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ORIGINAL ARTICLE

Development of Kinetic Inductance Detectors for Cosmic Microwave Background experiments

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Abstract We describe the design, optimization, electrical and optical tests of Microwave Kinetic Inductance Detectors (MKIDs) for the mm-wave range. Our detectors are based on a novel resonator design, and are suitable for ground-based astronomical observations in the 143 GHz atmospheric window. The measured optical Noise Equivalent Power (NEP) at 0.3 K is $\sim 10^{-16}$ W/$\sqrt{\text{Hz}}$ under a 300 K background load. This is equivalent or better than the performance of the best current bolometric detectors for the 140 GHz atmospheric window, limited by atmospheric noise in the best available sites. We also describe which improvements can be introduced to reduce the NEP of our detector, for lower background applications (narrow band or space-based).

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