

Latest Advances in Superconducting Strip Photon Detectors at SIMIT-CAS

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Superconducting strip photon detectors (SSPDs), also known as superconducting nanowire single-photon detectors (SNSPDs) was first experimental demonstrated in 2001. Over the past two decades, SSPDs have demonstrated unparalleled performance and found applications in diverse fields, with particular prominence in quantum information science. Notably, they have emerged as high-end scientific instruments in a niche yet rapidly expanding market.

In this talk, I will introduce the detector architecture and then review the latest advancements at SIMIT in enhancing key SSPD metrics, including: high detection efficiency (99% at 1550 nm), ultra-low dark count rate ($\sim 10^{-2}$ cps), and photon-number resolving capability. I will also show some latest results on advanced SSPDs: (1) MMF-coupled SSPDs with high SNR [SDE of 81% with a DCR of 4 cps]; (2) Compacted 100-channel SSPD system with infinite possibilities. Finally, I will present the applications of SSPDs in quantum information processing, highlighting their role in cutting-edge technological implementations.