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Readout systems for large arrays of superconducting resonators for astronomical imaging and spectroscopy

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Arrays of superconducting resonators are used for astronomical imaging, polarimetry and spectroscopy as well as in other areas requiring sensitive metrology such as quantum sensing and computation. The low loss of superconducting components enables large numbers of these resonators to be read out using frequency division multiplexing (FDM). I will discuss the system requirements and implementation of electronics for different FDM systems including readout of arrays kinetic inductance detectors (KIDs) and transition edge sensors (TES) for imaging polarimetry and spectroscopy. The power and mass/volume requirements for these readout electronics can be a limiting factor to the size of superconducting detector arrays, especially in constrained environments like balloon-borne or space-based platforms. The rapid development of radio frequency digital signal processing for commercial applications such as software defined radio is enabling larger multiplex ratios, lower power dissipation and smaller mass and volume.

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

N

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

N

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