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Current State of Thermal Kinetic Inductance Detectors for Ground-Based Millimeter Wave Cosmology

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Thermal Kinetic Inductance Detectors (TKIDs) are a promising path towards combining the excellent noise performance of traditional bolometers with an RF multiplexing architecture that enables the large detector counts needed for the next generation of millimeter wave instruments. In this work, we present dark prototype TKID pixels that achieve background limited noise performance in the 150 GHz band and at higher frequencies. We demonstrate that with a common-mode noise rejection strategy, we achieve good noise stability down to 0.1 Hz. We discuss the optimizations in the device design and fabrication techniques that were necessary to achieve good electrical performance and high-quality factors at our operating temperature. These improvements directly translate to a low readout noise penalty for improved multiplexing capabilities.

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

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Student (Ph.D., M.Sc. or B.Sc.)

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