

School of Physics & Astronomy Center for Detectors Seminar

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Roger O'Brient

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Bio: Roger O'Brient received his BS from Caltech and PhD from UC Berkeley, with a focus on astrophysics instrumentation. The detectors from his doctoral thesis are "mult-chroic" antenna-coupled TES bolometers that are being used by Polarbear, SPT, the EBEX balloon, and JAXA's Lightburd satellite.

He is currently a NASA postdoctoral scholar at NASA's Jet Propulsion Laboratory at Caltech where he manages the CMB detectors program that has provided detectors for BICEP2, Keck Array, BICEP3, and SPIDER. Currently, he is exploring how these detectors can be used to implement intensity mapping to explore a variety of cosmological experiments.

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Moore's law and astrophysics: detectors that teach us about physics beyond the standard model

Abstract: Data from modern submillimeter telescopes and in particular, their detectors, are teaching us about the history of our universe over the longest and shortest time-scales, and informing us of the laws of physics beyond the standard model. These detectors share the common feature of integrating quasi-optical components such as antennas, power dividers and hybrids, filters, and even spectrometers "on chip" with the detectors into monolithic packages. In this talk, I will discuss several examples of this technology including ones that let us test models of inflation by searching for inflationary gravitational waves (via the BICEP and Keck Array telescopes) and others that let us test the neutrino mass hierarchy (via Polarbear and South Pole Telescope). While these specific telescopes use the microwave background as their basic data set, the technology is more broadly applicable to submillimeter emissions from regions other than the last scattering surface. I will discuss how future extensions of this technology may let us learn the detailed history of reionization as well as deepening our constraints on Dark Energy.