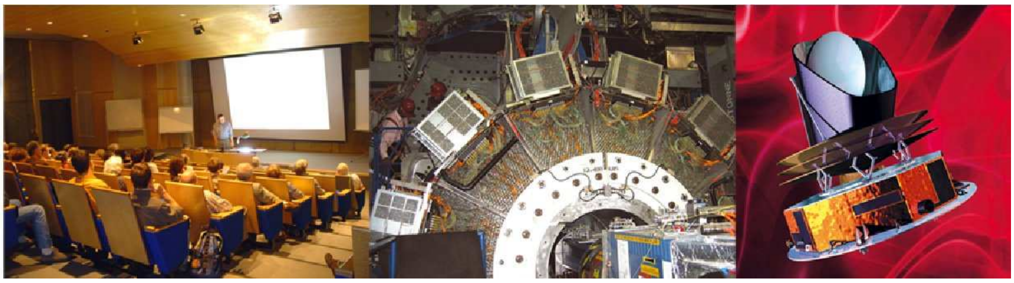
LABORATOIRE DE L'ACCÉLÉRATEUR LINÉAIRE



Séminaire du Laboratoire de l'Accélérateur Linéaire

Josquin Errard

Institut Lagrange de Paris (ILP)

Mardi 26 Janvier 2016 à 11 :00

Forecasts on fundamental physics from the foreground-obscured, gravitationally-lensed CMB polarization

First, I will introduce the POLARBEAR instrument as well as the latest published results, in particular one of the first direct detections of the lensing B-modes. Second, I will summarize the article Errard et al (2015, 1509.06770) which forecasts constraints on fundamental physics after the recent demonstration that Galactic foregrounds are an unavoidable obstacle in the search for evidence of inflationary gravitational waves in the cosmic microwave background (CMB) polarization. Beyond the foregrounds, the effect of lensing by intervening large-scale structure further obscures all but the strongest inflationary signals permitted by current data. With a plethora of ongoing and upcoming experiments aiming to measure these signatures, careful and self-consistent consideration of experiments' foreground- and lensing-removal capabilities is critical in obtaining credible forecasts of their performance. My collaborators and I investigated the capabilities of various instruments to clean contamination due to polarized synchrotron and dust from raw multi-frequency data, and remove lensing from the resulting co-added CMB maps (either using iterative CMB-only techniques or through cross-correlation with external data such as LSST lensing). Incorporating these effects, we presented forecasts for the constraining power of these experiments in terms of inflationary physics, the neutrino sector, and dark energy parameters. Made publicly available through an online interface, we developed a tool that enables the next generation of CMB experiments to foreground-proof their designs, optimize their frequency coverage to maximize scientific output, and determine where cross-experimental collaboration would be most beneficial. We showed that analyzing data from ground, balloon and space instruments in complementary combinations can significantly improve component separation performance, delensing, and cosmological constraints over individual datasets.

Salle 101 du LAL - Bât. 200, Orsay

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