TcSUH Special Seminar

Texas Center for Superconductivity at the University of Houston

Dr. Matthias Graf

Theoretical Division
Los Alamos National Laboratory

The Origin of Dark Counts

March 22, 2012
Room 102, University of Houston Science Center
4:00 – 5:00 pm

Abstract

Dark counts in superconducting nanowire single-photon detectors (SNSPD) generate unwanted noise and are detected even in the absence of photons. I will argue that they are caused by the transition from a current-biased metastable superconducting state to the normal state. Such transitions are triggered by vortices crossing the thin and narrow superconducting strip from one edge to another due to the Lorentz force. Of course, there is also the possibility of vortex-assisted photon counts. These occur when the energy of a single photon is insufficient to create a hot spot across the strip leading to a transition to the normal state. Since vortices are strongly affected by magnetic fields, contrary to photons, I propose to investigate the field dependence of dark count rates

Bio

Dr. Graf is a scientist in the Condensed Matter and Complex Systems theory group in the Theoretical Division at Los Alamos National Laboratory. His research encompasses thermodynamic and transport properties in correlated electron systems, heavy fermions, superconductors and solid helium. He is interested in the explanation of old and novel phenomena in tunneling, nuclear magnetic resonance, angle-resolved photoemission spectroscopy, field-angle resolved thermal measurements, and single-photon detectors. He received his PhD in 1995 in theoretical physics from the University of Bayreuth, Germany, followed by postdoctoral positions at Northwestern University and Los Alamos National Laboratory, where he joined the staff in 2000.

Persons with disabilities who require special accommodations in attending this lecture should call (713) 743-8210 as soon as possible.

TcSUH
TEXAS CENTER FOR SUPERCONDUCTIVITY