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## Digital Readout of Cryogenic Detectors using Superconductor Integrated Circuits

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Superconductor mixed-signal integrated circuits (ICs) offer a compelling solution to the needs of cryogenic detectors. Digitizing detector outputs at low temperature, close to the detectors, ensures naturally noise-immune digital transport to room temperature. This is especially important as the number of detectors increase since analog signal transport is susceptible to crosstalk and noise pick-up. Superconductor integrated circuits, comprising digitizers and digital processors, feature low power conversion, high clock frequency for sampling and digital logic, high sensitivity, and radiation hardness. We describe design and measurement results of several types of readout circuitry: (a) sensitive and fast digitizers for superconducting nanowire single photon detectors (SNSPDs) followed by digital circuitry for optical communication, and (b) time-division multiplexer for detector arrays. We also describe future trends of scaling speed and complexity of superconductor digital circuitry that could enable systems with larger arrays of cryogenic detectors.

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