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Low-T_c TES as Sensors for Fundamental Physics

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Low-T_c TES based radiation detectors are excellent choices for experiments in fundamental physics such as direct detection of low-mass dark matter, neutrino-less double beta decay search, and coherent neutrino nucleus scattering, owing to their advantages of low threshold, high energy resolution, and fast response time. We have been developing low-T_c materials and devices with the goal of realizing low-T_c TES detectors for various applications in fundamental physics research. In this presentation, we will discuss work carried out in collaboration with UC-Berkeley, to develop large-area low T_c detectors as potential low-threshold light detectors for a neutrino-less double beta decay experiment. We have successfully developed a number of recipes for low-T_c superconductor films including Ir/Pt bilayer and Au/Ir/Au trilayer with tunable and reproducible T_c's down to 20 mK and sharp superconducting transitions. Here we discuss our studies of thermal transport of our materials and present measurements of thermal conductance from both electron-phonon decoupling within our metals and materials interfaces.

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