

DEPARTMENT OF PHYSICS
COLLEGE OF ARTS AND SCIENCES

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students

FOR APPLICATION YEAR: 2026

PROJECT TITLE: Cosmology with the Cosmic Microwave Background

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Project Description

The Cosmic Microwave Background (CMB) is the oldest light in the universe, providing a snapshot of conditions less than 400,000 years after the Big Bang. The Cincinnati CMB group is involved with the BICEP series of telescopes, which are currently collecting data from the South Pole. The scientific focus of BICEP is to measure the signature of primordial gravitational waves via the polarization pattern of the CMB.

The UPRISE student will pursue one of several possible data analysis projects. Topics include instrumental calibration for BICEP3 or BICEP Array, studies of Galactic foreground emission, or statistical analyses including likelihood methods or machine learning. This project will develop computing and data analysis skills, as well as the fundamentals of observational cosmology. Prior programming experience is helpful, but not required.