Poster

Towards X-ray Microcalorimeters Using Kinetic Inductance Detectors

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Traditionally, kinetic inductance detectors (MKIDs) have been thought of as non-equilibrium detectors that detect the excess of quasiparticles from the absorbed photon. In this case, recombination of quasiparticles is the bottleneck that limits the quasiparticle lifetime. However, the response of an MKID to an excess of quasiparticles from photon absorption gives the identical response to the increase in quasiparticle density due to a temperature change. Thus, MKIDs can be used as thermometers to detect the temperature rise in an absorber due to a thermalized x-ray photon (i.e., an x-ray microcalorimeter). In this work, we present the working principle of an MKID-based x-ray microcalorimeter. We present a first working prototype using tungsten silicide resonators with normal and superconducting absorbers on silicon nitride membranes. Finally, we present results on the thermalization properties of tungsten silicide and tantalum absorbers.