

MICROWAVE KINETIC INDUCTANCE DETECTOR READOUT USING RFSOC

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Microwave Kinetic Inductance Detectors (MKIDs) are poised to overtake the more established Charge Coupled Device (CCD) technology because they are easy to multiplex into large arrays, can deliver a time resolution of 2 microseconds, and are capable of single photon counting without read noise or dark counts with energy resolution across the ultraviolet, visible, and infrared (UVOIR) spectrum. Currently, MKID arrays require large, complex, power-intensive readout electronics which present a major obstacle to MKID deployment in space. We plan to address this limitation by designing a new readout system incorporating CASPER blocks and the newly released Xilinx programmable computing chip: the Zynq UltraScale+ RFSoc. Successful implementation will decrease the readout system weight by 85% and volume by 85% all while using 1/20th the power. This upgrade will further increase the feasibility of utilizing MKID technology for a wide variety of astronomy research.