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Seminar of the Gravity and cosmology group of IJCLAB

Lundi 20 Janvier 2025, 14 :00
IJCLAB, 210/1-114 - Salle des Séminaires
Domaines : gr-qc

Titre : *New particles in the sky*

Orateur : **Sébastien Renaux-Petel (IAP)**

Résumé : *The field of primordial non-Gaussianities is twenty years old. During that time, cosmologists have built a dictionary between the physics active during inflation and higher-order correlation functions of primordial density fluctuations. I will argue that this dictionary is far from complete, with theoretical predictions available only in restricted classes of theories. To fill in this gap, I will present the cosmological flow, a complete and systematic approach to compute inflationary correlators for all inflationary theories. This enables us to assist our theoretical understanding and to generate theoretical data for an unbiased interpretation of upcoming cosmological observations. I will explain that the cosmological collider signal, lying in soft limits of correlators, often described as a robust probe of the field content of inflation, is as robust as its assumptions are restrictive, and I will show its properties in theories involving multiple degrees of freedom, with strong mixing, in the presence of features, and with non-trivial sound speeds. Eventually, I will describe another signal that would reveal the existence of additional heavy fields in a simpler and complementary manner to the cosmological collider : the low-speed collider signal arises when the curvature perturbation propagates at a reduced speed of sound, and it is characterised by a resonance in mildly-soft kinematic configurations of correlators. It can be understood in terms of a single-field effective field theory, albeit one that breaks the usual assumption of locality. Besides, I will show that this framework can naturally accommodate parity violation when the extra field is spinning.*