



Cryogenic detector arrays and readout for AdvACTPol

Main author:

HENDERSON Shawn

Co-authors:

Henderson Shawn, Cornell University

n/a n/a, Advanced ACTPol Collaboration

Advanced ACTPol is a polarization sensitive upgrade for the 6-meter aperture Atacama Cosmology Telescope (ACT) that adds new frequencies and increases the sensitivity of the ACTPol receiver. Starting in 2016 Advanced ACTPol will be used to map roughly half the sky in five frequency bands spanning from 30 - 220 GHz. The high angular resolution polarization and intensity maps produced will enable precision cosmological constraints on both primary and secondary CMB anisotropies as well as a wide array of cross-correlation science. To accomplish its scientific goals, Advanced ACTPol will require substantial upgrades to the existing ACTPol receiver, including four new multichroic arrays of feedhorn-coupled AlMn TES polarimeters fabricated on 150 mm diameter wafers, continuously rotating metamaterial silicon half wave plates, and a new SQUID-based time division multiplexing readout architecture with a 64-row multiplexing factor. The status and scientific goals of the Advanced ACTPol instrument will be presented, with particular emphasis on the design and implementation of the Advanced ACTPol cryogenic detector arrays.