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Title: The physics of nanowire superconducting single-photon detectors
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Propositions

belonging to the thesis: "The Physics of Nanowire Superconducting Single-Photon Detectors"

1. Quantum tomography offers several important advantages over semiclassical characterization methods of superconducting single-photon detectors.
   Chapters 2,3,4,5,7 of this thesis

2. The temperature dependence of a superconducting single-photon detector is entirely governed by the temperature dependence of the energy barrier for vortex entry.
   Chapter 4 of this thesis

3. Experiments on asymmetric detectors in a magnetic field could be used to determine where in the wire a vortex forms during a detection event.
   Chapter 6 of this thesis

4. The small size of the excitation in SSPDs significantly limits their use in multiphoton experiments in quantum optics.
   Chapter 7 of this thesis

5. In the presence of multiphoton processes of unknown or varying strength, detection efficiency is an undefined concept.
   M.K. Akhlaghi and A.H. Majedi, IEEE Trans. Appl. Supercond., ***19****, 2009.*

6. Although the calculations of Engel *et al.* are a significant advance over earlier work, the use of the London formalism is a strong limitation in these calculations.
A. Engel and A. Schilling, J. Appl. Phys., ***114*** *(21), 2013.*

7. Although there is strong experimental and theoretical evidence that WSi SSPDs differ from NbN SSPDs not only in the energy of the photons that can be detected but also in the qualitative nature of the detection mechanism, the theory is as yet unable to predict the point of transition from the normal-state model to the diffusion model. Additional experiments are needed.
F. Marsili et al., CLEO, FM4B.7, (2014).

8. The use of near field techniques offers not only the possibility of creating a more efficient scanning near-field optical microscope, but will also offer more insight into the detection mechanism of SSPDs.
Q. Wang and M.J.A. de Dood, Opt. Express, ***21****, 3682 (2013).*

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