Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Thermal relaxation below 1 K by phonons and photons in metallic nanostructures ILARI MAASILTA, JENNI KARVONEN, PANU KOPPINEN, LASSE TASKINEN, University of Jyvaskyla, Finland — We present experimental results on thermal energy flow (dissipation) from different metallic nanostructures below 1K, concentrating on the two possible channels: relaxation by phonon or by photon emission. We show how phonon emission can be suppressed either by lowering the dimensionality of the phonon gas (2D membranes), or by introducing impurities into the metal. As an example, we discuss Aluminum doped with Manganese, a material with significant technological importance for ultrasensitive detectors and solid-state coolers. We also discuss relaxation by photon emission in the near field, which becomes siginificant for distances in the sub-micron lengthscale at the sub-Kelvin temperature range. Theoretical understanding for most of the results obtained is still lacking.

Ilari Maasilta
University of Jyvaskyla

Date submitted: 30 Nov 2005 Electronic form version 1.4