

Superconducting Nanowires for Detectors and Cryogenic Electronics

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Superconducting nanowires are a potential new cryogenic platform for particle detection. These detectors have been used for nearly two decades for single-photon detection, in various experiments having demonstrated photon-detection efficiency of 98%, jitter of < 3 ps, signal count rates of several 100 MHz with dark count rates of < 1 count per day. Recent experiments have demonstrated operational arrays of ~ 1000 elements, and have used these nanowires for dark-matter search. Additionally, superconducting nanowires have shown promise independently as a promising platform for cryogenic electronics, enabling easy integration with complex semiconductor-based amplifiers and readout. As a technology family, they thus have significant potential application to the field of particle detection. In this presentation, I will review the field of superconducting nanowire photodetection and electronics, and discuss potential applications to the field of particle detection.

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