Biséminaire Friedmann CPHT-LLR

May 6, 2025 -

Salle Louis Michel, CPHT, École polytechnique

11:00

Sébastien Renaux-Petel

Institut d'Astrophysique de Paris

New Particles in the Sky

Inflation literally acts as a cosmological collider: it spontaneously produces all types of particles, which leaves peculiar imprints in the correlation functions of primordial density fluctuations. Primordial correlators thus hold the key to high-energy physics inaccessible by other means. However, they are much harder to compute than flat space amplitudes. In this talk, I will describe these opportunities and challenges, as well as analytical and numerical techniques that have been developed in the past few years to better understand quantum field theory in curved spacetime.

14:30

Laboratoire de Physique ENS Paris

Vincent Vennin Quantum diffusion and primordial black holes in the early universe

When primordial inhomogeneities are produced with sufficiently large amplitude in the early universe, they may subsequently collapse into primordial black holes. I will explain why the effect of quantum diffusion during inflation needs to be taken into account in such a case, and how the statistics of cosmological fluctuations can be predicted within the formalism of stochastic inflation. Quantum diffusion leads to a peculiar type of non-Gaussianity that cannot be captured by perturbative parametrisations. This leaves specific imprints on the statistics of collapsed structures that I will discuss. In particular, I will present recent results on the clustering of primordial black holes, which conditions the rate at which they merge and emit gravitational waves.

Comité Friedmann: S. Biermann, J.-R. Chazottes, M. de Naurois, P. M. Petropoulos, Y. Sirois











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