

LTD-10 Abstract

### **Microwave Kinetic Inductance Detectors: Background and First Results on Photon Detection**

We discuss the physics of a new type of superconducting detector, the Microwave Kinetic Inductance Detector (MKID), which is based on the microwave response of a thin film superconducting device to quasiparticle excitations. The devices studied are coplanar waveguide transmission line resonators with resonance frequencies of several GHz and quality factors in the range of  $10^4$  to  $10^6$ . We demonstrate the use of these devices as sensitive detectors of pair-breaking radiation, and show that the response of the devices to thermal quasiparticles can be accurately calculated. The response time of the device is measured as a function of temperature, and the energy resolution and NEP of a test device is estimated. We demonstrate multiplexed readout using a single cryogenic amplifier. Future challenges for this new technology will be discussed.