

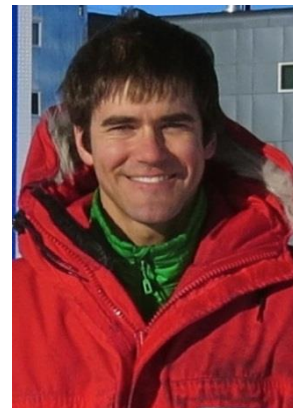


LABORATORY FOR ELEMENTARY-PARTICLE PHYSICS (LEPP)

Joint Experimental and Theory Seminar in Particle Physics and Cosmology:

Searching for Cosmic Inflation:

CMB Polarization B-mode
Delensing with SPTpol and
Herschel



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Cosmic inflation in the early universe is expected to have produced a background of primordial gravitational waves (PGW), which induce a curl or "B-mode" component in the polarization of the cosmic microwave background (CMB). In many inflation models, this B-mode signal is predicted to be at a level detectable by current or next-generation CMB experiments. Observed B modes also contain a component produced when primordial E modes are gravitationally lensed; current searches for PGW are already limited by contamination from these "lensing B modes." If the PGW signal is sufficiently small, detecting this signal will require characterizing and removing the lensing B modes using a process referred to as "delensing." This process has been studied theoretically and with simulations but has not been demonstrated with data until now. I will present delensing of a measurement of the CMB B-mode power spectrum from SPTpol using data from Herschel as a tracer of the lensing potential. The measured B-mode power is reduced by 28 percent, in agreement with predictions from simulations, and the null hypothesis of no delensing is ruled out at 6.9 sigma. This work represents a crucial step on the road to detecting primordial gravitational waves.

Friday, September 1st, 2017
1:00pm
401 Physical Sciences Bldg.