Contributed Talk

Dual-polarization Sensitive Kinetic Inductance Detectors for Balloon-borne FIR Polarimetry

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We are developing arrays of kinetic inductance detectors for wide-bandwidth, far-infrared (FIR) polarimetry that will be deployed on the BLAST balloon-borne instrument. Each 2$f\lambda$-spaced pixel in an array is feedhorn-coupled and contains two lumped-element kinetic inductance detectors (LEKIDs) made of TiN. The absorbing, inductive sections of the LEKID-pair are orthogonal, which allows simultaneous measurement of both horizontal and vertical polarizations within one spatial pixel. In this paper, we discuss the design optimizations required to achieve background-limited sensitivity at FIR power loads relevant for a balloon-borne experiment. We show results from initial test devices fabricated from stoichiometric TiN (T_c ~4.5 K) on silicon substrates. Resonator quality factors exceed 10^6, good control of the coupling Q is achieved, and microstrip feed-line coupling exhibits a low voltage standing wave ratio. Measurements of frequency noise as a function of interdigitated capacitor size in TiN LEKIDs are presented.