

Superconducting NbN-Nanowire Single-Photon Detectors Capable of Photon Number Resolving

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Abstract - We present our latest generation of ultra-fast superconducting NbN single-photon detectors (SSPD) capable of photon-number resolving (PNR). The novel SSPDs combine $10\ \mu\text{m} \times 10\ \mu\text{m}$ active area with low kinetic inductance and PNR capability. That resulted in significantly reduced photoresponse pulse duration, allowing for GHz counting rates. The detector's response magnitude is directly proportional to the number of incident photons, which makes this feature easy to use. We present experimental data on the performance of the PNR SSPDs. These detectors are perfectly suited for fibreless free-space telecommunications, as well as for ultra-fast quantum cryptography and quantum computing.

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