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Improving the performance of hot-electron bolometers and solid state coolers with disordered alloys ILARI MAASILTA, JENNI KARVONEN, LASSE TASKINEN, University of Jyvaskyla — Normal metal-insulator-superconductor tunnel junctions were used as thermometers at sub-Kelvin temperatures to study the electron-phonon (e-p) interaction in thin aluminum films doped with manganese, as a function of manganese concentration. The temperature dependence of the e-p interaction is consistent with an existing theory for disordered metals. The strength of the interaction decreases with increasing manganese concentration, providing a means to improve sensitivity of detectors and the base temperature of solid state coolers. In addition, we discuss the effect of non-uniform heating on the temperature profiles in mesoscopic wires. Even in good conductors such as Cu, thermal gradients develop quite easily at sub-Kelvin temperatures.

Ilari Maasilta
University of Jyvaskyla

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