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Development of Low-Frequency Space-Optimized TES Bolometer Arrays for LiteBIRD

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LiteBIRD is a cosmic microwave background polarization experiment with the goal of measuring the tensor-to-scalar ratio with a total uncertainty of $\delta r < 0.001$. It will survey the full sky for three years in 15 frequency bands spanning 34 to 448 GHz. We are developing detector arrays for the six lowest frequency bands, 34 to 99 GHz. The arrays are populated with lenslet-coupled sinuous antennas, two types of triplexer filters, and transition-edge sensor (TES) bolometers. We have measured the electrical and thermal properties of these space-optimized TES bolometers. The design balances requirements for low saturation power of the space environment while maintaining a fast time response for use with a continuously-rotating half-wave plate. We have achieved detector saturation powers below 1 pW, with time constants faster than 1 ms, at a 100 mK bath temperature using both time- and frequency-division multiplexed SQUID readout systems.

Less than 5 years of experience since completion of Ph.D

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