

## The Design and Integrated Performance of SPT-3G

*Tuesday 13 July 2021 15:00 (15 minutes)*

SPT-3G is the third survey receiver operating on the South Pole Telescope dedicated to high-resolution observations of the cosmic microwave background (CMB). Sensitive measurements of the temperature and polarization anisotropies of the CMB provide a powerful dataset for constraining the fundamental physics of the early universe, including models of inflation and the neutrino sector. Additionally, CMB surveys with arcminute-scale resolution are capable of detecting galaxy clusters, millimeter-wave bright galaxies, and a variety of transient phenomena. The SPT-3G instrument provides a significant improvement in mapping speed over its predecessors, SPT-SZ and SPTpol. The broadband optics design of the instrument achieves a 430 mm diameter image plane across observing bands of 95 GHz, 150 GHz, and 220 GHz, with 1.2 arcmin FWHM beam response at 150 GHz. In the receiver, this image plane is populated with 2690 dual-polarization, trichroic pixels (~16000 detectors) read out using a 68X digital frequency-domain multiplexing readout system. In 2018, SPT-3G began a multiyear survey of 1500 deg<sup>2</sup> of the southern sky. I will summarize the unique optical, cryogenic, detector, and readout technologies employed in SPT-3G, and I will report on the integrated performance of the instrument.

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