



ID de Contribution: 53

Type: Non spécifié

# Bayesian Inference with Differentiable Simulators for the Joint Analysis of Galaxy Clustering and CMB Lensing

*mercredi 3 juin 2026 09:30 (30 minutes)*

We present our work towards a field-level inference (FLI) pipeline for the joint analysis of DESI galaxy clustering and CMB lensing from Planck and ACT. Using synthetic data, we demonstrate an end-to-end Bayesian framework that jointly samples the posterior of the initial density field, galaxy bias, and cosmological parameters ( $\Omega_m$ ,  $\sigma_8$ ).

Our differentiable forward model propagates Gaussian initial conditions through Lagrangian Perturbation Theory (2LPT), applies a Lagrangian bias expansion, and computes CMB lensing convergence along the LOS via the Born approximation. The joint likelihood combines galaxy number density with the convergence map observations, incorporating Planck PR4 reconstruction noise and analytically marginalizing over the unmodeled high- $z$  lensing contribution beyond the simulation volume.

We demonstrate efficient exploration of the high-dimensional posterior using the MCLMC sampler. Preliminary results suggest that the joint analysis tightens parameter constraints. This work is a step toward applying FLI to real data to constrain large-scale physics, such as (local) primordial non-Gaussianity.

**Auteur:** HAWLA, Jonathan (CEA Paris-Saclay)

**Orateur:** HAWLA, Jonathan (CEA Paris-Saclay)

**Classification de Session:** Wednesday Morning