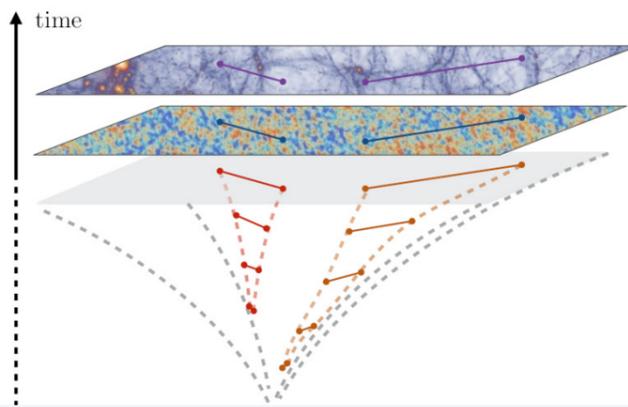


Institut de Physique Théorique

Theoretical physics courses



Cosmological Correlators: Theory and Phenomenology

Guilherme L. Pimentel (SNS, Pisa)

*Friday, March 20 2026, 10:00–12:15 and 14:15–16:30; Monday, March 23, 10:00–12:15;
Friday, March 27, 10:00–12:15. In person at IPhT and live online.*

All the information we will ever obtain from the early universe is imprinted in the spatial correlations of primordial fluctuations at the hot Big Bang. I will explain how an influx of ideas from various areas of fundamental physics is providing us with new conceptual and practical tools to decode the physics of these primordial fluctuations. A thorough understanding of the fluctuations will give us insight into particle physics at the highest energies and may provide a window into the nature of spacetime itself.

In these lectures I will review the current status of the theory and phenomenology of cosmological correlators — the observable which encodes the statistics of primordial fluctuations.

- I will give a broad overview of inflationary perturbation theory, the current observational status and future prospects for constraining inflation;
- Motivate the EFT perspective on primordial fluctuations, and propose “cosmological collider physics” as a way to probe the UV completion of inflation;
- Explain the various methods to compute cosmological correlators: the in-in formalism, the wavefunction of the universe, and the cosmological bootstrap;
- Give a survey of recent theoretical developments that draw inspiration from the scattering amplitude and conformal field theory literature.

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