

Amy Bender – HEP Seminar – March 19, 2024
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Superconducting detectors: A technology revolution advancing
microwave cosmology

Microwave cosmology has rapidly advanced our understanding of the universe over the past two decades, progress that has been driven by advances in superconducting detector technology. Arrays of transition-edge sensor (TES) bolometers are now fabricated with nearly ideal sensitivity, allowing ultraprecise measurements of the microwave sky. One example is the 16,000 element array of TES detectors in use in the SPT-3G receiver currently installed on the South Pole Telescope. I will describe the SPT-3G TES array and some of the technical challenges encountered during development. I'll also look forward to some of the challenges anticipated for the upcoming CMB-S4 experiment and its planned order of magnitude increase to nearly half a million detectors.