

Superconducting Strip Photon Detectors and Quantum Applications

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Abstract — The pioneering work by Prof. Goltsman in 2001 brought us an unique detector: superconducting strip photon detectors (SSPDs), which are also called superconducting (nanowire) single photon detectors (SNSPDs). In 20 years, SSPDs have shown unparalleled performance and been applied into various fields, especially in quantum information. We are also excited to see a niche but growing market for SSPDs, as high-end scientific instruments. In this talk, I will introduce the detector and review some latest progress at SIMIT on improving the key metrics of SNSPDs, such as the detection efficiency (98%@1550nm) and the dark count rate ($\sim 1E-2$ cps). I will also summarize the applications of SSPDs in quantum information, such as quantum key distribution (QKD) and quantum computation. Some recent demonstrations will also be included, such as QKD over 1000 km fiber distance, high-rate QKD exceeding 110 Mb/s and solving graph problems using Gaussian Boson Sampling.

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