

Looking Forward from Twenty Years of Superconducting Single-photon Detectors

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Abstract— Photon and particle detectors have been an important application of superconducting technologies, rivaling SQUID magnetic-field sensors for their breadth and depth of impact. But 20 years ago, in 2001, the range of available detector technologies expanded in an important new direction: single-photon detection in superconducting nanostrips. These detectors have since been demonstrated to have unrivaled timing precision, detection efficiency, and false count rates. Because of these features, nanostrips have become one of the fastest growing applications of superconducting detectors, with uses in LIDAR, quantum information science, space communications, fluorescence lifetime spectroscopy, integrated-circuit analysis, and even in the search for dark matter. Emerging development of large-format arrays and integrated superconducting readout electronics (some based on nanostrips as well) suggests that the next 20 years of these devices will be at least as exciting as the past 20 have been).

Keywords (Index Terms) — Digital, superconducting, electronics, adiabatic, low-power, quantum flux parametron, QFP.

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