



Cours de physique théorique

agrée par l'École doctorale "Physique en Ile de France" - ED PIF

Cosmic inflation

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(IPhT)

Les vendredis 6, 13, 20 et 27 mars, 3 avril 2015 à 10h

Inflation is currently the most successful early-universe scenario. It succeeds in solving the shortcomings of the standard big-bang model through a period of accelerated expansion which makes the Universe very flat and homogeneous. But its most striking feature is that it can explain the origin of the primordial cosmological perturbations as the result of the amplification of quantum vacuum fluctuations during the accelerating phase. These primordial fluctuations have sourced the first inhomogeneities in the Universe and have left their trace in the cosmic microwave background radiation and in the large-scale structures that we observe today. Testing inflation and the origin of such primordial perturbations is one of the main goals of current and future cosmic surveys.

The aim of these lectures is to introduce the students to the inflationary scenario, its motivations, some of its concrete realizations, its predictions and problems. The course is introductory and addressed to an audience with a very minimal knowledge of quantum field theory and general relativity.

The plan of the lectures is the following:

- Basics of the hot big-bang cosmology
- Cosmological problems and their solution
- What causes inflation and how inflation ends
- Amplification of quantum vacuum fluctuations during inflation
- Cosmological perturbations and inflationary observables
- Observing inflation with the CMB
- Primordial non-Gaussianities

Lieu : IPhT, CEA Saclay, Orme des Merisiers, Bât. 774, p. 1A Salle C. Itzykson.

Accès : navettes CEA du RER B Le Guichet vers CEA Ormes, toutes les 15 minutes de 8h00 à 9h45
ou bus publics Mobicaps 9 et 10, Albatrans 91.06 et 91.10.

Renseignements : <http://ipht.cea.fr> ou ipht-lectures@cea.fr