



Contribution ID: 275

Type: **Poster**

Decay times of optical pulses for aluminum CPW KIDs

Thursday, July 25, 2019 6:30 PM (15 minutes)

The recombination rate of quasiparticle excitations and metal thickness are both important factors in determining the sensitivity of kinetic inductance detectors (KIDs). To maximize KID sensitivity we aim to quantify the interdependence of these two detector attributes. We have measured the decay times of optical pulses produced by illuminating aluminum CPW resonators with an infrared LED. Measurements were made using both 1/4-wavelength and 1/2-wavelength resonators for film thicknesses between 20 and 100 nm for a range of temperatures. We observed several millisecond decay times observed for the 20 nm thick devices. The observed recombination times are compared with dark noise measurements, and we discuss the contributions of quasiparticle recombination, quasiparticle diffusion, and thermal effects on the results.

Less than 5 years of experience since completion of Ph.D

Y

Student (Ph.D., M.Sc. or B.Sc.)

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Presenter: FYHRIE, Adalyn

Session Classification: Poster session

Track Classification: Low Temperature Detector Development and Physics