

Superconducting Nanowire Single-photon Detectors and Imagers

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Abstract—Single-photon detection technology has overcome the limitations of traditional photodetectors, achieving detection sensitivity close to the quantum limit. Single-photon detector serves as a key device for quantum information technology and promotes the development of many applications that depend on light or photon, such as quantum communication, quantum computing, laser communication, LIDAR, and imaging. In recent years, research on superconducting nanowire single-photon detectors (SNSPDs) has evolved from initially pursuing improvements in basic performance such as single-photon detection efficiency to developing large-scale imaging arrays. Some performance bottlenecks of the detectors have also emerged. This report will introduce the recent progresses made by Nanjing University in the development of superconducting single-photon detectors and imagers, as well as related implementations of these devices in single-photon communication, spectral detection, active/passive imaging, and integrated optical quantum chips.

Keywords (Index Terms): Quantum Information Processing; Nanowire; single photon detector