

# Probing Inflation with PICO: Simulations and Delensing for CMB B-Modes

*mardi 10 juin 2025 12:10 (20 minutes)*

The polarized cosmic microwave background (CMB) signal can be decomposed into parity-even E-modes and parity-odd B-modes. The inflationary signal would manifest itself as a B-mode signal. An inflationary period at the beginning of the Universe imprints a B-mode signal in the polarization of the CMB and if the energy scale of inflation is large enough the signal may be detectable. At a maximum the signal is one part in  $10^8$  relative to the nearly uniform glow of the CMB, and it could be lower. Unambiguously detecting the signal requires precise subtraction of confounding foregrounds, which have much larger amplitude. One such foreground is B-modes generated by gravitational lensing of E-modes, a process called 'lensing'. Accounting for and removing this foreground is called 'delensing'.

PICO - the Probe of Inflation and Cosmic Origin - is a proposed NASA space mission that has been endorsed for implementation by the US Astro2020 Decadal Panel. Its data will give the most sensitive probe for the B-mode inflationary signal. I will describe my contributions to developing the mission through conducting simulations and validating the efficacy of delensing.

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**Classification de Session:** COLOURS Workshop