Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Large kinetic inductance microwave resonators in magnetic field

MARTIN WEIDES, PHILIPP MAYER, FENGBIN SONG, SEBASTIAN PROBST, HANNES ROTZINGER, ALEXEY USTINOV, Karlsruhe Institute of Technology, Karlsruhe, Germany — Superconducting resonators of high quality factors are of great interest for photon detection and quantum computation. Conventionally, they operate in or close to the magnetic vacuum. However, for some circuits -for instance resonators coupled to spin ensemble crystals or Majorana fermions- the magnetic field is not negligible and the resonator's field robustness has to be well engineered. The magnetic field dependencies of resonance frequency and quality factor are of considerable interest to improve resonant quantum devices. In this presentation we will discuss thin film titanium nitride resonators operating in a homogeneous magnetic field. Titanium nitride has remarkably high internal microwave quality factors down to single photon levels, and a significant kinetic inductance contribution for thin film resonators. The microwave scattering data of frequency multiplexed resonators was taken in a Helium-3 refrigerator over a large range of photon number levels, temperatures, and magnetic fields. The resonators exhibit strong magnetic hysteresis effects in frequency and quality factor. The magnetic memory -caused by a spatial distribution of trapped vortices- is related to the resonator geometry.

Martin Weides
Karlsruhe Institute of Technology, Karlsruhe, Germany

Date submitted: 09 Nov 2012 Electronic form version 1.4