

New Technologies for Discovery IV: The 2018 CPAD Instrumentation Frontier Workshop

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Development of Antenna-Coupled Lumped-Element KID for CMB Observations

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Kinetic Inductance Detectors (KIDs) have become an attractive choice of detector in the sub-mm and mm observing community due to their innate frequency multiplexing capabilities and simple lithographic processes. These advantages make KIDs a viable option for the $O(500,000)$ detectors needed for the next generation CMB experiments, such as Cosmic Microwave Background - Stage 4 (CMB-S4) experiment. We developed a novel design of an antenna-coupled lumped element KID design optimized for CMB detection. Light is focused via alumina lenses to polarization-sensitive dual-slot antennae. A Nb/SiN/Nb microstrip line carries the signal to an Al/Nb KID. We present the design, fabrication process, and preliminary performance of a prototype array, and comment on the current status and future plans of this design.

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