

DEPARTMENT OF PHYSICS  
COLLEGE OF ARTS AND SCIENCES

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students

FOR APPLICATION YEAR: 2024

PROJECT TITLE: Cosmology with the Cosmic Microwave Background

Colin Bischoff  
College of Arts and Sciences  
Geology/Physics Building Room 421  
bischocn@ucmail.uc.edu  
phone: 513-556-0515

### 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 currently observe from the South Pole, and with the next-generation CMB-S4 project. The scientific focus of the BICEP telescopes, and one of the major goals of CMB-S4, 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, simulations of CMB-S4, studies of galactic foreground emission, or statistical analyses that use data from a variety of sources to constrain cosmology. This project will develop computing and data analysis skills. Prior programming experience is helpful, but not required.