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Position-Sensitive Response of Single-Pixel Large-Area SNSPDs[1]

BRIAN LERNER, Oak Ridge National Lab — Superconducting nanowire single photon detectors (SNSPDs) are typically employed as single-pixel small-area detectors. Demand for large-area detectors is building for a variety of applications including microscopy and free-space quantum communication. Using large-area SNSPDs, we examine the leading edge of the readout pulse as a function of incident spot size, bias current, and mean photon number per pulse. We show a bimodal distribution of rise times that is correlated with spot size for small photon number. In the limit of low bias current, the set of dark-count readout pulses are most similar to the bright-count pulses at large spot size and small photon number. These observations are consistent with a model of traveling microwave modes excited by single photons incident at different positions along the length of the nanowire.

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