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Quasiparticle diffusion in Al film and transmission with an Al/W interface JEFFREY YEN, Stanford University, PAUL BRINK, SLAC, BLAS CABRERA, MATT CHERRY, Stanford University, MATT PYLE, University of California, Berkeley, PETER REDL, Stanford University, ASTRID TOMADA, SLAC, BETTY YOUNG, Santa Clara University, CDMS COLLABORATION —
The Cryogenic Dark Matter Search (CDMS) experiment uses both high-purity Si and Ge crystals to directly search for Weakly Interacting Massive Particles (WIMPs). These detectors simultaneously measure the ionization and phonon energy produced by particle interactions. This talk will focus on experiments performed with a separate set of test devices fabricated to study the fundamental physics of the CDMS phonon sensors. In our test experiments, an ^{55}Fe source was used to excite a NaCl reflector, producing 2.6 keV x-rays that hit our test devices after passing through a collimator. The devices under study consisted of a 250 μ m wide x 350 μ m long Al absorber film (300 nm thick) coupled to two 250 μ m x 250 μ m (40 nm thick) W transition edge sensors (TESs), one at each end of the Al film. The impinging x-rays break Cooper pairs in the Al film, producing quasiparticles that we detect as they propagate into the W TESs. We studied the diffusion of these quasiparticles, trapping in the Al film, and their transmission probability at the Al/W interfaces. Results from our precision experiments will be presented in this talk. These results are also being used to further optimize the design of SuperCDMS detectors for a proposed 100 kg scale dark matter search.

Jeffrey Yen
Stanford University

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