.-P., METRIS G., RODRIGUES M., TOUBOUL P.	Constraints on chameleon gravity from the measurement of the electrostatic stiffness of the MICROSCOPE mission accelerometers	Physical Review D	2021	103	064070	https://hal.archives-ouvertes.fr/insu-03182938	B
921	PESCHANSKI R., SEKI S.	Evaluation of entanglement entropy in high energy elastic scattering	Physical Review D	2019	100	076012	https://hal.archives-ouvertes.fr/hal-02178549	B
922	PICCO M., RIBAULT S., SANTACHIARA R.	On four-point connectivities in the critical 2d Potts model	SciPost Physics	2019	7	044	https://hal.archives-ouvertes.fr/hal-02166498	A
923	PIGA L., MARINUCCI M., D'AMICO G., PIETRONI M., VERNIZZI F., WRIGHT B. S.	Constraints on modified gravity from the BOSS galaxy survey	JCAP	2023	04	038	https://hal.archives-ouvertes.fr/hal-03892292	B
924	PILCH K., WALKER R., WARNER N. P.	Separability in consistent truncations	JHEP	2021	07	008	https://hal.archives-ouvertes.fr/hal-03171329	A
925	PINON S., KALADZHYAN V., BENA C.	Modeling long imperfect SNS junctions and Andreev bound states using two impurities and the T-matrix formalism	Physical Review B	2020	101	205136	https://hal.archives-ouvertes.fr/cea-03196137	C
926	PINON S., KALADZHYAN V., BENA C.	Surface Green's functions and boundary modes using impurities: Weyl semimetals and topological insulators	Physical Review B	2020	101	115405	https://hal.archives-ouvertes.fr/cea-03196147	C
927	PINON S., KALADZHYAN V., BENA C.	Surface Green's functions and quasiparticle interference in Weyl semimetals	Physical Review B	2020	102	165117	https://hal.archives-ouvertes.fr/cea-03196103	C
928	PRINS D.	Supersymmeric Gauge Theory on Curved 7-Branes	Fortsch.Phys.	2019	67	1900009	https://hal.archives-ouvertes.fr/hal-01974796	A
929	RAINONE C., URBANI P., ZAMPONI F., LERNER E., BOUCHBINDER E.	Mean-field model of interacting quasilocalized excitations in glasses	SciPost Physics Core	2021	4	008	https://hal.archives-ouvertes.fr/hal-03200199	C
930	REGALDO-SAINT BLANCARD B., CODIS S., BOND J. R., STEIN G.	Statistical exploration of halo anisotropic clustering and intrinsic alignments with the mass-Peak Patch algorithm	Monthly Notices of the Royal Astronomical Society	2021	504	1694-1713	https://hal.archives-ouvertes.fr/hal-03122217	B
931	REIA S., RAO P. S., BARTHELEMY M., UKKUSURI S.	Spatial structure of city population growth	Nature Communications	2022	13	5931	https://hal.archives-ouvertes.fr/cea-03772912	C
932	REICHELT D., CALETTI S., FEDKEVYCH O., MARZANI S., SCHUMANN S., SOYEZ G.	Phenomenology of jet angularities at the LHC	Journal of High Energy Physics	2022	03	131	https://hal.archives-ouvertes.fr/hal-03513887	B
933	REIMBERG P., BERNARDEAU F.	Large deviation principle at work: Computation of the statistical properties of the exact one-point aperture mass	Physical Review D	2018	97	023524	https://hal.archives-ouvertes.fr/hal-01703564	B
934	REIMBERG P., BERNARDEAU F., NISHIMICHI T., RIZZATO M.	Failures of Halofit model for computation of Fisher matrices: a response function analysis	Monthly Notices of the Royal Astronomical Society	2020	492	5226-5233	https://hal.archives-ouvertes.fr/hal-03985635	B
935	RETOLAZA A., ROGERS J., TATAR R., TONIONI F.	Branes, fermions, and superspace dualities	Journal of High Energy Physics	2021	10	243	https://hal.archives-ouvertes.fr/hal-03266078	A

936	RHO M.	Anomaly-Induced Quenching of {g_A} in Nuclear Matter	Symmetry	2023	15	1648	https://hal.archives-ouvertes.fr/hal-03991011	B
937	RHO M.	Dense Baryonic Matter Predicted in "Pseudo-Conformal Model	Symmetry	2023	15	1271	https://hal.archives-ouvertes.fr/hal-04103870	B
938	RHO M.	Mapping topology of skyrmions and fractional quantum Hall droplets to nuclear EFT for ultra-dense baryonic matter	Symmetry	2022	14	994	https://hal.archives-ouvertes.fr/hal-03622119	B
939	RHO M.	Pseudo-Conformal Sound Speed in the Core of Compact Stars	Symmetry	2022	14	2154	https://hal.archives-ouvertes.fr/hal-03868926	B
940	RHO M.	Multifarious Roles of Hidden Chiral-Scale Symmetry: "Quenching" gA in Nuclei	Symmetry	2021	13	1388	https://hal.archives-ouvertes.fr/hal-03107986	B
941	RHO M., MA Y.-L.	Manifestation of Hidden Symmetries in Baryonic Matter: From Finite Nuclei to Neutron Stars	Mod.Phys.Lett.A	2021	36	2130012	https://hal.archives-ouvertes.fr/hal-03129442	B
942	RHO M., MA Y.-L.	Going from Asymmetric Nuclei to Neutron Stars to Tidal Polarizability in Gravitational Waves	Int.J.Mod.Phys.E	2018	27	1830006	https://hal.archives-ouvertes.fr/hal-01846611	B
943	RIBAULT S.	The non-rational limit of D-series minimal models	SciPost Physics Core	2020	3	002	https://hal.archives-ouvertes.fr/hal-02339034	A
944	RIBAULT S.	On 2d CFTs that interpolate between minimal models	SciPost Physics	2019	6	075	https://hal.archives-ouvertes.fr/hal-01886246	A
945	RIBAULT S.	Minimal lectures on two-dimensional conformal field theory	SciPost Physics	2018	1		https://hal.archives-ouvertes.fr/cea-01469008	A
946	RICCI-TERSENGHI F., SEMERJIAN G., ZDEBOROVA L.	Typology of phase transitions in Bayesian inference problems	Physical Review E	2019	99	042109	https://hal.archives-ouvertes.fr/cea-01933097	C
947	RIVA M. M., VERNIZZI F.	Radiated momentum in the post-Minkowskian worldline approach via reverse unitarity	Journal of High Energy Physics	2021	11	228	https://hal.archives-ouvertes.fr/hal-03388132	B
948	RIVA M. M., VERNIZZI F., WONG L. K.	Angular momentum balance in gravitational two-body scattering: Flux, memory, and supertranslation invariance	Physical Review D	2023	108	104052	https://hal.archives-ouvertes.fr/hal-04424332	B
949	RIVA M. M., VERNIZZI F., WONG L. K.	Gravitational bremsstrahlung from spinning binaries in the post-Minkowskian expansion	Physical Review D	2022	106	044013	https://hal.archives-ouvertes.fr/hal-03693178	B
950	RIZZATO M., BENABED K., BERNARDEAU F., LACASA F.	Tomographic weak lensing bispectrum: a thorough analysis towards the next generation of galaxy surveys	Monthly Notices of the Royal Astronomical Society	2019	490	4688-4714	https://hal.archives-ouvertes.fr/hal-01975051	B
951	ROBERDEL V., LEIBFRIED D., ULLMO D., LANDA H.	Phase-space study of surface-electrode Paul traps: Integrable, chaotic, and mixed motions	Physical Review A : Atomic, molecular, and optical physics [1990-2015]	2018	97		https://hal.archives-ouvertes.fr/hal-01807855	C
952	ROBERTSON N. F., JACOBSEN J. L., SALEUR H.	Lattice regularisation of a non-compact boundary conformal field theory	Journal of High Energy Physics	2021	2021	180	https://hal.archives-ouvertes.fr/hal-03107910	A
953	ROBERTSON N. F., JACOBSEN J. L., SALEUR H.	Conformally invariant boundary conditions in the antiferromagnetic Potts model and the SL(2,\mathbb{R})/U(1) sigma model	Journal of High Energy Physics	2019	2019	254	https://hal.archives-ouvertes.fr/hal-02178536	A
954	ROBERTSON N. F., PAWELKIEWICZ M., JACOBSEN J. L., SALEUR H.	Integrable boundary conditions in the antiferromagnetic Potts model	Journal of High Energy Physics	2020	05	144	https://hal.archives-ouvertes.fr/hal-02518080	A
955	RODINA L.	UV consistency conditions for Cachazo-He-Yuan integrands	Physical Review D	2020	102	045012	https://hal.archives-ouvertes.fr/hal-02739950	B
956	RODINA L.	Scattering Amplitudes from Soft Theorems and Infrared Behavior	Physical Review Letters	2019	122	071601	https://hal.archives-ouvertes.fr/hal-01861955	B
957	ROGLY R., GIACALONE G., OLLITRAULT J.-Y.	Geometric scaling in symmetric nucleus-nucleus collisions	Nuclear Physics A	2019	982	355-358	https://hal.archives-ouvertes.fr/cea-02006484	B
958	ROGLY R., GIACALONE G., OLLITRAULT J.-Y.	Isolating dynamical net-charge fluctuations	Phys.Rev.C	2019	99	034902	https://hal.archives-ouvertes.fr/hal-01876138	B
959	ROGLY R., GIACALONE G., OLLITRAULT J.-Y.	Reconstructing the impact parameter of proton-nucleus and nucleus-nucleus collisions	Phys.Rev.C	2018	98	024902	https://hal.archives-ouvertes.fr/hal-01774310	B
960	ROS V., BEN AROUS G., BIROLI G., CAMMAROTA C.	Complex Energy Landscapes in Spiked-Tensor and Simple Glassy Models: Ruggedness, Arrangements of Local Minima, and Phase Transitions	Physical Review X	2019	9	011003	https://hal.archives-ouvertes.fr/hal-02557451	C
961	ROS V., BIROLI G., CAMMAROTA C.	Complexity of energy barriers in mean-field glassy systems	EPL - Europhysics Letters	2019	126	20003	https://hal.archives-ouvertes.fr/hal-02319314	C
962	ROY A., SALEUR H.	Quantum electronic circuit simulation of generalized Sine-Gordon models	Physical Review B	2019	100	155425	https://hal.archives-ouvertes.fr/hal-02066928	A
963	ROY A., SCHURICHT D., HAUSCHILD J., POLLMANN F., SALEUR H.	The quantum sine-Gordon model with quantum circuits	Nucl.Phys.B	2021	968	115445	https://hal.archives-ouvertes.fr/hal-02911928	A
964	ROY F., BIROLI G., BUNIN G., CAMMAROTA C.	Numerical implementation of dynamical mean field theory for disordered systems: application to the Lotka–Volterra model of ecosystems	Journal of Physics A: Mathematical and Theoretical	2019	52	484001	https://hal.archives-ouvertes.fr/hal-02557465	C
965	RUGGIERO P., CALABRESE P., FOINI L., GIAMARCHI T.	Quenches in initially coupled Tomonaga-Luttinger Liquids: a conformal field theory approach	SciPost Physics	2021	11	055	https://hal.archives-ouvertes.fr/hal-03186167	C
966	RUGGIERO P., CALABRESE P., GIAMARCHI T., FOINI L.	Electrostatic solution of massless quenches in Luttinger liquids	SciPost Physics	2022	13	111	https://hal.archives-ouvertes.fr/hal-03622509	C
967	RUGGIERO P., FOINI L., GIAMARCHI T.	Large-scale thermalization, prethermalization, and impact of temperature in the quench dynamics of two unequal Luttinger liquids	Phys.Rev.Res.	2021	3	013048	https://hal.archives-ouvertes.fr/hal-02905926	C
968	SAADE A., KRZAKALA F., LELARGE M., ZDEBOROVA L.	Fast Randomized Semi-Supervised Clustering	Journal of Physics: Conference Series	2018	1036	012015	https://hal.archives-ouvertes.fr/cea-04542690	C
969	SACHS I., VANHOVE P.	A Landau Pole in Conformal Field Theory	Journal of High Energy Physics	2023	07	106	https://hal.archives-ouvertes.fr/hal-04039955	A
970	SALAZAR F., SCHENKE B., SOTO-ONTOSO A.	Accessing subnuclear fluctuations and saturation with multiplicity dependent J/ψ production in p+p and p+Pb collisions	Phys.Lett.B	2022	827	136952	https://hal.archives-ouvertes.fr/hal-03500366	B
971	SAMANTA R., PICCHETTI J. P., LUZUM M., OLLITRAULT J.-Y.	Non-Gaussian transverse momentum fluctuations from impact parameter fluctuations	Phys.Rev.C	2023	108	024908	https://hal.archives-ouvertes.fr/hal-04147483	B
972	SARAO MANNELLI S., ZDEBOROVA L.	Thresholds of descending algorithms in inference problems	Journal of Statistical Mechanics: Theory and Experiment	2020	2020	034004	https://hal.archives-ouvertes.fr/cea-04539111	C
973	SARKAR S., CHAKRABORTY D., PEPIN C.	Incipient loop current order in the under-doped cuprate superconductors	Physical Review B	2019	100	214519	https://hal.archives-ouvertes.fr/cea-04215597	C
974	SARKAR S., GRANDADAM M., PEPIN C.	Anomalous softening of phonon dispersion in cuprate superconductors	Physical Review Research	2021	3	013162	https://hal.archives-ouvertes.fr/cea-04212359	C
975	SCARLATELLA O., CLERK A., SCHIRO M.	Spectral functions and negative density of states of a driven-dissipative nonlinear quantum resonator	New Journal of Physics	2019	21	043040	https://hal.archives-ouvertes.fr/hal-02415374	C

976	SCARLATELLA O., FAZIO R., SCHIRO M.	Emergent finite frequency criticality of driven-dissipative correlated lattice bosons	Physical Review B	2019	99	064511	https://hal.archives-ouvertes.fr/cea-04542791	C
977	SCHMIDT C., PFISTER H., ZDEBOROVA L.	Minimal sets to destroy the k-core in random networks	Physical Review E	2019	99	022310	https://hal.archives-ouvertes.fr/cea-04542622	C
978	SCLOCCHI A., URBANI P.	High-dimensional optimization under nonconvex excluded volume constraints	Physical Review E	2022	105	024134	https://hal.archives-ouvertes.fr/hal-03738525	C
979	SCLOCCHI A., URBANI P.	Proliferation of non-linear excitations in the piecewise-linear perceptron	SciPost Physics	2021	10	013	https://hal.archives-ouvertes.fr/hal-03223926	C
980	SEDLMAYR N., BENA C.	Instability of Majorana states in Shiba chains due to leakage into a topological substrate	J.Phys.Condens.Matter	2022	34	104004	https://hal.archives-ouvertes.fr/hal-03434377	C
981	SEDLMAYR N., KALADZHYAN V., BENA C.	Analytical and semianalytical tools to determine the topological character of Shiba chains	Physical Review B	2021	104	024508	https://hal.archives-ouvertes.fr/cea-04391537	C
982	SEKATSKI P., BANCAL J.-D., IOANNOU M., AFZELIUS M., BRUNNER N.	Towards the device-independent certification of a quantum memory	Physical Review Letters	2023	131	170802	https://hal.archives-ouvertes.fr/hal-04092914	C
983	SEKATSKI P., BANCAL J.-D., VALCARCE X., TAN Y.-Z., RENNER R., SANGOUARD N.	Device-independent quantum key distribution from generalized CHSH inequalities	Quantum	2021	5	444	https://hal.archives-ouvertes.fr/cea-02955219	C
984	SEKATSKI P., OUDOT E., CASPAR P., THEW R., SANGOUARD N.	Benchmarking single-photon sources from an auto-correlation measurement	Quantum	2022	6	875	https://hal.archives-ouvertes.fr/hal-03518853	C
985	SEMERJIAN G., SICURO G., ZDEBOROVA L.	Recovery thresholds in the sparse planted matching problem	Physical Review E	2020	102	022304	https://hal.archives-ouvertes.fr/cea-04538800	C
986	SERENO M., ETTORI S., ECKERT D., GILES P., MAUGHAN B. J., PACAUD F., PIERRE M., VALAGEAS P.	The XXL Survey	Astronomy and Astrophysics - A&A	2019	632	A54	https://hal.archives-ouvertes.fr/cea-02383657	B
987	SIMONOVIĆ M., BALDAUF T., ZALDARRIAGA M., CARRASCO J. J., KOLLMEIER J. A.	Cosmological perturbation theory using the FFTLog: formalism and connection to QFT loop integrals	JCAP	2018	04	030	https://hal.archives-ouvertes.fr/cea-01690039	A
988	SOYEZ G.	Pileup mitigation at the LHC: A theorist's view	Physics Reports	2019	803	1 - 158	https://hal.archives-ouvertes.fr/hal-03484419	B
989	SPURIO MANCINI A., REISCHKE R., PETTORINO V., SCHAFER B.M., ZUMALACARREGUI M.	Testing (modified) gravity with 3D and tomographic cosmic shear	Monthly Notices of the Royal Astronomical Society	2018	480	3725-3738	https://hal.archives-ouvertes.fr/hal-01703603	B
990	STORZ S., SCHAR J., KULIKOV A., MAGNARD P., KURPIERS P., LUTOLF J., WALTER T., COPETUDO A., REUER K., AKIN A., BESSE J.-C., GABUREAC M., NORRIS G., ROSARIO A., MARTIN F., MARTINEZ J., AMAYA W., MITCHELL M., ABELLAN C., BANCAL J.-D., SANGOUARD N., ROYER B., BLAIS A., WALLRAFF A.	Loophole-free Bell inequality violation with superconducting circuits	Nature	2023	617	265-270	https://hal.archives-ouvertes.fr/hal-04208554	C
991	STRAND H., ZINGL M., WENTZELL N., PARCOLLET O., GEORGES A.	Magnetic response of Sr_2RuO_4 : quasi-local spin fluctuations due to Hund's coupling	Physical Review B	2019	100	125120	https://hal.archives-ouvertes.fr/cea-04541097	C
992	TAILLANTER E., BARTHELEMY M.	Evolution of road infrastructure in large urban areas	Physical Review E	2023	107	034304	https://hal.archives-ouvertes.fr/cea-04372518	C
993	TAILLANTER E., BARTHELEMY M.	Empirical evidence for a jamming transition in urban traffic	Journal of the Royal Society Interface	2021	18	20210391	https://hal.archives-ouvertes.fr/cea-04360378	C
994	TAN E.-Z., SEKATSKI P., BANCAL J.-D., SCHWONNEK R., RENNER R., SANGOUARD N., LIM C.-W.	Improved DIQKD protocols with finite-size analysis	Quantum	2022	6	880	https://hal.archives-ouvertes.fr/hal-03919914	C
995	TAN X., COUVREUR R., DENG Y., JACOBSEN J. L.	Observation of nonscalar and logarithmic correlations in two- and three-dimensional percolation	Physical Review E	2019	99	050103	https://hal.archives-ouvertes.fr/hal-01891466	A
996	TAN X., DENG Y., JACOBSEN J. L.	N-cluster correlations in four- and five-dimensional percolation	Frontiers of Physics	2020	15	41501	https://hal.archives-ouvertes.fr/hal-02892952	A
997	TAULE P., GARNY M.	The two-loop power spectrum in redshift space	JCAP	2023	11	078	https://hal.archives-ouvertes.fr/hal-04190052	B
998	TAULE P., GARNY M.	The two-loop power spectrum in redshift space	Journal of Cosmology and Astroparticle Physics	2023	2023	078	https://hal.archives-ouvertes.fr/hal-04326064	B
999	TAYLOR P. L., BERNARDEAU F., HUFF E.	x-cut Cosmic Shear: Optimally Removing Sensitivity to Baryonic and Nonlinear Physics with an Application to the Dark Energy Survey Year 1 Shear Data	Physical Review D	2021	103	043531	https://hal.archives-ouvertes.fr/hal-02905939	B
1000	TAYLOR P. L., BERNARDEAU F., KITCHING T. D.	k-cut Cosmic Shear: Tunable Power Spectrum Sensitivity to Test Gravity	Physical Review D	2018	98	083514	https://hal.archives-ouvertes.fr/hal-01880905	B
1001	TAYLOR P.L., KITCHING T., CARDONE V.F., FERTE A., HUFF E.M., BERNARDEAU F., RHODES J., DESHPANDE A.C., TUTUSAUS I., POURTSIDOU A., CAMERA S. et al.	Euclid: Forecasts for k-cut 3 \times 2 Point Statistics	Open J.Astrophys.	2021	4	6	https://hal.archives-ouvertes.fr/hal-03129526	B
1002	TEIXEIRA R. M., PEPIN C., FREIRE H.	Strange metallicity in an antiferromagnetic quantum critical model: A sign-problem-free quantum Monte-Carlo study	Physical Review B	2023	108	085131	https://hal.archives-ouvertes.fr/hal-04106752	C
1003	TEP K., FOUVRY J.-B., PICHON C.	Non-resonant relaxation of anisotropic globular clusters	Monthly Notices of the Royal Astronomical Society	2022	514	875-892	https://hal.archives-ouvertes.fr/hal-03543823	B
1004	THOMINE O., ALIZON S., BOENNEC C., BARTHELEMY M., SOFONEA M.	Emerging dynamics from high-resolution spatial numerical epidemics	eLife	2021	10		https://hal.archives-ouvertes.fr/hal-03415297	C
1005	THOMSON S. J., SCHIRO M.	Dynamics of disordered quantum systems using flow equations	Eur.Phys.J.B	2020	93	22	https://hal.archives-ouvertes.fr/hal-02483915	C
1006	THOMSON S., MAGANO D., SCHIRO' M.	Flow equations for disordered Floquet systems	SciPost Physics	2021	11	028	https://hal.archives-ouvertes.fr/hal-02946128	C
1007	THOMSON S., SCHIRO M.	Time Evolution of Many-Body Localized Systems with the Flow Equation Approach	Physical Review B: Condensed Matter and Materials Physics (1998-2015)	2018	97	060201	https://hal.archives-ouvertes.fr/cea-01729268	C
1008	THOMSON S., URBANI P., SCHIRO M.	Quantum quenches in isolated quantum glasses out of equilibrium	Physical Review Letters	2020	125	120602	https://hal.archives-ouvertes.fr/cea-02395083	C
1009	TITO D'AGNOLO R., TERESI D.	Sliding naturalness: cosmological selection of the weak scale	Journal of High Energy Physics	2022	02	023	https://hal.archives-ouvertes.fr/hal-03377175	B
1010	TRAINI M. C., BLAIZOT J.-P.	Diffractive incoherent vector meson production off protons: a quark model approach to gluon fluctuation effects	European Physical Journal C: Particles and Fields	2019	79	327	https://hal.archives-ouvertes.fr/hal-01781933	B
1011	TRAVAGLINI G., BRANDHUBER A., DOREY P., MCLOUGHLIN T., ABREU S., BERN Z., BJERRUM-BOHR N. E. J., BLUMLEIN J., BRITTO R., CARRASCO J. J. M. et al.	The SAGEX Review on Scattering Amplitudes	J.Phys.A	2022	55	443001	https://hal.archives-ouvertes.fr/hal-03644368	B : A
1012	TRESTINI D., LARROUTUROU F., BLANCHET L.	The quadrupole moment of compact binaries to the fourth post-Newtonian order: relating the harmonic and radiative metrics	Class.Quant.Grav.	2023	40	055006	https://hal.archives-ouvertes.fr/hal-03790348	B
1013	TROJANOWSKI S., BRAX P., VAN DE BRUCK C.	Dark matter relic density from conformally or disformally coupled light scalars	Physical Review D	2020	102	023035	https://hal.archives-ouvertes.fr/hal-02870848	B

#	Authors	Title	Journal	Year	Vol	Pages	URL	Cat
1014	UHLEMANN C., FEIX M., CODIS S., PICHON C., BERNARDEAU F., L'HUILLIER B., KIM J., HONG S. E., PARK C., SHIN J., POGOSYAN D.	A question of separation: disentangling tracer bias and gravitational nonlinearity with counts-in-cells statistics	Monthly Notices of the Royal Astronomical Society	2018	473	5098-5112	https://hal.archives-ouvertes.fr/cea-01548491	B
1015	UHLEMANN C., FRIEDRICH O., BOYLE A., GOUGH A., BARTHELEMY A., BERNARDEAU F., CODIS S.	It takes two to know one: computing accurate one-point PDF covariances from effective two-point PDF models	Open Journal of Astrophysics	2023	6		https://hal.archives-ouvertes.fr/cea-04240674	B
1016	UHLEMANN C., PAJER E., PICHON C., NISHIMICHI T., CODIS S., BERNARDEAU F.	Hunting high and low: disentangling primordial and late-time non-Gaussianity with cosmic densities in spheres	Monthly Notices of the Royal Astronomical Society	2018	474	2853 - 2870	https://hal.archives-ouvertes.fr/cea-01677174	B
1017	UPIć I., BANCAL J.-D., BRUNNER N.	Quantum nonlocality in presence of strong measurement dependence	Physical Review A	2023	108	042207	https://hal.archives-ouvertes.fr/hal-03783004	C
1018	UPIć I., BANCAL J.-D., CAI Y., BRUNNER N.	Genuine network quantum nonlocality and self-testing	Physical Review A	2022	105	022206	https://hal.archives-ouvertes.fr/hal-03591199	C
1019	URBANI P.	A continuous constraint satisfaction problem for the rigidity transition in confluent tissues	Journal of Physics A: Mathematical and Theoretical	2023	56	115003	https://hal.archives-ouvertes.fr/hal-03855467	C
1020	URBANI P.	Field theory for zero temperature soft anharmonic spin glasses in a field	Journal of Physics A: Mathematical and Theoretical	2022	55	335002	https://hal.archives-ouvertes.fr/hal-03855451	C
1021	URBANI P.	Disordered high-dimensional optimal control	Journal of Physics A: Mathematical and Theoretical	2021	54	324001	https://hal.archives-ouvertes.fr/hal-03431743	C
1022	VAGNOZZI S., VISINELLI L., BRAX P., DAVIS A.-C., SAKSTEIN J.	Direct detection of dark energy: The XENON1T excess and future prospects	Physical Review D	2021	104	063023	https://hal.archives-ouvertes.fr/hal-03197497	B
1023	VALAGEAS P.	Projection of the gravitational dynamics on a subspace of probability distributions: curl-free Gaussian ansatz	Physical Review D	2020	101	123524	https://hal.archives-ouvertes.fr/hal-02564601	B
1024	VALAGEAS P., NISHIMICHI T.	Lagrangian-space Gaussian ansatz for the matter redshift-space power spectrum and correlation function	Physical Review D	2020	102	043530	https://hal.archives-ouvertes.fr/hal-02614354	B
1025	VALCARCE X., SEKATSKI P., GOUZIEN E., MELNIKOV A., SANGOUARD N.	Automated design of quantum optical experiments for device-independent quantum key distribution	Phys.Rev.A	2023	107	062607	https://hal.archives-ouvertes.fr/hal-03791525	C
1026	VALCARCE X., ZIVY J., SANGOUARD N., SEKATSKI P.	Self-testing two-qubit maximally entangled states from generalized CHSH tests	Phys.Rev.Res.	2022	4	013049	https://hal.archives-ouvertes.fr/hal-03625886	C
1027	VAN BEEKVELD M., FERRARIO RAVASIO S., HAMILTON K., SALAM G. P., SOTO-ONTOSO A., SOYEZ G., VERHEYEN R.	PanScales showers for hadron collisions: all-order validation	Journal of High Energy Physics	2022	11	020	https://hal.archives-ouvertes.fr/hal-03758806	B
1028	VAN BEEKVELD M., FERRARIO RAVASIO S., SALAM G. P., SOTO-ONTOSO A., SOYEZ G., VERHEYEN R.	PanScales parton showers for hadron collisions: formulation and fixed-order studies	Journal of High Energy Physics	2022	11	019	https://hal.archives-ouvertes.fr/hal-03672824	B
1029	VAN BEEST M., BOURGET A., ECKHARD J., SCHAFER-NAMEKI S.	(5d RG-flow) trees in the tropical rain forest	Journal of High Energy Physics	2021	2021	241	https://hal.archives-ouvertes.fr/hal-04239094	A
1030	VAN BEEST M., BOURGET A., ECKHARD J., SCHAFER-NAMEKI S.	(Symplectic) leaves and (5d Higgs) branches in the Poly(go)nesian Tropical Rain Forest	Journal of High Energy Physics	2020	2020	124	https://hal.archives-ouvertes.fr/hal-04239105	A
1031	VANHOVE P.	An S-matrix approach to gravitational-wave physics	Phil.Trans.Roy.Soc.Lond.A	2022	380	20210181	https://hal.archives-ouvertes.fr/hal-03716149	A
1032	VANHOVE P., ZERBINI F.	Closed string amplitudes from single-valued correlation functions	Advances in Theoretical and Mathematical Physics	2022	26	455-530	https://hal.archives-ouvertes.fr/hal-01956505	A
1033	VERBAVATZ V., BARTHELEMY M.	Modeling the spatial dynamics of income in cities	Environment and Planning B: Urban Analytics and City Science	2023		2,39981E+14	https://hal.archives-ouvertes.fr/cea-04313429	C
1034	VERBAVATZ V., BARTHELEMY M.	Betweenness centrality in dense spatial networks	Physical Review E	2022	105	054303	https://hal.archives-ouvertes.fr/cea-04371326	C
1035	VERBAVATZ V., BARTHELEMY M.	From one-way streets to percolation on random mixed graphs	Physical Review E	2021			https://hal.archives-ouvertes.fr/cea-03188105	C
1036	VERBAVATZ V., BARTHELEMY M.	The growth equation of cities	Nature	2020	587	397-401	https://hal.archives-ouvertes.fr/cea-03076686	C
1037	VERBAVATZ V., BARTHELEMY M.	Access to mass rapid transit in OECD urban areas	Scientific Data	2020			https://hal.archives-ouvertes.fr/cea-02942218	C
1038	VERNIZZI G., NGUYEN T. D., ORLAND H., DE LA CRUZ M. O.	Multicanonical Monte Carlo ensemble growth algorithm	Physical Review E	2020	101		https://hal.archives-ouvertes.fr/cea-02924046	C
1039	VOLPATI V., BARTHELEMY M.	Revisiting the coupling between accessibility and population growth	Journal of Physics: Complexity	2020	2020	025002	https://hal.archives-ouvertes.fr/cea-02564095	C
1040	VOROS A.	Exact sum rules for spectral zeta functions of homogeneous 1D quantum oscillators, revisited	J.Phys.A	2023	56	064001	https://hal.archives-ouvertes.fr/hal-03720852	A
1041	VOROS A.	Discretized Keiper/Li approach to the Riemann Hypothesis	Experimental Mathematics	2018			https://hal.archives-ouvertes.fr/cea-01696126	A
1042	VU D.-L.	Cumulants of conserved charges in GGE and cumulants of total transport in GHD: exact summation of matrix elements?	Journal of Statistical Mechanics: Theory and Experiment	2020	2002	023103	https://hal.archives-ouvertes.fr/hal-02339036	A
1043	VU D.-L., KOSTOV I., SERBAN D.	Boundary entropy of integrable perturbed SU (2)_{k} WZNW	Journal of High Energy Physics	2019	08	154	https://hal.archives-ouvertes.fr/hal-02166567	A
1044	VU D.-L., YOSHIMURA T.	Equations of state in generalized hydrodynamics	SciPost Phys.	2019	6	023	https://hal.archives-ouvertes.fr/hal-01880828	A
1045	WAGNER D., WEICKGENANNT N., SPERANZA E.	Quantum kinetic theory with interactions for massive vector bosons	Physical Review D	2023	108	116017	https://hal.archives-ouvertes.fr/hal-04137394	B
1046	WEICKGENANNT N.	Linearly stable and causal relativistic first-order spin hydrodynamics	Physical Review D	2023	108	076011	https://hal.archives-ouvertes.fr/hal-04179226	B
1047	WILLIAMS I., TURCI F., HALLETT J., CROWTHER P., CAMMAROTA C., BIROLI G., ROYALL C. P.	Experimental determination of configurational entropy in a two-dimensional liquid under random pinning	Journal of Physics: Condensed Matter	2018	30	094003	https://hal.archives-ouvertes.fr/cea-04373059	C
1048	WILLIS J.P., OGURI M., RAMOS-CEJA M.E., GASTALDELLO F., SERENO M., ADAMI C., ALIS S., ALTIERI B., CHIAPPETTI L., CORASANITI P.S., ECKERT D., ETTORI S. *et al.*	Understanding X-ray and optical selection of galaxy clusters: A comparison of the XXL and CAMIRA cluster catalogues obtained in the common XXL-HSC SSP area	Monthly Notices of the Royal Astronomical Society	2021	503	5624-5637	https://hal.archives-ouvertes.fr/hal-03191172	B
1049	WONG L. K., HERDEIRO C. A., RADU E.	Constraining spontaneous black hole scalarization in scalar-tensor-Gauss-Bonnet theories with current gravitational-wave data	Physical Review D	2022	106	024008	https://hal.archives-ouvertes.fr/hal-03661333	B
1050	YOSHIMURA T.	Full counting statistics in the free Dirac theory	J.Phys.A	2018	51	475002	https://hal.archives-ouvertes.fr/hal-01714118	A
1051	YOSHIMURA T., BIDZHIEV K., SALEUR H.	Non-Hermitian quantum impurity systems in and out of equilibrium: Noninteracting case	Physical Review B	2020	102	125124	https://hal.archives-ouvertes.fr/hal-03017010	A ; C
1052	YOUSEFNIA K. V., KOTIBHASKAR A., BHALERAO R., OLLITRAULT J.-Y.	Bayesian approach to long-range correlations and multiplicity fluctuations in nucleus-nucleus collisions	Phys.Rev.C	2022	105	014907	https://hal.archives-ouvertes.fr/hal-03323989	B

1053	ZAAROUR A., MALESYS V., TEYSSANDIER J., CRANNEY M., DENYS E., BUBENDORFF J.-L., FLORENTIN A., JOSIEN L., VONAU F., AUBEL D., OUERGHI A., BENA C., SIMON L.	Flat band and Lifshitz transition in long-range-ordered supergraphene obtained by Erbium intercalation	Physical Review Research	2023	5	013099	https://hal.archives-ouvertes.fr/hal-04024130	C
1054	ZAGIER D., ZERBINI F.	Genus-zero and genus-one string amplitudes and special multiple zeta values	Commun.Num.Theor.Phys.	2020	14	413-452	https://hal.archives-ouvertes.fr/hal-02189045	A
1055	ZDEBOROVA L.	Understanding deep learning is also a job for physicists	Nature Physics	2020	16	602-604	https://hal.archives-ouvertes.fr/cea-04538853	C
1056	ZHANG C., ZHANG W.-H., SEKATSKI P., BANCAL J.-D., ZWERGER M., YIN P., LI G.-C., PENG X.-X., CHEN L., HAN Y.-J., XU J.-S., HUANG Y.-F., CHEN G., LI C.-F., GUO G.-C.	Certification of Genuine Multipartite Entanglement with General and Robust Device-Independent Witnesses	Physical Review Letters	2022	129	190503	https://hal.archives-ouvertes.fr/hal-03838599	C ; A
1057	ZHANG M., CHOUCHANE M., SHOJAEE S. A., WINIARSKI B., LIU Z., LI L., PELAPUR R., SHODIEV A., YAO W., DOUX J.-M., WANG S., LI Y., LIU C., LEMMENS H., FRANCO A., MENG Y. S.	Coupling of multiscale imaging analysis and computational modeling for understanding thick cathode degradation mechanisms	Joule	2023	7	201-220	https://hal.archives-ouvertes.fr/hal-04010933	A
1058	ZINGL M., MRAVLJE J., AICHHORN M., PARCOLLET O., GEORGES A.	Hall coefficient signals orbital differentiation in the Hund's metal Sr_2RuO_4	Npj Quantum Materials	2019	4	35	https://hal.archives-ouvertes.fr/cea-04541157	C
1059	ZUMALACARREGUI M.	Gravity in the Era of Equality: Towards solutions to the Hubble problem without fine-tuned initial conditions	Physical Review D	2020	102	023523	https://hal.archives-ouvertes.fr/hal-02536127	B
1060	ZUMALACARREGUI M., SELJAK U.	Limits on stellar-mass compact objects as dark matter from gravitational lensing of type Ia supernovae	Physical Review Letters	2018	121	141101	https://hal.archives-ouvertes.fr/hal-01903460	B
1061	ZUO Z.-W., BALRAM A. C., PU S., ZHAO J., JOLICOEUR T., WOJS A., JAIN J. K.	Interplay between fractional quantum Hall liquid and crystal phases at low filling	Physical Review B	2020	102	075307	https://hal.archives-ouvertes.fr/hal-02918913	C

Books

Author(s)	Title	Publisher	Year	HAL link
BARTHELEMY M.	Le monde des réseaux	Odile Jacob	2023	https://hal.archives-ouvertes.fr/cea-04546085
BARTHELEMY M., VERBAVATZ V.	Statistics and dynamics of urban populations	Oxford University Press	2023	https://hal.archives-ouvertes.fr/cea-04446124
DAVID F.	Théorie Statistique des Champs Tome 2	EDP Sciences / CNRS Editions	2022	https://hal.archives-ouvertes.fr/hal-04438977
BARTHELEMY M.	Spatial Networks: A Complete Introduction: From Graph Theory and Statistical Physics to Real-World Applications.	Springer International Publishing	2022	https://hal.archives-ouvertes.fr/cea-04446077
DUPLANTIER B., RIVASSEAU V.	The Universe	Springer International Publishing	2021	https://hal.archives-ouvertes.fr/cea-04469199
DUPLANTIER B., RIVASSEAU V.	Information Theory	Springer International Publishing	2021	https://hal.archives-ouvertes.fr/cea-04469227
GELIS F.	Problems in Quantum Field Theory	Cambridge University Press	2021	https://hal.archives-ouvertes.fr/cea-04440663
R. E., MAKAROV D. E., ORLAND H.	Molecular kinetics in condensed phases: : Theory, simulation, and analysis	John Wiley and Sons Ltd	2020	https://hal.archives-ouvertes.fr/cea-02537155
GELIS F.	Quantum Field Theory	Cambridge University Press	2019	https://hal.archives-ouvertes.fr/cea-04440650
PARISI G., URBANI P., ZAMPONI F.	Theory of Simple Glasses	Cambridge University Press	2019	https://hal.archives-ouvertes.fr/hal-04443267
DAVID F.	Théorie Statistique des Champs Tome 1	EDP Sciences / CNRS Editions	2019	https://hal.archives-ouvertes.fr/hal-04438965
KOUCHNER A., LAVIGNAC, S.	À la recherche des neutrinos	Dunod	2018	https://hal.archives-ouvertes.fr/cea-04572663

Vague E : campagne d'évaluation 2024 - 2025

Dossier d'autoévaluation des unités de recherche

Données de caractérisation et de production

1 - Informations administratives sur l'unité au 31/12/2023

Tutelles de l'unité - Établissements d'enseignement supérieur et de recherche	CEA
Tutelles de l'unité - Organismes de recherche	CNRS

Organisme responsable du dépôt du dossier	CEA
Intitulé complet de l'unité de recherche	Institut de Physique Théorique
Acronyme de l'unité	IPhT
Label(s) et n°	UMR 3681
RNSR	201522372G
Nom directeur(trice)	PEPIN
Prénom directeur(trice)	Catherine
Nombre d'équipes	4

Nom des équipes	A	B	C	D
	A:Physique mathématique, Théorie des cordes, gravitation	B : Cosmologie et astrophysique, Physique des hautes énergies, matière hadronique	C : Physique Statistique et applications, matière condensée, information quantique	D : Soutien à la recherche
Périmètre scientifique de l'unité Domaine(s) scientifique(s) : SHS, ST, SVE	Sciences et technologies	Sciences et technologies	Sciences et technologies	
Mots clés	physique mathématique	cosmologie	physique statistique	
	théorie des cordes	astrophysique	matière condensée	
	gravitation	physique des hautes énergies	information quantique	
		matière hadronique		

2.1 - Liste nominative des personnels de l'unité du 01/01/2018 au 31/12/2023

Nom	Prénom	H/F	Nom de l'équipe interne n°1	Établissement	Corps	Sections disciplinaires CoNRS 02 vaut pour "Théories physiques : méthodes, modèles et applications"	HDR	Date d'entrée	Date de sortie
ANGLES	ANNE	F	D	CEA	IE	J		01/2014	08/2019
ANSON	TIM	H	B	CEA	post-doc			06/2022	11/2022
BAKER	ANTOINE	H	C	CNRS	post-doc			05/2018	10/2018
BANCAL	JEAN-DANIEL	H	C	CEA	chercheur perm.		Oui	11/2020	
BANERJEE	ANURAG	H	C	CEA	post-doc			09/2019	09/2021
BANERJEE	ANURAG	H	C	CEA	post-doc			09/2023	
BARTHELEMY	MARC	H	C	CEA	chercheur perm.		Oui	03/1992	
BAUER	MICHEL	H	A	CEA	chercheur perm.		Oui	01/2022	
BAUTISTA CHIVATA	YILBER-FABIAN	H	B	CEA	post-doc			10/2022	
BELLAZZINI	BRANDO	H	B	CEA	chercheur perm.		Oui	10/2013	
BELLETETE	JONATHAN	H	A	CEA	post-doc			09/2019	08/2020
BENA	CRISTINA-VIORICA	F	C	CEA	chercheur perm.		Oui	12/2012	
BENA	IOSIF	H	A	CEA	chercheur perm.		Oui	10/2006	
BERNARDEAU	FRANCIS	H	B	CEA	chercheur perm.		Oui	09/1992	
BERTHELOT	PATRICK	H	D	CEA	IE	E		07/2002	05/2020
BERVAS	LOIC	H	D	CEA	TECH	J		09/2002	02/2021
BILHERE	MARGAUX	F	D	CNRS	AI	J		01/2021	03/2022
BIROLI	GIULIO	H	C	CEA	chercheur perm.		Oui	06/2002	09/2018
BLAIZOT	JEAN-PAUL	H	B	CNRS	DREM		Oui	03/2014	
BLANCHET	LUC	H	B	CNRS	chercheur perm.		Oui	03/2022	09/2022
BOMBINI	ALESSANDRO	H	A	Autre Ét. étranger	post-doc			01/2019	04/2020
BOUHAJJA	MARIEM	F	D	CEA	Stag	E		12/2022	
BOURGET	ANTOINE	H	A	CEA	chercheur perm.			09/2023	

BOURGET	ANTOINE	H	A	CEA	post-doc			10/2021	04/2023
BOUTTIER	JÉRÉMIE	H	A	CEA	chercheur perm.		Oui	10/2006	09/2023
BRAX	PHILIPPE	H	B	CEA	chercheur perm.		Oui	10/1993	
BRODIE	CALLUM	H	A	CEA	post-doc			10/2020	08/2021
BZOWSKI	ADAM	H	A	CEA	post-doc			10/2017	09/2018
CAPDEPON	ANNE	F	D	CEA	IR	J		11/2023	
CARRASCO	JOHN-JOSEPH	H	A	CEA	chercheur perm.			06/2015	06/2022
CEPLAK	NEJC	H	A	CEA	post-doc			10/2020	09/2023
CHAKRABORTY	SOUMANGSU-BHUSAN	H	A	CEA	post-doc			09/2022	
CHATTERJEE	SABYA-SACHI	H	B	CEA	post-doc			10/2021	09/2023
CODIS	SANDRINE	F	B	CNRS	chercheur perm.			02/2019	02/2021
CRISOSTOMI	MARCO	H	B	CEA	post-doc			10/2017	12/2019
D'AGNOLO	RAFFAELE-TITO	H	B	CEA	chercheur perm.		Oui	11/2019	
DANDEKAR	RAHUL	H	C	CEA	post-doc			09/2021	08/2023
DAVID	FRANCOIS	H	A	CNRS	chercheur perm.	CoNRS 02	Oui	01/2007	02/2022
DAVID	FRANCOIS	H	A	CNRS	DREM	CoNRS 02	Oui	03/2022	
DE ANGELIS	STEFANO	H	B	CEA	post-doc			10/2022	
DE LA CRUZ TRUJI	LEONARDO-RENE	H	B	CEA	post-doc			10/2022	
DE LABORDERIE	EMMANUELLE	F	D	CEA	IE	E		06/2012	
DI FRANCESCO	PHILIPPE	H	A	CEA	chercheur perm.		Oui	06/2012	
DIONISI	JUSTINE	F	D	CNRS	AI	J		06/2022	
DUCLOUE	BERTRAND	H	B	CEA	post-doc			09/2017	03/2019
DUPLANTIER	BERTRAND-H M	H	C	CEA	chercheur perm.		Oui	03/1995	
ELLIS	SEBASTIAN	H	B	CEA	post-doc			10/2020	07/2021
EPERON	FELICITY	F	A	CEA	post-doc			10/2019	01/2020
ESER	JÜRGEN	H	B	CEA	post-doc			11/2021	02/2022
EYNARD	BERTRAND	H	A	CEA	chercheur perm.		Oui	04/1995	
FELD	YANNICK	H	C	CEA	post-doc			10/2023	
FLEURY	PIERRE	H	B	CNRS	chercheur perm.	CoNRS 02		02/2022	
FLOURET	CAMILLE	F	D	CEA	AI	J		12/2019	
FOINI	LAURA	F	C	CNRS	chercheur perm.	CoNRS 02		10/2018	

Vague E campagne d'évaluation 2024-2025 -
Page 3/26
2.1 - Liste nominative des personnels de l'unité du 01/01/2018 au 31/12/2023
2.1 RH-personnels

GALLIANI	ANDREA	H	A	CEA	post-doc			01/2019	12/2020
GANCHEV	BOGDAN	H	A	CEA	post-doc			09/2020	12/2023
GARCIA FAILDE	ELBA	F	A	CEA	post-doc			11/2018	11/2020
GELIS	FRANÇOIS	H	B	CEA	chercheur perm.		Oui	11/2002	
GEORGOUDIS	ALESSANDRO	H	B	CEA	post-doc			10/2019	12/2019
GERACE	FEDERICA	F	C	CNRS	post-doc			04/2019	10/2020
GERBER	ELI	H	C	CEA	post-doc			10/2023	
GIACCHETTO	ALESSANDRO	H	A	CEA	post-doc			10/2021	10/2023
GIRAULT	PHILIPPE	H	D	CEA	IE	E		05/2020	
GLIOTI	ALFREDO	H	B	CEA	post-doc			10/2022	
GODRECHE	CLAUDE	H	C	CEA	chercheur perm.		Oui	07/1979	
GOLDT	SEBASTIAN	H	C	CNRS	post-doc			03/2018	10/2019
GOLINELLI	OLIVIER	H	C	CEA	chercheur perm.			01/2022	
GONZÀLEZ RUIZ	EVA	F	C	CEA	post-doc			12/2023	
GOUZIEN	ELIE	H	C	CEA	post-doc			04/2020	04/2023
GRANA	MARIANA	F	A	CEA	chercheur perm.		Oui	10/2005	
GRASSELLI	FEDERICO	H	C	CEA	post-doc			10/2023	
GREGORI	PAOLO	H	A	CEA	post-doc			10/2022	
GRENET	SYLVIE	F	D	CEA	AI			05/1981	10/2019
GROSSI	EDUARDO	H	B	CEA	post-doc			10/2021	09/2022
GUICA	MONICA	F	A	CEA	chercheur perm.			09/2016	
GUIDA	RICCARDO	H	A	CEA	chercheur perm.			05/1998	
GUITTER	EMMANUEL	H	C	CEA	chercheur perm.		Oui	07/1989	
GUO	BIN	H	A	CEA	post-doc			10/2021	12/2023
HAMPTON	SHAUN	H	A	CEA	post-doc			10/2020	09/2023
HAUKSSON	SIGTRYGGUR	H	B	CEA	post-doc			11/2023	
HE	YIFEI	F	A	CEA	post-doc			11/2018	12/2020
HENRIKSSON	JOHAN	H	A	CEA	post-doc			10/2023	
HERRAEZ ESCUDERO	ALVARO	H	A	CEA	post-doc			09/2020	09/2023
HOGG	NATALIE	F	B	CEA	post-doc			02/2022	09/2023
HOLGUIN	JACK	H	B	CEA	post-doc			09/2022	09/2023

Vague E campagne d'évaluation 2024-2025 -
Page 4/26
2.1 - Liste nominative des personnels de l'unité du 01/01/2018 au 31/12/2023
2.1 RH-personnels

HOUDAYER	JEROME	H	C	CNRS	chercheur perm.	CoNRS 02		09/2017	
IANCU	EDMOND	H	B	CNRS	chercheur perm.	CoNRS 02	Oui	10/2014	
INELHAJ	ABDOULLAH	H	D	CEA	stag	E		09/2021	09/2022
JOLICOEUR	THIERRY	H	C	CNRS	chercheur perm.	CoNRS 02	Oui	10/2010	
KORTCHEMSKI	GREGORI	H	B	CNRS	chercheur perm.	CoNRS 02	Oui	01/2007	
KOSOWER	DAVID	H	B	CEA	chercheur perm.		Oui	05/1994	
KOSTOV	IVAN	H	A	CNRS	chercheur perm.	CoNRS 02	Oui	01/2007	04/2019
KOSTOV	IVAN	H	A	CNRS	DREM	CoNRS 02	Oui	04/2019	
KOVENSKY	NICOLAS	H	A	CEA	post-doc			09/2023	
LAMERS	JULES	H	A	CEA	post-doc			10/2021	10/2023
LANDA	HAGGAI	H	C	CEA	post-doc			07/2017	06/2019
LAVIGNAC	STEPHANE	H	B	CNRS	chercheur perm.	CoNRS 02		09/2007	
LEROY	MAXIME	H	D	CEA	TECH	F		01/2022	01/2023
LEVI	MICHELE	F	B	CEA	post-doc			10/2016	09/2019
LEVKOVICH-MASLYU	FEDOR	H	C	CEA	post-doc			09/2020	09/2023
LEWANDOWSKI	MATTHEW	H	B	CEA	post-doc			10/2016	12/2018
LEWANSKI	DANILO	H	A	CEA	post-doc			11/2019	10/2021
LLABRES LLAMBIAS	EVA	F	A	CEA	post-doc			11/2018	08/2021
LO MONACO	GABRIELE	H	A	CEA	post-doc			06/2021	10/2022
LOUREIRO	BRUNO	H	C	CNRS	post-doc			09/2018	08/2020
LUCK	JEAN-MARC	H	C	CEA	chercheur perm.		Oui	10/1982	
LUST	SEVERIN	H	A	CEA	post-doc			11/2018	11/2019
MAIMBOURG	THIBAUD	H	C	CEA	post-doc			01/2021	01/2023
MALLICK	KIRONE	H	C	CEA	chercheur perm.		Oui	09/2023	
MAYERSON	DANIEL	H	A	CEA	post-doc			09/2018	08/2021
MAZAC	DALIMIL	H	A	CEA	chercheur perm.			08/2023	
MEYSSON	CAROLINE	F	D	CEA	IR	J		09/2019	09/2023
MINASIAN	RUBEN	H	A	CNRS	chercheur perm.	CoNRS 02	Oui	10/2007	
MISGUICH	GREGOIRE	H	C	CEA	chercheur perm.	CoNRS 02	Oui	01/2001	
MONNAI	AKIHIKO	H	B	Autre Ét. étranger	post-doc			04/2016	03/2018

Vague E campagne d'évaluation 2024-2025 -
Page 5/26
2.1 - Liste nominative des personnels de l'unité du 01/01/2018 au 31/12/2023
2.1 RH-personnels

MONTEN	RUBEN	H	A	CEA	post-doc			01/2019	09/2020
MONTHUS	CECILE	F	C	CNRS	chercheur perm.	CoNRS 02	Oui	10/2010	
MOTCHAN	LUKAS	H	D	CEA	TECH	F		10/2023	
MULIAN	YAIR	H	B	CEA	post-doc			10/2017	09/2018
NAPOLETANO	DAVIDE	H	B	CNRS	post-doc			10/2017	09/2019
NORTIER	FLORIAN	H	B	CEA	post-doc			10/2021	09/2023
NOVICHKOV	PAVEL	H	B	CEA	post-doc			11/2021	
OLLITRAULT	JEAN-YVES	H	B	CNRS	chercheur perm.	CoNRS 02	Oui	01/2007	
ORLAND	HENRI	H	C	CEA	chercheur perm.		Oui	01/2006	07/2023
ORLAND	HENRI	H	C	CEA	DREM		Oui	08/2023	
PAGE	BENJAMIN	H	B	CEA	post-doc			10/2018	10/2020
PARCOLLET	OLIVIER	H	C	Autre Ét. étranger	chercheur perm.			01/2018	
PASQUIER	VINCENT	H	A	CEA	chercheur perm.		Oui	12/1983	
PAUL	HYNEK	H	A	CEA	post-doc			09/2022	08/2023
PAWELKIEWICZ	MICHAL	H	A	CEA	post-doc			06/2016	07/2019
PEPIN	CATHERINE	F	C	CEA	chercheur perm.		Oui	07/2000	
PERLMUTTER	ERIC	H	A	CEA	chercheur perm.			12/2020	
PESCHANSKI	ROBERT	H	B	CEA	DREM		Oui	09/2006	
PRLINA	IGOR	H	B	CEA	post-doc			07/2019	09/2020
RAJ	HIMANSHU	H	A	CEA	post-doc			09/2021	
RAMASSAMY	SANJAY	H	A	CNRS	chercheur perm.	CoNRS 41 - CoNRS 02		10/2019	
RETOLAZA DIEZ	ANDER	H	A	CEA	post-doc			11/2020	10/2021
REYS	VALENTIN	H	A	CEA	post-doc			11/2022	
RIBAULT	SYLVAIN	H	A	CNRS	chercheur perm.	CoNRS 02	Oui	09/2017	
RIGO	GABRIELE	H	B	CEA	post-doc			11/2022	
RODINA	LAURENTIU	H	B	CEA	post-doc			07/2017	05/2020
ROGER ROULING	CARINE	F	D	CNRS	TECH	J		04/2017	10/2020
ROMAO	NUNO	H	A	CEA	post-doc			12/2021	05/2022
ROY	ANANTA	H	A	Autre Ét. étranger	post-doc			06/2018	12/2018

Vague E campagne d'évaluation 2024-2025 -
Page 6/26
2.1 - Liste nominative des personnels de l'unité du 01/01/2018 au 31/12/2023
2.1 RH-personnels

SAHAKIAN	VATCHE	H	A	Autre Ét. étranger	Invité			03/2021	10/2021
SALEUR	HUBERT	H	A	CEA	chercheur perm.		Oui	12/2002	
SANGOUARD	NICOLAS	H	C	CEA	chercheur perm.		Oui	12/2019	
SARKAR	SAHELI	F	C	CEA	post-doc			10/2018	09/2020
SAUBOY	LAURE	F	D	CEA	AI	J		05/2003	
SCHIRO	MARCO	H	C	CNRS	chercheur perm.	CoNRS 02	Oui	10/2013	07/2019
SENGMANIVANH	PHENG-LAURENT	H	D	CEA	IE	E		11/2007	
SERBAN	DIDINA	F	A	CEA	chercheur perm.		Oui	03/1998	
SERGOLA	MATTEO	H	B	CEA	post-doc			09/2023	
SILVA TAVARES	THIAGO	H	A	CEA	post-doc			09/2019	08/2020
SOTO ONTOSO	ALBA	F	B	CNRS	post-doc			10/2020	09/2022
SOYEZ	GREGORY	H	B	CNRS	chercheur perm.	CoNRS 02	Oui	02/2010	
TARRICONE	SOFIA	F	A	CEA	post-doc			11/2022	
TAULE	PETTER	H	B	CEA	post-doc			11/2022	
THEEUWES	VINCENT	H	B	Autre Ét. étranger	post-doc			10/2018	10/2019
THOMSON	STEVEN	H	C	CNRS	post-doc			10/2018	09/2019
TOLDO	CHIARA	F	A	CEA	post-doc			09/2019	08/2020
TREVISANI	EMILIO	H	A	CEA	post-doc			11/2022	09/2023
TSIARES	IOANNIS	H	A	CEA	post-doc			09/2022	
URBANI	PIERFANCESCO	H	C	CNRS	chercheur perm.	CoNRS 02		10/2016	
VALAGEAS	PATRICK	H	B	CEA	chercheur perm.		Oui	10/1998	
VALCARCE	XAVIER	H	C	CEA	post-doc			06/2023	
VALL CAMELL	VALENTIN	H	A	Autre Ét. étranger	post-doc			01/2020	01/2022
VANHOVE	PIERRE	H	A	CEA	chercheur perm.		Oui	10/2000	
VERNIZZI	FILIPPO	H	B	CEA	chercheur perm.		Oui	10/2008	
VOLPATI	VALERIO	H	C	CEA	post-doc			11/2016	10/2018
VON HIPPEL	MATTHEW	H	B	CEA	chercheur perm.			09/2023	
VOROS	ANDRE	H	A	CEA	DREM			11/2008	
VOSMERA	JAKUB	H	A	CEA	post-doc			10/2023	

WARNER	NICHOLAS	H	A	CEA	chercheur CDD			01/2019	
WEICKGENANNT	NORA	F	B	Autre Ét. étranger	post-doc			11/2022	
WIEDER	BENJAMIN	H	C	CEA	chercheur perm.			10/2022	
WONG	LEONG-KHIM	H	B	CEA	post-doc			10/2020	09/2023
YOSHIMURA	TAKATO	H	A	Autre Ét. étranger	Invité			01/2018	12/2018
ZDEBOROVA	LENKA	F	C	CNRS	chercheur perm.	CoNRS 02	Oui	10/2010	09/2020
ZERBINI	FEDERICO	H	A	CEA	post-doc			09/2020	08/2022
ZHANG	YUZHE	H	C	CEA	post-doc			11/2023	
ZUMALACARREGUI	MIGUEL	H	B	CEA	post-doc			11/2017	11/2020

2.2 - Liste nominative des doctorants de l'unité du 01/01/2018 au 31/12/2023

Nom	Prénom	H/F	Nom de l'équipe interne n°1	Établissement ayant délivré le master	Numéro de l'école doctorale de rattachement	Direction de thèse	Co-direction de thèse	Établissement de rattachement de la co-direction de thèse	Date d'inscription en thèse	Date de soutenance	Abandon (oui ou vide)	Financement du doctorat (1)
AUBIN	BENJAMIN	H	C		564	Zdeborova, Lenka			10/2017	12/2020		CD
BAILLARD	VALENTIN	H	A	U PARIS XI	574	Eynard, Bertrand			06/2019		oui	CDUE
BARIZIEN	VICTOR	H	C	ENS ULM-PARIS	564	Sangouard, Nicolas	Bancal, Jean-Daniel		09/2021			CD
BEN MOUSSA	ADEL	H	A	U PARIS IV	564	Serban, Didina			05/2022			CD
BIDZHIEV	KEMAL	H	C		564	Misguich, Grégoire			05/2016			CD
BOROT	GAËTAN	H	A		564	Eynard, Bertrand			09/2008	06/2021		CD
BOSKOVIC	VLADIMIR	H	A	U PARIS IV	574	Boutillier, Cédric	Ramassamy, Sanjay		06/2023			CD
BOUDON	ALEXIS	H	B		564	Valageas, Patrick	Brax, Philippe		10/2020	09/2023		CD
BRUNELLO	GIACOMO	H	B	Universita Degli Studi Di Padova	564	David Kosower	Pierpaolo Mastrolia	Università degli Studi di Padova	10/2022			CDETR
CANAY	MARC	H	B	U/E ALLEMAGNE	564	Kosower, David			12/2020			CDUE
CARRERA UNAUCHO	EDISON	H	C	U PARIS VI	564	Misguich, Grégoire			11/2023			CDAGE
CAUCAL	PAUL	H	B		564	Iancu, Edmond	Soyez, Grégory		09/2017	09/2020		CD
CHABROL	LILIAN	H	A		564	Grana, Mariana			10/2017	09/2020		CD
CHARBONNIER	SEVERIN	H	A		564	David, François	Eynard, Bertrand		09/2015	09/2018		CD
CHENG	PENG	H	A		564	Minasian, Ruben			03/2020	09/2022		CD
CHERNYAK	Dmitry	H	A		564	Saleur, Hubert			06/2021	08/2023		CD
COLLAZUOL	VERONICA	F	A	Universita Degli Studi Di Padova	564	Grana, Mariana			10/2021			CD
COUVREUR	ROMAIN	H	A		564	Jacobsen, Jesper	Saleur, Hubert		09/2015	06/2019		CD
CUSSENOT	PIERRE	H	C		564	Misguich, Grégoire	Bancal, Jean-Daniel		12/2022			CD
DHARMADARSHI	KUSHAN	H	B	U BENARES	564	Kosower, David			11/2022			CDUE
DI RUSSO	GIORGIO	H	A			Bena, Iosif			10/2023			CDETR
DI UBALDO	GABRIELE	H	A		564	Grana, Mariana	Perlmutter, Eric		03/2021			CDUE
FAUGNO	WILLIAM	H	C			Jolicoeur, Thierry			09/2019	05/2020		CDETR
FAURE	REMI	H	B		564	Brax, Philippe	Lavignac, Stéphane		10/2021			CD
FERRANDO	GWENAEL	H	A		564	Kazakov, Vladimir	Serban, Didina		09/2018	09/2021		CD
FOURNIER	SAMANTHA	F	C	Université et Université Paris Saclay	564	Urbani, Pierfrancesco			10/2023			CD
FRAIMAN	BERNARDO	H	A	Univ. Nuenos Aires - Argentine	564	Grana, Mariana	Nunez Carmen		03/2020	11/2022		CD
GALAZO GARCIA	RAQUEL	F	B	U MADRID	564	Brax, Philippe	Valageas, Patrick		10/2020	09/2023		CD
GEORGESCU	SILVIA	F	A	EP PARISTECH	626	Partouche Hervé	Guica, Monica		10/2020			CDUE
GIACALONE	GIULIANO	H	B		564	Ollitrault, Jean-Yves			04/2016	11/2020		CD
GRANDADAM	MAXENCE	H	C		564	Pépin, Catherine	Bena, Cristina		04/2018	11/2021		CD
GRANET	ETIENNE	H	A		564	Saleur, Hubert	Jacobsen, Jesper		09/2016	09/2019		CD
GRANS SAMUELSSON	ANNA-LINNÉA	F	A	U PARIS XI	564	Saleur, Hubert	Jacobsen, Jesper		10/2018	09/2022		CDUE
GRIVET	BASTIEN	H	C	ENSTA PARISTECH	564	Sangouard, Nicolas	Bancal, Jean-Daniel		03/2023			CDUE
HAURIE	LOUIS	H	C		564	Pépin, Catherine			10/2021			CD
HEIDMANN	PIERRE	H	A		564	Bena, Iosif			09/2016	06/2019		CD
HOLM	Ingrid	F	A	Univ. Oslo	564	Carrasco, John Joseph	Kosower, David		10/2018	09/2021		CDUE
HOUPPE	ANTHONY	H	A	U PARIS IV	564	Bena, Iosif	Warner Nicholas		06/2019	06/2023		CDUE
ISABELLA	GIULIA	F	B		576	Falkowski, Adam	Bellazzini, Brando		12/2019	06/2023		CD
LANORE	CORENTIN	H	C	ENS ULM-PARIS	564	Sangouard, Nicolas	Bancal, Jean-Daniel		10/2022			CDAGE
LE	NGOC-DUC	H	C	ECL LYON	564	Jolicoeur, Thierry			10/2020	06/2023		CD

LI	YIXUAN	H	A		564	Bena, Iosif			09/2019	06/2022		CD
MAJUMDAR	SAPTARSHI	H	C		564	Rosso, Alberto	Foini, Laura		06/2021			CD
MANET	HUGO	H	C	ENS ULM-PARIS	386	Chapuis, Guillaume	Guitter, Emmanuel		10/2023			CD
MATEI	TOMA-CRISTIAN	H	C	Université Paris-Saclay	564	Pépin, Catherine	Bena, Cristina		10/2023			CD
MIGNACCO	FRANCESCA	F	C		564	Zdeborova, Lenka	Urbani, Pierfrancesco		03/2019	09/2022		CD
MIGLIACCIO CHAMO	SANTIAGO GAST	H	A	Universidad de Buenos Aires	564	Ribault, Sylvain			10/2015	10/2018		CD
MILAM	MICHAEL-NALLY	H	A		564	Minasian, Ruben			10/2022			CD
MITSIOS	DIMITRIOS	H	A	EP PARISTECH	564	Eynard, Bertrand			10/2021			CDUE
MOUGIAKAKOS	STAVROS	H	A		564	Vanhove, Pierre			10/2018	12/2021		CD
NIVESVIVAT	RONGVORAM	H	A	U BONN	564	Ribault, Sylvain			10/2019	09/2022		CD
OOMS	ADRIEN	H	A	U ALBERTA	564	Eynard, Bertrand			10/2019		oui	CDUE
OLIVERIA LEFUNDES	GABRIELE	H	A		564	Kostov, Ivan	Serban, Didina		10/2023			CD
OUKASSI	SOUFIANE	H	A	U/E MAROC	564	Eynard, Bertrand			10/2022			CDUE
PANGBURN	EMILE	H	C	U PARIS XI	564	Bena, Cristina	Pépin, Catherine		04/2022			CD
PARRA DE FREITAS	HECTOR	H	A	XREP	564	Grana, Mariana			11/2020	09/2023		CDUE
PICHON-PHARABOD	ERIC	H	A		574	Vanhove, Pierre			12/2021			CD
PINON	SARAH	F	C	ENS ULM-PARIS	564	Bena, Cristina	Pépin, Catherine		10/2018	09/2021		CD
POGEL	SEBASTIAN	H	B		564	Kosower, David	Carrasco John Joseph		10/2018	09/2021		CDUE
RIVA	MASSIMILIANO-M	H	B	U MILAN	564	Vernizzi, Filippo			09/2018	09/2022		CD
ROBERTSON	NIALL	H	A	U CAMBRIDGE	564	Saleur, Hubert			10/2016	06/2020		CDUE
ROMANO	MARCELLO	H	B	Universita Di Roma	564	Bellazzini, Brando			11/2023			CD
ROUX	PAUL	H	A		564	Ribault, Sylvain	Jacobsen, Jesper		10/2023			CD
ROY	FÉLIX	H	C		564	Biroli, Giulio			04/2017	12/2020		CDORG
SAMANTA	RUPAN	H	B	Indian Institute of Technology Guwahati, Guwahati, Assam, India		Ollitrault, Jean-Yves			02/2023	07/2023		CDETR
SARAO MANNELLI	STEFANO	H	C		564	Zdeborova, Lenka			03/2017	10/2020		CD
SAVIC	NIKOLA	H	B	U BELGRADE	564	Vernizzi, Filippo			09/2023			CD
SCARLATELLA	ORAZIO	H	C		564	Schiro, Marco			10/2016	10/2019		CD
SCHMIDT	CHRISTIAN	H	C	Universität Wien	564	Zdeborova, Lenka			09/2015	10/2018		CD
SCLOCCHI	ANTONIO	H	C		564	Franz, Silvio	Urbani, Pierfrancesco		09/2017	12/2020		CD
SESMA	PABLO	H	B		564	D'agnolo, Raffaele Tito			10/2022			CD
TAILLANTER	ERWAN	H	C	U PARIS XI	564	Barthelemy, Marc			03/2020	09/2023		CD
TERLAT	BENJAMIN	H	A		574	Singh, Arvind	Ramassamy, Sanjay		10/2021			CD
TOULIKAS	DIMITRIOS	H	A	U FRANCAISE	564	Bena, Iosif			10/2020			CD
TOUZEAU	DAVID	H	B		564	Bernardeau, Francis			10/2023			CD
VALCARCE	XAVIER	H	C	U LYON 1	564	Sangouard, Nicolas			10/2020	05/2023		CDUE
VALLET	BENOIT	H	A		564	Serban, didina			10/2016	10/2019		CD
VERBAVATZ	VINCENT	H	C		564	Barthelemy, Marc			09/2019	07/2022		CD
VU	DINH-LONG	H	A		564	Kostov, Ivan	Serban, Didina		09/2017	07/2020		CD
ZHANG	YI	H	A		564	Minasian, Ruben			10/2017	10/2021		CDETR
ZIVY	JULIAN	H	C	U/E SUISSE	564	Sangouard, Nicolas	Bancal, Jean-Daniel		10/2020		oui	CDAGE

3 - Ressources de l'unité (<u>en k€ arrondis au k€ supérieur</u>)

Masse salariale (en k€) pour l'année 2023

Nom de l'établissement ou organisme	Masse salariale brute chargée des permanents (CDI + titulaires)
CEA	4 370 k€
CNRS	1 792 k€
Total	6 162 k€

Dotations récurrentes (en k€) pour les années 2018 à 2023

Nom de l'établissement ou organisme	Dotation récurrente globale					
	Notification 2018	Notification 2019	Notification 2020	Notification 2021	Notification 2022	Notification 2023
CEA (y.c. salaires)	3 796 k€	3 658 k€	3 709 k€	3 945 k€	4 007 k€	4 228 k€
CNRS	36 k€	59 k€	49 k€	61 k€	72 k€	55 k€

Ressources propres (en k€) pour les années 2018 à 2023

	Notification 2018	Notification 2019	Notification 2020	Notification 2021	Notification 2022	Notification 2023
Ressources propres obtenues sur appels à projets régionaux et locaux (sommes issues de AAP Idex, I-site, CPER, collectivités territoriales, BQR, etc.)	124 k€	76 k€	226 k€	197 k€	459 k€	147 k€
Ressources propres obtenues sur financements publics ou associatifs nationaux (sommes obtenues du PIA, de l'ANR, de la FRM, de l'INCa, des organismes de recherche, du réseau des MSH, etc.)				154 k€	1 077 k€	493 k€
Ressources propres obtenues sur appels à projets internationaux	2 260 k€	4 602 k€	1 742 k€	2 422 k€	306 k€	1 900 k€

Total des ressources (en k€)

	2018	2019	2020	2021	2022	2023
Dotations récurrentes	3 832 k€	3 717 k€	3 758 k€	4 006 k€	4 079 k€	4 283 k€
Ressources propres	2 384 k€	4 678 k€	1 968 k€	2 773 k€	1 842 k€	2 540 k€
Total des ressources de l'unité	**6 216 k€**	**8 395 k€**	**5 726 k€**	**6 779 k€**	**5 921 k€**	**6 823 k€**

Ressources propres (en k€) par équipe quand l'unité est pluri-équipe (Tableau à reproduire pour chacune des équipes)

Équipe : A	Notification 2018	Notification 2019	Notification 2020	Notification 2021	Notification 2022	Notification 2023
Ressources propres obtenues sur appels à projets régionaux et locaux (sommes issues de AAP Idex, I-site, CPER, collectivités territoriales, BQR, etc.)	102 k€	**5 k€**		121 k€	256 k€	1 k€
Ressources propres obtenues sur financements publics ou associatifs nationaux (sommes obtenues du PIA, de l'ANR, de la FRM, de l'INCa, des organismes de recherche, du réseau des MSH etc.)					154 k€	
Ressources propres obtenues sur appels à projets internationaux	1 846 k€	4 602 k€	1 628 k€			
Total	**1 948 k€**	**4 607 k€**	**1 628 k€**	**121 k€**	**410 k€**	**1 k€**

Équipe : B	Notification 2018	Notification 2019	Notification 2020	Notification 2021	Notification 2022	Notification 2023
Ressources propres obtenues sur appels à projets régionaux et locaux (sommes issues de AAP Idex, I-site, CPER, collectivités territoriales, BQR, etc.)	5 k€	60 k€	326 k€	7 k€	131 k€	8 k€
Ressources propres obtenues sur financements publics ou associatifs nationaux (sommes obtenues du PIA, de l'ANR, de la FRM, de l'INCa, des organismes de recherche, du réseau des MSH etc.)					269 k€	634 k€
Ressources propres obtenues sur appels à projets internationaux	668 k€			2 297 k€		
Total	**673 k€**	**60 k€**	**326 k€**	**2 304 k€**	**400 k€**	**642 k€**

Équipe : C	Notification 2018	Notification 2019	Notification 2020	Notification 2021	Notification 2022	Notification 2023

Ressources propres obtenues sur appels à projets régionaux et locaux (sommes issues de AAP Idex, I-site, CPER, collectivités territoriales, BQR, etc.)	72 k€	15 k€	112 k€	144 k€	72 k€	8 k€
Ressources propres obtenues sur financements publics ou associatifs nationaux (sommes obtenues du PIA, de l'ANR, de la FRM, de l'INCa, des organismes de recherche, du réseau des MSH etc.)					71 k€	187 k€
Ressources propres obtenues sur appels à projets internationaux		111 k€	114 k€	125 k€	306 k€	1 900 k€
Total	**72 k€**	**126 k€**	**226 k€**	**269 k€**	**449 k€**	**2 095 k€**

Nom	Prénom	Nom de l'équipe de rattachement	Intitulé de l'élément de distinction (nom du prix par exemple)	Année ou période (début MM/AAAA - fin MM/AAAA)
Prix ou distinctions scientifiques				
BIROLI	Giulio	C	Prix d'Aumale, Académie des Sciences	2018
DAVID	François	A	Médaille de Physique, Académie des Sciences	2023
EYNARD	Bertrand	A	Prix Claude-Berthault de l'Académie des Sciences	2019
GAUDIN	Michel	A	Prix Dannie Heineman, American Physical Soceity (APS/AIP)	2019
GIACALONE	Giuliano	B	Accessit prix de thèse, Saint Gobin	2020
GRANA	Mariana	A	Prix 'Paul Langevin' de la Société Française de Physique (SFP)	2021
GUICA	Monica	A	Médaile de bronze du CNRS	2023
MALLICK	Kirone	C	Prix 'Paul Langevin' de la Société Française de Physique (SFP)	2023
ORLAND	Henri	C	Elected member of the American Academy of Arts and Science, USA	2023
SALEUR	Hubert	A	Recipient of the Jean Ricard Grand Prize, Société Française de Physique (SFP)	2019
SCARLATELLA	Orazio	C	Prix de thèse, Université Paris Saclay, département PHOM	2020
URBANI	Pierfrancso	C	Emerging Talents, Journal of Physics A: Mathematical and Theoretical, IOPscience	2021
ZDEBOROVA	Lenka	C	Prix Irène Joliot-Curie, catégorie Jeune femme scientifique, ministère de l'Enseignement supérieur et de la Recherche	2018
Autres distinctions				
Appartenance à l'IUF				
Séjours dans des laboratoires étrangers				
BELLAZZINI	Brando	B	Scientific host at the EPFL, Switzerland Scientific associate at CERN, Switzerland	2021 2020
BENA	Iosif	A	University of Harvard, USA	2023
BLAIZOT	Jean-Paul	B	Insitute for Theoretical Physics, Heidelberg, Germany Yukawa Institute of Theoretical Physics, YITP, Kyoto, Japan Brookhaven National Laboratory, USA National Institute of Science Education and Research (NISER), Bhubaneswar, India	2019,2023 2010 2018 2023
BRAX	Philippe	B	CERN, Switzerland	10/2022-06/2023
DAVID	François	A	Perimeter Institute for Theoretical Physics, Canada Science Institute, Univ. of Reykjavik, 3 semaines, Iceland	2018 à 2020, 2022, 2023 2020
DI FRANCESCO	Philippe	A	University of Illinois, Urbana-Champaign, USA Simons Visiting Professor, Mathematical Sciences Research Institute, Berkeley, Ca, USA Galileo Galilei institute, Florence, Italy Simons Center for Geometry and Physics, State University of New York at Stony Brook, NY, USA	2018 - 2020 - 2022 - 2023 2014 2022 2023
DUPLANTIER	Bertrand	A	Visit to MIT Math and collaboration with Scott Sheffield, Cambridge, USA Visit to Math Dept. at Toronto University and collaboration with Ilia Binder, Canada, Visit and collaboration with Michael Aizenman, Physics Dept., Princeton University, USA Visit and Seminar at Math Depart., Helsinki Univ., Iceland Visit to CUNY, New York, USA Visit and collaboration with Michael Aizenman, Department of Physics, Princeton, USA Member of the Mathematical Sciences Research Institute (MSRI), Berkeley, USA Participation to "Probability Theory and Mathematical Physics", Helsinki Univ., Iceland Participationto the Fields Medal Ceremony at ICM 2022, Aalto Univ., Helsinki, Iceland Visit and scientific collaboration at the Math Department of KIAS, Seoul, Korea Visit of the Math Dept., MIT, Cambridge USA, and Physics Dept. Princeton University, USA	03/2018 04/2018 06/2018 10/2018 08/2019 04/2022 05/2022 07/2022 07/2022 06/2023 10/2023

14/25
3 - Ressources de l'unité
5 - Indices de reconnaissance de l'unité - Période de référence : du 01/01/2018 au 31/12/2023

Vague E : campagne d'évaluation 2024-2025

GRANA	Mariana	A	University of Torino, Italy Max-Planck Institute, Munich, Germany Edinburg, UK Liverpool Univ., UK Cambridge Univ., UK Queen Mary, London, UK	2024 2022 2021 2019 2018 2018
IANCU	Edmond	B	ECT* Trento, Italy Lawrence Berkeley National Laboratory, USA Simons Center for Geometry and Physics, Stony Brook, USA INT (Institute for Nuclear Theory) Seattle, USA Wuhan University, China Tata Institute for Fundamental Research, India	2023 2022 2021 2018 2019 2018
LAVIGNAC	Stéphane	B	Physics Department, University of Washington, Seattle Theoretical Physics Department, Fermilab, USA	2018 2019
MALLICK	Kirone	C	Bangalore, India Tokyo Tech., Japan Univ. of Tel Aviv, Israel Univ Minneapolis, USA	2022 2019 2018 2023
MINASIAN	Ruben	A	Korea Institute for Advanced Study , South Korea Johns Hopkins University, USA Korea Institute for Advanced Study Seoul, South Korea Johns Hopkins University, USA University of Michigan, USA MPI-Albert Einstein Institute, Germany University Tor Vergata Rome, Italy MPI-Albert Einstein Institute, Germany Johns Hopkins University, USA MPI-Albert Einstein Institute, Germany	11/2018 02/2019 11/2019 01/2020 02/2020 09/2020 11/2021 03/2023 05/2023 08/2023
OLLITRAULT	Jean-Yves	B	IISER Pune, Inde NISER Bhubaneswar, Inde	2019 2020
PERLMUTTER	Eric	A	Harvard University, USA UCSB, USA	2022 2023
RAMASSAMY	Sanjay	A	Graduate School of Mathematical Sciences, the Univ. of Tokyo, Japan Galileo Galilei Institute, Florence, Italy, Univ. of Vienna, Austria	2020 2022 2022
SERBAN	Didina	A	SAIFR Sao Paulo, Brazil Perimeter Institute, Waterloo, Canada IIP Natal, Brazil Melbourne University, Australia Galileo Galilei Institute, Florence, Italy Kavli Institute for Theoretical Physics, Santa Barbara, , USA Osaka City Univ., Japan CERN, Switzerland Wigner Institute Budapest, Hungaria Isaac Newton Institute for Mathematical Sciences Cambridge, UK	2018 2018 2019 2019,2020 2022 2022 2019 2023 2021 2022
SOYEZ	Gregory	B	CERN Scientific Associate, Switzerland multiple week-long visits to Oxford Univ., UK CERN , Switzerland Manchester Univ., UK	09/2022-08/2023 2018 2018 2018-2019
VALAGEAS	Patrick	B	Yukawa institute, Kyoto University, Japan	04/2019-05-2019
VANHOVE	Pierre	A	Theory Divison CERN, Switzerland	2022, 2023
WIEDER	Benjamin	C	Research Affiliate at MIT, Department of Physics, Condensed Matter Theory, USA	
Organisations de colloques/congrès internationaux				
BANCAL	Jean-Daniel	C	"Quantum computers & simulators: How can they help solving long-standing problems in physics?", IPhT, France	2021
BARTHELEMY	Marc	C	Co-organizer of the satellite conference SpaceNet @ CCS , Thessaloniki, Greece Co-organizer of the satellite conference "Complex-Space: Analysis and Modelling of Spatial Complex Systems" @ CCS 2020, Online Co-organizer of the conference PhyMo22 – "Physics of Mobility" – Max Planck Institute for the Physics of Complex Systems (MPIPKS), Dresden Co-organizer of the satellite conference U"rbanSys23" of the CCS23 (Conference on Complex Systems) Salvador, Bahia, Brazil	09/2018 12/2020 03/2022 10/2023
BELLAZZINI	Brando	B	International workshop "Positivity and the Bootstrap", CERN, Switzerland Internation conference "EFT in cosmology, gravity and particle physics", Itzykson conference, IPhT, CEA Saclay, France	2021 2019
BENA	Iosif	A	"de Sitter constructions in String Theory", CEA Saclay, France "Black-Hole Microstructure", CEA Saclay, online, France "Black-Hole Microstructure II", CEA Saclay online, France "Black-Hole Microstructure II", CEA Saclay online, France "Black-Hole Microstructure IV" - 26th Itzykson Meeting, CEA Saclay, France "Black-Hole Microstructure V", CEA Saclay, France	2019 2020 2020 2021 2022 2023

15/25
3 - Ressources de l'unité
5 - Indices de reconnaissance de l'unité - Période de référence : du 01/01/2018 au 31/12/2023

BLAIZOT	Jean-Paul	B	"Exact Renormalization Group 2018" (ERG2018), Paris "Hard Probes 2018: International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions", Aix les Bains	2018 2018
BOURGET	Antoine	A	International Workshop, Simons Center for Geometry and Physics, Stony Brook, "5d N=1 SCFTs and Gauge Theories on Brane Webs", USA International Workshop, Banff International Research Station (UBC Okanagan), "The Geometry, Algebra, and Physics of Higgs Bundles", Canada Summer School, LAMFA, Amiens, "Symplectic Singularities and Supersymmetric QFT", France International Workshop, LAMFA, Amiens, "Symplectic Singularities and Supersymmetric QFT", France	10/2022 05/2023 07/2023 07/2023
BRAX	Philippe	B	"Paris-Saclay astroparticle symposium", Institut Pascal, Paris-Saclay (4 times) "Pont Avignon", Avignon (2 times), France "Dark energy action annual meeting", Paris(4 times) + Marseille+Annecy, France CNRS School "Gravity", CIRM Marseille, France	2019,2021,2022,2023 2020, 2023. 2018-2023. 07/2021
D'AGNOLO	Raffaele Tito	B	CSF Conference "Beyond BSM", Ascona, Switzerland Convenor Les Houches Workshop, "Physics at TeV Colliders and Beyond the Standard Model", Les Houches, France Cargèse Summer School "Rethinking Beyond the Standard Model", Cargèse, France CERN-ARIES Workshop "Storage Rings and Gravitational Waves", CERN, Switzerland Galileo Galilei Institute Workshop "New Physics from the Sky", GGI, Florence, Italy International Advisory Board Member, Cargèse Summer School, France Colloquium: Particle Physics in Paris (P3) Cross-institution (IPhT, IJCLab, LTPHE) monthly colloquium, Paris, France	2023 2023 2022 2021 2021 2020 2019-present
DAVID	François	A	Congrès Général Société Française de Physique 2023 (Comité scientifique) Cité des Sciences, Paris, France Rencontre SFP-SMF "Pi-Day", Institut Henri Poincaré, Paris, France	07/2023 03/2023
DUPLANTIER	Bertrand	A	Poincaré Seminar 2018 "Information Theory", Institut Henri Poincaré, Paris Poincaré Seminar 2023 "Quantum Gravity", Institut Henri Poincaré, Paris	11/2018 12/2023
EYNARD	Bertrand	A	summer School: "Topological Recursion School Salento 2021", Italy summer School: "Topological Recursion School Salento 2022", Italy summer School: "Trieste Topological Recursion and Integrability School Trieste 2023" scientific board of StringMath 2023 Melbourne Australia	09/2021 09/2022 2023 2023
olli	Laura	C	International school on "Clean and disordered systems out of equilibrium", Cargèse, France Conference "MECO47: the 47th Conference of the Middle European Cooperation in Statistical Physics", Erice, Italy	09/2020 06/2022
GELIS	Francois	B	"Strong and Electroweak Matter" (SEWM) 2021, Online "Strong and Electroweak Matter (SEWM) 2022, IPhT, Saclay	07/ 2021 06/2022
GRANA	Mariana	A	"Deconstructing the string landscape", IPhT, Saclay "Planck 2022 ", Paris (200 participants) "Eurostrings 2022 ", Lyon (250 participants) "Geometry and swampland ", Banff, Online (250 participants) "New developments in Quantum gravity and String Theory", Corfu (110 participants) "de Sitter constructions in String Theory", IPhT (50 participants) "1st Workshop on high energy theory and gender", CERN (90 participants) "String dualities and geometry", Centro Atomico Bariloche, Argentina (60 participants)	11/2023 05/2022 04/2022 01/2022 09/2021 12/2019 09/2018 01/2018
GUICA	Monica	A	"ICTP Workshop on String Theory, Holography, and Black Holes", ICTP, Trieste, Italy "Advanced Summer School in Quantum Field Theory and Quantum Gravity", Quy Nhon, Vietnam "Huddle on Entanglement, Black Holes and Spacetime", ICTP, Trieste, Italy "Confinement, Flux Tubes, and Large N", KITP, Santa Barbara, USA 25th Itzykson Conference "Many body chaos, scrambling and thermalization in interacting quantum systems", CEA Saclay, France "Integrability in gauge and string theory", Nordita, Stockholm, Sweden "Chaos and Order: from Strongly Correlated Systems to Black Holes", KITP, Santa Barbara, USA "Black holes, quantum information, and space-time reconstruction", CERN "Cargèse summer institute", Cargèse, France	10/2023 07/2023 06/2023 01/2022 06/2021 07/2019 10/2018 08/2018 06/2018
IANCU	Edmond	B	"Strong and Electroweak Matter 2022", IPhT Saclay and Sorbonne Université, Jussieu, Paris, France Special on-line edition of the conference "Strong and Electroweak Matter 2021" Workshop "The Color Glass Condensate at the Electron-Ion Collider", ECT* Trento, Italy Session D (Deconfinement) of the "13th Conference on Quark Confinement and the Hadron Spectrum", Maynooth University, Ireland Session D (Deconfinement) of the Special on-line edition of the "Conference Quark Confinement and the Hadron spectrum'"	2022 2021 2023 2018 2021
LAVIGNAC	Stéphane	B	"Higgs Hunting 2018" (international), Orsay, France, "History of the Neutrino" (international, Paris, France "Higgs Hunting 2019" (international, Orsay, France "Higgs Hunting 2021" (international, Orsay, France "24th International Conference From the Planck Scale to the Electroweak Scale (Planck 2022)", Paris, France "Higgs Hunting 2022", Orsay, France "Higgs Hunting 2023", Orsay, France	07/2018 09/2018 07/2019 09/ 2021 06/2022 09/ 2022 09/2023
MALLICK	Kirone	C	23rd Itzykson Meeting "Systems out of equilibrium', IPhT, CEA Saclay, France	06/2023
MISGUICH	Grégoire	C	International conference "Topological Matter (TOPMAT)", IPhT, CEA Saclay, France	06/2018
OLLITRAULT	Jean-Yves	B	MIAPP programme "Probing the quark-gluon plasma with collective phenomena and heavy quarks", Munich, Allemagne Symposium on "Contemporary QCD Physics and Relativistic Nuclear Collisions", Wuhan, Chine "Deciphering nuclear phenomenology across energy scales", IRFU, CEA Saclay	09/2018 11/2019 09/2022
ORLAND	Henri	C	Molecular Kinetics in the Condensed Phases, CECAM, Lausanne Itzykson conference: Statistical Physics of Disordered and Complex Systems	2019 2018
PEPIN	Catherine	C	Hereaus seminar on "Strange metals", in Bad Honef, Germany ICAM workshop "Exotic Superconductivity", Cargèse, Corsica "Emergent Phenomena in Strongly Correlated Matter", International Institute of Physics, Natal, Brazil	12/2023 06/2022 08/2018

16/25
3 - Ressources de l'unité
5 - Indices de reconnaissance de l'unité - Période de référence : du 01/01/2018 au 31/12/2023

Vague E : campagne d'évaluation 2024-2025

	PERLMUTTER	Eric	A	"Bootstrapping String Theory", international program at Aspen Center for Physics, USA "Bootstrapping Quantum Gravity", international program at Kavli Institute for Theoretical Physics, Santa Barbara, CA, USA	08/2021 01/2023
	RAMASSAMY	Sanjay	A	"Random networks and interacting particle systems", ENS, France (cancelled at the last minute due to covid) Workshop on "Dimers, Ising and spanning trees beyond the critical isoradial case", MFO Oberwolfach, Germany Junior online conference on "Random graphs and interacting particle systems"	2020 2020 2021
	RIBAULT	Sylvain	A	Bootstat 2021, Institut Pascal, Université Paris-Saclay	2021
	SALEUR	Hubert	A	"International Congress of Mathematical Physics'', Quantum Field Theory Session, Montreal, Canada "Quantum Theory and Symmetry XI / Quantum Field Theory Session", Montreal, Canada	2018 2019
	SERBAN	Didina	A	Workshop on" higher point correlation functions and integrable AdS/CFT", Trinity College Dublin, Ireland "Integrable Models: from quantum spin chains and vertex models to AdS/CFT", ICTP-SAIFR Sao Paulo, Brazil "Correlation functions and wave functions in solvable models" , IPhT Salcay et IHP Paris "Hubert@60", IPhT Saclay "Mathematical Harmonies, conférence anniversaire pour les 60 ans de D. Bernard", ENS Paris "Randomness, Integrability and Universality", GGI Florence, Italy "Integrability in String, Field and Condensed Matter Theory", KITP Santa Barbara, USA "Integrability in condensed matter physics and QFT", Les Diablerets, Switzerland	04/2018 07/2018 09/2021 09/2021 10/2021 04/2022-06/2022 08/2022-10/2022 02/2023
	SOYEZ	Gregory	B	"Boost 2018", Jussieu, Paris, France "Parton Showers for future e+e- colliders", CERN (Geneva, Switzerland), "First Lund Jet Plane Institute", CERN (Geneva, Switzerland),	07/2018 04/2023 07/2023
	URBANI	Pierfrancesco	C	Itzykson Conference on "Many-body chaos, scrambling and thermalization in interacting quantum systems", IPhT, France "Disorder in complex systems", Institut Pascal, France "Mathematics meets physics on disordered systems", Cortona, Italy	06/2021 2021 2022
	VANHOVE	Pierre	A	``Special Session on Mathematical Physics of Gravity, Geometry, QFTs, Feynman and Stochastic Integrals, Quantum/Classical Number Theory, Algebra, and Topology", AMS-SMF-EMS Joint International Meeting, Grenoble, France Workshop "Gravitational scattering, inspiral, and radiation", the Galileo Galilei Institute, Florence, Italy Workshop "Paris Winter Workshop: The Infrared in QFT", Jussieu, Paris, France Workshop "multi-loop calculations (methods and applications)", LPTHE, Paris, France École de Cargèse, "Quantum Gravity, Strings and Fields", Cargèse, France	2021 2021 2020 2019 2018
	VERNIZZI	Filippo	B	7th General assembly of the GdR of Gravitational waves, LUTH, Observatoire de Paris, Meudon Workshop "Théorie, Univers et Gravitation", ENS Paris Euclid Theory Working Group meeting, IAP, Paris 17th International Workshop "Dark Side of the Universe" DSU2023, ICTP-EAIFR, Kigali, Rwanda Rencontres de Moriond (Cosmology), La Thuile Workshop "Euclid France Theory and Likelihood", IAP 6th General assembly of the GdR of Gravitational waves, Université Paul Sabatier, Toulous Workshop "Théorie, Univers et Gravitation", Montpellier University Workshop "Théorie, Univers et Gravitation", Institut Henri Poincaré Paris Working Group "Waveforms" and "Tests of general relativity and alternative theories" meeting Institut Henri Poincaré Workshop, "Gravitational waves: a new messenger to explore the Universe Conference "Theory and interpretation of the data" at the GOLD Workshop, Institut Pascal, Université Paris-Saclay 24th Itzykson meeting, IPhT, Gif-sur-Yvette Rencontres du Vietnam (Cosmology session), Quy Nhon Meeting of the Working Group "Tests of general relativity and alternative theories" of the GdR Gravitational waves, IPhT, Gif-sur-Yvette Workshop "Gravity falls" at APC, Paris Euclid Theory Working Group Meeting, IHP Paris Rencontres de Moriond (Cosmology session), La Thuile	10/2023 10/2023 10/2023 07/2023 01/2022 11/2022 10/2022 10/2022 12/2021 12/2021 03/2021 05/2020 06/2019 08/2019 04/2019 12/2018 04/2018 03/2018
	WIEDER	Benjamin	C	American Physical Society (APS) March Meeting Session Planning and Abstract Sorting for Sessions on Topological Insulators and Topological Materials Workshop on the Principles and Future of Quantum Matter, Philadelphia Pennsylvania, University of Pennsylvania, USA	2022 - 2023 - 2024 2023
Responsabilités dans des sociétés savantes	LAVIGNAC	Stéphane	B	Membre du bureau de la section locale Paris-Sud de la Société Française de Physique	09/21 à aujourd'hui
Enseignements universitaires et Grandes Écoles (ne comprend pas les cours d'école d'été)	BARTHELEMY	Marc	C	"Complex networks", École Polytechnique, 2 hours "Complex networks", École Polytechnique, 2 hours "Complex networks", M2 Urbantic, École des Ingénieurs de la Ville de Paris (EIVP), 2 hours "Revisiting urban economics", M2, École des ponts et Chaussées, 6 hours (online) "Complex networks", École Polytechnique, 2 hours "Revisiting urban economics", M2, École des ponts et Chaussées, 6 hours "Revisiting urban economics", M2, École des ponts et Chaussées, 6 hours	mars-23 2022 2021 2020 2020 2019 2018
	BAUER	Michel	A	"From Young integrals to rough paths and stochastic calculus", Master 1-2, ENS Paris, 50 hours "From Young integrals to rough paths and stochastic calculus", Master 1-2, ENS Paris, 50 hours "From Young integrals to rough paths and stochastic calculus", Master 1-2, ENS Paris, 50 hours "From Young integrals to rough paths and stochastic calculus", Master 1-2, ENS Paris, 50 hours "From Young integrals to rough paths and stochastic calculus", Master 1-2, ENS Paris, 50 hours	2018 2019 2020 2021 2022
	BELLAZZINI	Brando	B	"Quantum Field Theory I", ICFP Master 2, ENS Paris, 52 hours "Quantum Field Theory I", ICFP Master 2, ENS Paris, 52 hours "Advanced Quantum Field Theory", EPFL Lausanne, PhD, 33 hours "Advanced Quantum Field Theory", EPFL Lausanne, PhD, 33 hours "Topics in Effective Field Theory", Rome, PhD, 30 hours "Advanced Topics Theory of Fundamental Interactions", Padova, PhD, 20 hours	2023 2022 2023 2021 2020 2018
	BERNADEAU	Francis	B	"Advanced lectures in cosmology", École Polytechnique "Advanced lectures in cosmology", École Polytechnique "Advanced lectures in cosmology", École Polytechnique "Advanced lectures in cosmology", École Polytechnique "Advanced lectures in cosmology", École Polytechnique "Advanced lectures in cosmology", École Polytechnique	2018 2019 2020 2021 2022 2023
	BOURGET	Antoine	A	TA for "Symmetries in Physics", ENS Paris, M1, 30 hours TA for "Particle Physics and the Standard Model", ENS Paris, L3. 60 hours TA for "Particle Physics and the Standard Model", ENS Paris, L3. 60 hours	2022 2022 2023
	BRAX	Philippe	B	"Statistical Physics", 1ère année, ENSTA Paris-Tech	2018

			"Statistical Physics", 1ère année, ENSTA Paris-Tech	2019
			"Statistical Physics", 1ère année, ENSTA Paris-Tech	2020
			"Statistical Physics", 1ère année, ENSTA Paris-Tech	2021
			"Statistical Physics", 1ère année, ENSTA Paris-Tech	2022
			"Statistical Physic"s, 1ère année, ENSTA Paris-Tech	2023
D'AGNOLO	Raffaele Tito	B	"Particle Physics Meets Cosmology", La Sapienza, Rome, Italy, 20 hours	2023
			"Phenomenology of High Energy Physics", Scuola Normale Superiore di Pisa, 24 hours	2020
			"Phenomenology of High Energy Physics", Scuola Normale Superiore di Pisa, 24 hours	2021
			"Phenomenology of High Energy Physics", Scuola Normale Superiore di Pisa, 24 hours	2022
			"Phenomenology of High Energy Physics", Scuola Normale Superiore di Pisa, 24 hours	2023
			"Quantum Field Theory II", ENS, Paris, 10 hours	2020
			"Quantum Field Theory II", ENS, Paris, 10 hours	2021
DAVID	François	A	"Quantum Field Theory II", PSI Master 2 program, Perimeter Institute. Canada, 23 hours	2018
			"Quantum Field Theory II", PSI Master 2 program, Perimeter Institute. Canada, 23 hours	2019
			"Quantum Field Theory II", PSI Master 2 program, Perimeter Institute, Canada, 23 hours (online)	2020
			"Quantum Field Theory III", PSI Master 2 program, Perimeter Institute, Canada, 23 hours	2022
			"Quantum Field Theory II", PSI Master 2 program, Perimeter Institute. Canada, 23 hours	2022
			"Quantum Field Theory II", PSI Master 2 program, Perimeter Institute. Canada, 23 hours	2023
DI FRANCESCO	Philippe	A	"Symmetric Polynomials, Algebraic Structures and Integrability". Fall semester, graduate topics course, Univ. of Illinois at Urbana-Champaign, USA	2018
			"Integrable Combinatorics", Spring semester, Univ. of Illinois at Urbana-Champaign, USA	2023
EYNARD	Bertrand	A	"Random Matrices", M2 Probabilité et statistiques, Univ. d'Orsay	2018
			"Random Matrices", M2 Probabilité et statistiques, Univ. d'Orsay	2019
GELIS	Francois	B	"Théorie quantique des champs", M2 Physique des Hautes Énergies, École polytechnique, 76 hours	2018
			"Théorie quantique des champs", M2 Physique des Hautes Énergies, École polytechnique, 76 hours	2019
			"Théorie quantique des champs", M2 Physique des Hautes Énergies, École polytechnique, 76 hours	2020
			"Théorie quantique des champs", M2 Physique des Hautes Énergies, École polytechnique, 76 hours	2021
			"Théorie quantique des champs", M2 Physique des Hautes Énergies, École polytechnique, 76 hours	2022
			"Théorie quantique des champs", M2 Physique des Hautes Énergies, École polytechnique, 76 hours	2023
GRANA	Mariana	A	"String Theory", M2 Physique des Hautes Energies, École polytechnique, 32 hours	2018
			"String Theory", M2 Physique des Hautes Énergies, École Polytechnique, 32 hours	2019
			"String Theory", M2 Physique des Hautes Énergies, École Polytechnique, 32 hours	2020
			"String Theory", M2 Physique des Hautes Énergies, École Polytechnique, 32 hours	2021
			"String Theory", M2 Physique des Hautes Énergies, École Polytechnique, 32 hours	2022
			"String Theory", M2 Physique des Hautes Énergies, École Polytechnique, 32 hours	2023
GUICA	Monica	A	"CFT and Gravity", EPFL, Switezerland, 6 hours	2022
			"CFT and Gravity", EPFL, Switezerland, 6 hours	2023
JOLICOEUR	Thierry	C	"Classical thermodynamics", M2, ENS Paris-Saclay, 12 hours	2018
			"Classical thermodynamics", M2, ENS Paris-Saclay, 12 hours	2019
			"Classical thermodynamics", M2, ENS Paris-Saclay, 12 hours	2020
			"Classical thermodynamics", M2, ENS Paris-Saclay, 12 hours	2021
			"Classical thermodynamics", M2, ENS Paris-Saclay, 12 hours	2022
LAVIGNAC	Stéphane	B	"Neutrino physics", Master 2 NPAC, Sorbonne Université / Université Paris Cité / Université Paris-Saclay, 9 hours	2018
			"Gauge theory of electroweak interactions", Master 2 ICFP (ENS / Sorbonne Université / Université Paris Cité / Université Paris-Saclay / Institut Polytechni	2018
			Quantum field theory II, Master 2 ICFP (ENS / Sorbonne Université / Université Paris Cité / Université Paris-Saclay / Institut Polytechnique de Paris), 24 ho	2019
			Quantum field theory II, Master 2 ICFP (ENS / Sorbonne Université / Université Paris Cité / Université Paris-Saclay / Institut Polytechnique de Paris), 24 ho	2020
			Quantum field theory II, Master 2 ICFP (ENS / Sorbonne Université / Université Paris Cité / Université Paris-Saclay / Institut Polytechnique de Paris), 24 ho	2021
			Quantum field theory II, Master 2 ICFP (ENS / Sorbonne Université / Université Paris Cité / Université Paris-Saclay / Institut Polytechnique de Paris), 24 ho	2022
MALLICK	Kirone	C	"Complex Systems" et "Introduction to Quantum Mechanics", École Polytechnique, 80 hours	2018
			"Complex Systems" et "Introduction to Quantum Mechanics", École Polytechnique, 80 hours	2019
			"Complex Systems" et "Introduction to Quantum Mechanics", École Polytechnique, 80 hours	2020
			"Complex Systems" et "Introduction to Quantum Mechanics", École Polytechnique, 80 hours	2021
			"Complex Systems" et "Introduction to Quantum Mechanics", École Polytechnique, 80 hours	2022
			"Complex Systems" et "Introduction to Quantum Mechanics", École Polytechnique, 80 hours	2023
MISGUICH	Grégoire	C	"Physique Statistique avancée", M2, Univ. Cergy-Pontoise, 50 hours	2018
			Préparation aux oraux de concours, Licence 3, Univ. Cergy-Pontoise, 10 hours	2018
			"Optique ondulatoire et ondes électromagnétiques", Licence 2, Univ. Cergy-Pontoise, 33 hours	2018
			"Physique Statistique avancée", M2, Univ. Cergy-Pontoise, 50 hours	2019
			Préparation aux oraux de concours, Licence 3, Univ. Cergy-Pontoise, 10 hours	2019
			"Optique ondulatoire et ondes électromagnétiques", Licence 2, Univ. Cergy-Pontoise, 33 hours	2019
			"Physique Statistique avancée", M2, Univ. Cergy-Pontoise, 50 hours	2020
			Préparation aux oraux de concours, Licence 3, Univ. Cergy-Pontoise, 10 hours	2020
			"Optique ondulatoire et ondes électromagnétiques", Licence 2, Univ. Cergy-Pontoise, 33 hours	2020
ORLAND	Henri	C	"Electrostatic Interactions in Soft and Biological Matter", International Master Course in Physics of Complex Systems, ICTP, Trieste, 20 hours	2019
SANGOUARD	Nicolas	C	"Quantum communication", advanced course for 4th year and PhD students, EPFL, Switzerland, 28 hours	2022
SERBAN	Didina	A	"Symmetries and Integrable Models", M2, Univ. Cergy-Pontoise, 30 hours	2021
			"TP Optique/Mécanique", Univ. Cergy-Pontoise, 12 hours	2021
			"Symmetries and Group Theory", Master, Univ. Cergy-Pontoise, 30 hours	2021
			"Advanced quantum mechanics", M1, Univ. Cergy-Pontoise, 40 hours	2022
			"Statistical Physics", travaux dirigés, École Polytechnique, 40 hours	2023
			"Electrodynamics", travaux dirigés, École Polytechnique, 14 hours	2023
VERNIZZI	Filippo	B	Tutorials in "General Relativity", Master 2 International Centre for Fundamental Physics, École Normale Supérieure, Paris, 20 hours	2021
			Tutorials in "General Relativity", Master 2 International Centre for Fundamental Physics, École Normale Supérieure, Paris, 20 hours	2022
			Tutorials in "General Relativity", Master 2 International Centre for Fundamental Physics, École Normale Supérieure, Paris, 20 hours	2023
			Tutorials in "General Relativity", Master 1 of the Université Paris Diderot, 20 hours	2020
			Tutorials in "General Relativity", Master 1 of the Université Paris Diderot, 20 hours	2021
			Tutorials in "General Relativity", Master 1 of the Université Paris Diderot, 20 hours	2022
			Tutorials in "General Relativity", Master 1 of the Université Paris Diderot, 20 hours	2023
			"Dark energy", course at the International School for Advanced Studies (SISSA), Italy, 10 hours	2019

18/25
3 - Ressources de l'unité
5 - Indices de reconnaissance de l'unité - Période de référence : du 01/01/2018 au 31/12/2023

Vague E : campagne d'évaluation 2024-2025

	Nom du contrat	Type de contrat	Nom et Prénom du responsable au sein de l'unité	Porteur (O/N)	Nom de l'équipe ou des équipes	Dates du contrat (début, fin)	Montant total et part revenant à l'équipe ou à l'unité, en k€
Contrats internationaux (hors Europe)	Deconstructing the String Landsacpe	Bourse de la fondation TEMPLETON	Bena, Iosif	O	A	2018-2021	177
	CEFIPRA CSRP	Indo-French Centre for the Promotion of Advanced Research	Pépin, Catherine	O	C	2022-2025	100
	Higgs Boson Mass from Cosmology, and its experimental tests	FACCTS - France and Chucao Univ. Fundings	D'Agnolo, Raffaele	O	B	2022-2024	25
	Discrete Quantum integrability https://www.nsf.gov/awardsearch/showAward?AWD_ID=1802044&HistoricalAwards=false	US National Science Foundation - Continuing Grant	Di Francesco, Philippe	O	A	2018-2020	265
	Research in Combinatories https://www.nsf.gov/awardsearch/showAward?AWD_ID=1937241&HistoricalAwards=false	US National Science Foundation - Continuing Grant	Di Francesco, Philippe	O	A	2020-2025	2 493
	Holography in Quantum Gravity	FACCTS - France and Chucao Univ. Fundings	Guica, Monica	O	A	2022-2024	24
	Theoretical Challenges for the Electron-Ion Collider	France-Berkeley Univ. Fund	Iancu, Edmond	O	B	2023-2025	12
	Bourse pour William Faugno	Chateaubriand Fellowship	Jolicoeur, Thierry	O	C	2019-2020	13
	Observing the minibang through its fluctuation spectrum	USP-COFECUB and FAPESP-CNRS - collaborations avec le Bresil	Ollitrault, Jean-Yves	O	B	2016-2019	20
Contrats européens	Ampl2Einstein	H2020 - ERC	Kosower, David	O	B	2021 - 2025	2 297
	ASYMMETRY	H2020 MSCA Staff Exchange	Lavignac, Stéphane	O	B	2023 - 2026	28
	CHAMPAGNE	H2020 - ERC Advanced grant	Pépin, Catherine	O	C	2016 - 2021	1 318
	CoSP	H2020 MSCA Staff Exchange	Zdeborova Lenka	N	C	2019-2024	870 - 111
	EMERGENT Emergent spacetime and maxima	H2020 - ERC Starting grant	Guica, Monica	O	A	2016 -2022	1 495
	ELUSIVES	H2020 - MSCA - ITN	Lavignac, Stéphane	N	B	2016-2020	4
	HIPSAM	H2020 - Marie Curie - IF	Vanhove, Pierre	O	A	2020-2022	184
	HPCQS	H2020 - CP	Sangouard, Nicolas	N	C	2021-2025	6000-125
	INVISIBLESPlus	H2020-MSCA Staff Exchange	Lavignac, Stéphane	N	B	2016-2020	2322-31
	NLO-CO	H2020 - Marie Curie -IF	Vernizzi, Filippo	O	B	2017-2020	264
	NuQFT	H2020 - ERC Advanced grant	Saleur, Hubert	O	A	2015-2021	2 098
	PanScales	H2020 - ERC	Soyez, Grégory	N	B	2018-2024	2 465 - 223
	preQFT	H2020 - ERC	Carrasco, John Joseph	O	B	2015-2020	1 300
	PRESTIGE MULIAN	H2020 - Marie Curie - Cofund	Iancu, Edmond	O	B	2017-2018	15
	PRESTIGE ZERBINI	H2020 - Marie Curie - Cofund	Vanhove, Pierre	O	A	2017-2019	30
	QBH	H2020 - ERC	Warner, Nicholas	O	A	2019-2024	2 463
	QGBoot	H2020 - ERC Starting grant	Perlmutter, Eric	O	A	2020-2025	1 444
	QIA	H2020 - CP	Sangouard, Nicolas	N	C	2020-2022	10000-114
	QIA Phase 1	H2020 - CP	Sangouard, Nicolas	N	C	2022-2026	24000-306

	QSNP	H2020 - CP	Sangouard, Nicolas	N	C	2023-2026	25000-300
	ReNewQuantum	H2020 - ERC - Synergy grant	Eynard, Bertrand	O	A	2019-2025	2 139
	SAGEX	H2020 - Marie Curie - ITN	Carrasco, John Joseph	N	B	2018-2022	3984-414
	SMILE	H2020 - ERC Starting grant	Zdeborova Lenka	O	C	2017-2022	1 347
	Stringlandscape	H2020 - ERC - Consolidator	Grana, Mariana	O	A	2018-2024	1 669
	TopoRosetta	H2020 - ERC Starting grant	Wieder, Benjamin	O	C	2023-2028	1 500
Contrats nationaux (ANR, PHRC, FUI, INCA, réseau des MSH, etc.)	AGRUME	ANR	Vanhove, Pierre	N	A	2017-2021	323
	AMPLITUDES	ANR	Kosower, David	O	B	2017-2022	254
	BLACK-DS-STRING	ANR	Bena, Iosif	O	A	2016-2021	414-237
	COLSS	ANR	Vernizzi, Filippo	O	B	2022-2026	283
	CONFICA	ANR	Saleur, Hubert	N	A	2022-2026	263
	DENSEQCD@LHC	ANR	Iancu, Edmond	O	B	2016-2022	474-269
	Discrete integrable systems from geometry and statstical mechanics	CNRS - Tremplin @ INP	Ramassamy, Sanjay	O	A	2021-2021	7
	ELROND	ANR JCJC	Fleury, Pierre	O	B	2023-2027	380
	EUHiggs	ANR	d'Agnolo, Raffaele	O	B	2023-2027	306
	GERASIC	ANR	Nonnenmacher, Stéphane	N	A	2013-2019	232
	GRAAL	ANR	Guitter, Emmanuel	N	C	2014-2018	442
	OPTIMALJETS	ANR	Soyez, Gregory	O	B	2016-2019	208
	QUANTACT	ANR	Eynard, Bertrand	N	A	2016-2020	289
	RETENU	ANR	Mallick, Kirone	N	C	2021-2025	81
	SMAGP	ANR	Vanhove, Pierre	O	A	2021-2024	154
	SODUCO	ANR	Barthelemy, Marc	N	C	2019-2023	546
	UNESCOS	ANR	Pépin, Catherine	N	C	2014-2018	71
	Collaboration avec le Brésil	IRP CNRS	Serban, Didina	O	A	2023-2028	10
Contrats financés dans le cadre du PIA (idex, i-site, labex, équipex, etc.)	Accueil Mr Luzum	LABEX P2IO	Ollitrault, Jean-Yves	O	B	2022-2023	7
	BACQ	France 2030 - ANR	Misguich, Grégoire	N	C	2023-2026	187
	BEGROHU PALM	LABEX PALM	Biroli, Giulio	O	C	2018-2019	10
	CLAND - RD43	Instituts de Convergence	Barthelemy, Marc	N	C	2021-2025	72
	CLAND 2 - RD45	Instituts de Convergence	Barthelemy, Marc	N	C	2022-2025	68
	CLAND 3 - RD 58	Instituts de Convergence	Barthelemy, Marc	N	C	2023-2025	139
	Conf Conformal	LABEX LMH	Kostov, Ivan	O	A	2018-2019	2
	CONF STRING COSMOLOG	LABEX P2IO	Grana, Mariana	O	A	2019-2019	1
	Conference BOOST	LABEX P2IO	Soyez, Gregory	O	B	2018-2019	2
	Conference RANDOM	LABEX LMH	Ramassamy, Sanjay	O	A	2020-2024	5
	Conference STRING	LABEX P2IO	David, Francois	O	A	2020-2022	1
	Conference STRONG	LABEX P2IO	Gelis, François	O	B	2020-2022	2
	Conference SEWM	LABEX P2IO	Gelis, François	O	B	2022-2022	1
	CRISOSTOMI	LABEX P2IO	Vernizzi, Filippo	O	B	2017-2019	104
	DIQKD	PEPR	Sangouard, Nicolas	O	C	2022-2026	429
	DRISDISMBS	LABEX PALM	Misguich, Gregoire	O	C	2017-2019	62
	DynIntDisQuant	LABEX PALM	Schiro, Marco	O	C	2015-2018	146
	EPIQ	PEPR	Misguich, Grégoire	O	C	2022-2027	365
	EQUIDYSTANT	LABEX PALM	Foini, Laura	O	C	2019-2022	15
	Flagship BSM-NU	LABEX P2IO	Lavignac, Stephane	N	B	2020-2024	3120-100
	GARCIA LMH	LABEX LMH	David, Francois	N	A	2018-2020	1808-102
	Gluodynamics	LABEX P2IO	Ollitrault, Jean-Yves	N	B	2020-2024	3740-114
	GRADUATE SCHOOL	LABEX PALM	Mallick, Kirone	O	C	2023-2023	8
	HISTOIRE	IDéES avec UPSACLAY	Fleury, Pierre	N	B	2021-2029	40-5
	Igor PRLINA	LABEX P2IO	Bellazzini, Brando	N	B	2019-2020	14000-57
	IQUPS	LABEX PALM	Misguich, Gregoire	O	C	2017-2018	69
	ITZYKSON 2018	LABEX PALM	Biroli, Giulio	O	C	2018-2018	4
	ITZYKSON COMUE	LABEX P2IO	Bellazzini, Brando	O	B	2019-2019	3
	ITZYKSON2019	LABEX P2IO	Vernizzi, Filippo	O	B	2018-2019	3

	Journées ALEA	LABEX LMH	Bouttier, Jérémie	O	C	2021-2022	4
	LAMERS - LMH	LABEX LMH	Pasquier, Vincent	N	A	2021-2023	119
	SAMURAI	LABEX PALM	Zdeborova, Lenka	N	C	2016-2018	125
	SCOPI Paris-Saclay	LABEX P2IO	Brax, Philippe	O	B	2015-2022	9
	STAGE MASTER RD 307	LABEX PALM	David, Francois	O	A	2021-2024	2
	Stage Palm 141	LABEX PALM	Mallick, Kirone	O	C	2017-2021	3
	STATPHYSDISSYS	LABEX PALM	Urbani, Pierfrancesco	N	C	2017-2022	17000-21
	T. BUDD	LABEX LMH	Bauer, Michel	O	A	2016-2018	5149-126
	Valentin REYS	LABEX LMH	David, Francois	O	A	2022-2024	5940-123
	ZERBINI	LABEX LMH	David, Francois	O	A	2017-2019	102
Partenariats avec l'environnement socio-économique et culturel (contrats de R&D, revenus de la PI, Carnot, SATT, expertises et prestations, etc.)	Consulting on Quantum Key distribution Syster	Rohde & Schwarz GmbH & Co.	Sangouard, Nicolas	O	C	2021-2021	
Contrats avec les collectivités territoriales	PRFP 2022 - G. RIGO	Région Ile de France	d'Agnolo, Raffaele	O	B	2022-2024	131
	PRFP 2022 - S. CHRAKABORTY	Région Ile de France	Guica, Monica	O	A	2022-2024	131
	Domaine d'intérêt Majeur Science et Ingénierie pour les tehnologies quantiques (SIRTEQ)	Région Ile de France	Sangouard, Nicolas	O	C	2020-2021	50
Contrats financés par des associations caritatives et des fondations (ARC, FMR, FRM, etc.)							

7. Données du prochain contrat

7.1 - Type de demande

Situation proposée pour le prochain contrat

Tutelle de l'unité - Organisme de recherche

CEA
CNRS

	Nom de l'unité	Institut de Physique Théorique
Contrat 2026 - 2030	Acronyme de l'unité	IPhT
	Directeur(trice) proposé(e)	Mme Catherine Pépin
	Adjoint(e) proposé(e)	M. Grégory Soyez

Équipes de l'unité pour le contrat 2026/2030

N° équipe	Nom de la (du) responsable	Nom de l'équipe
A	Ramassamy, Sanjay	Physique mathématique, Théorie des cordes, gravitation
B	Bellazzini, Brando	Cosmologie et astrophysique, Physique des hautes énergies, matière hadronique
C	Jolicoeur, Thierry	Physique Statistique
D	Capdepon, Anne	Soutien à la recherche

7.2 - Liste prévisionnelle des personnels de l'unité au 01/01/2026

Nom	Prénom	H/F	Nom de l'équipe interne n°1	Établissement	Sections disciplinaires	HDR (Oui, ou case vide)	Date d'entrée
BANCAL	JEAN-DANIEL	H	C	CEA		Oui	11/2020
BARTHELEMY	MARC	H	C	CEA		Oui	03/1992
BAUER	MICHEL	H	A	CEA		Oui	01/2022
BELLAZZINI	BRANDO	H	B	CEA		Oui	07/2023
BENA	CRISTINA-VIORICA	F	C	CEA		Oui	07/2020
BENA	IOSIF	H	A	CEA		Oui	10/2006
BERNARDEAU	FRANCIS	H	B	CEA		Oui	09/1992
BLAIZOT	JEAN-PAUL	H	B	CNRS		Oui	03/2014
BOURGET	ANTOINE	H	A	CEA			09/2023
BRAX	PHILIPPE	H	B	CEA		Oui	10/1993
CAPDEPON	ANNE	F	D	CEA	J		11/2023
D'AGNOLO	RAFFAELE-TITO	H	B	CEA		Oui	11/2019
DAVID	FRANCOIS	H	A	CNRS		Oui	03/2022
DE LABORDERIE	EMMANUELLE	F	D	CEA	E		06/2012
DI FRANCESCO	PHILIPPE	H	A	CEA		Oui	06/2012
DIONISI	JUSTINE	F	D	CNRS	J		06/2022
DUPLANTIER	BERTRAND-H M	H	C	CEA		Oui	03/1995

EYNARD	BERTRAND	H	A	CEA		Oui	04/1995
FLOURET	CAMILLE	F	D	CEA	J		12/2019
FOINI	LAURA	F	C	CNRS	CoNRS 02		10/2018
GELIS	FRANÇOIS	H	B	CEA		Oui	11/2002
GIRAULT	PHILIPPE	H	D	CEA	E		05/2020
GOLINELLI	OLIVIER	H	C	CEA			01/2022
GRANA	MARIANA	F	A	CEA		Oui	10/2005
GUIDA	RICCARDO	H	A	CEA			05/1998
GUITTER	EMMANUEL	H	C	CEA		Oui	07/1989
HOUDAYER	JEROME	H	C	CNRS	CoNRS 02		09/2017
IANCU	EDMOND	H	B	CNRS	CoNRS 02	Oui	10/2014
JOLICOEUR	THIERRY	H	C	CNRS	CoNRS 02	Oui	10/2010
KORTCHEMSKI	GREGORI	H	B	CNRS	CoNRS 02	Oui	01/2007
KOSOWER	DAVID	H	B	CEA		Oui	05/1994
KOSTOV	IVAN	H	A	CNRS		Oui	04/2019
LAVIGNAC	STEPHANE	H	B	CNRS	CoNRS 02		09/2007
LUCK	JEAN-MARC	H	C	CEA		Oui	10/1982
MALLICK	KIRONE	H	C	CEA		Oui	09/2023
MAZAC	DALIMIL	H	A	CEA			08/2023
MINASIAN	RUBEN	H	A	CNRS	CoNRS 02	Oui	10/2007
MISGUICH	GREGOIRE	H	C	CEA		Oui	01/2001
MONTHUS	CECILE	F	C	CNRS	CoNRS 02	Oui	10/2010
OLLITRAULT	JEAN-YVES	H	B	CNRS	CoNRS 02	Oui	01/2007
ORLAND	HENRI	H	C	CEA		Oui	08/2023
PASQUIER	VINCENT	H	A	CEA		Oui	12/1983
PEPIN	CATHERINE	F	C	CEA		Oui	07/2000
PERLMUTTER	ERIC	H	A	CEA			12/2020
PESCHANSKI	ROBERT	H	B	CEA		Oui	09/2006
RAMASSAMY	SANJAY	H	A	CNRS	CoNRS 41 - CoNRS 02		10/2019
RIBAULT	SYLVAIN	H	A	CNRS	CoNRS 02	Oui	09/2017
SALEUR	HUBERT	H	A	CEA		Oui	12/2002
SANGOUARD	NICOLAS	H	C	CEA		Oui	12/2019
SAUBOY	LAURE	F	D	CEA	J		05/2003
SENGMANIVANH	PHENG-LAURENT	H	D	CEA	E		11/2007
SERBAN	DIDINA	F	A	CEA		Oui	03/1998
SOYEZ	GREGORY	H	B	CNRS	CoNRS 02	Oui	10/2018
URBANI	PIERFANCESCO	H	C	CNRS	CoNRS 02	Oui	10/2016
VALAGEAS	PATRICK	H	B	CEA		Oui	10/1998
VANHOVE	PIERRE	H	A	CEA		Oui	10/2000
VERNIZZI	FILIPPO	H	B	CEA		Oui	10/2008
WIEDER	BENJAMIN	H	C	CEA			10/2022

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