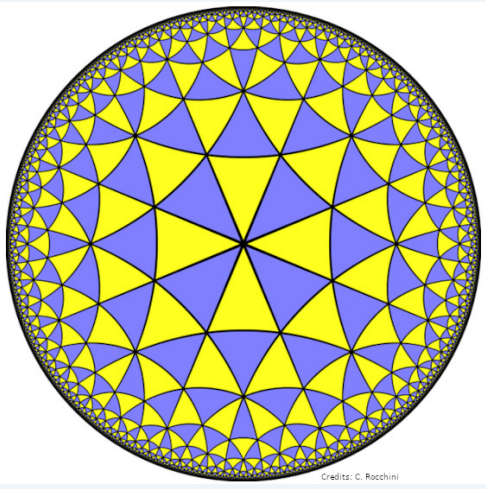
Institut de Physique Théorique

Theoretical physics courses



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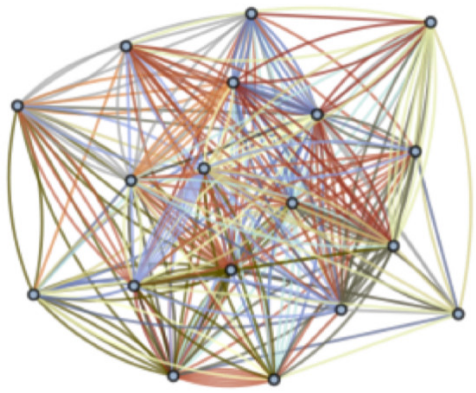

Advances in 2D holography

Luca Iliesiu (Stanford University)

Schedule (revision 2023-05-03): May 22nd (10:00–12:30), 26th (10:00–12:30 and 15:00–17:30), 30th (10:00–12:30), and 1st of June 2023 (10:00–12:30). In person at IPhT and online.

In the past years, quantum effects in the gravitational path integral have given us an accurate picture of how black holes behave close to extremality. In particular, while the fluctuations of most modes are small in the semi-classical limit, a particular set of modes, the modes of JT gravity, have large fluctuations and lead to drastic corrections to the black hole entropy. In the first three lectures, I shall review these developments, describing our new understanding of the behavior of both supersymmetric and non-supersymmetric black holes.

In the last two lectures, our focus shall shift toward understanding JT gravity as a toy model of holography. In this part of the course, I shall review the relation between JT gravity and matrix integrals. This will then allow us to understand how several versions of the black hole information paradox can be addressed in this toy model.

Program of the course:

1. Black hole thermodynamics and the problem with the extremal limit.
2. From near-extremal black holes to JT gravity.
3. Perturbative corrections to the black hole entropy.
4. Beyond perturbative corrections: JT gravity and matrix integrals.
5. Addressing the black hole information paradox and beyond.

To receive the latest news on this course and the video-conference links, please subscribe to its newsletter, as explained at the website `courses.ipht.fr`. An open, non-interactive livestream will also be available at `youtube.com/ipht-tv`.

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