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Influence of Phonon dimensionality on Electron Energy Relaxation ILARI MAASILTA, JENNI KARVONEN, University of Jyvaskyla — We studied experimentally the role of phonon dimensionality on electron-phonon (e-p) interaction in thin copper wires evaporated either on suspended silicon nitride membranes or on bulk substrates, at sub-Kelvin temperatures. The power emitted from electrons to phonons was measured using sensitive normal metal-insulator-superconductor (NIS) tunnel junction thermometers. Membrane thicknesses ranging from 30 nm to 750 nm were used to clearly see the onset of the effects of two-dimensional (2D) phonon system. We observed for the first time that a 2D phonon spectrum clearly changes the temperature dependence and strength of the e-p scattering rate, with the interaction becoming stronger at the lowest temperatures below ~ 0.5 K for the 30 nm membranes[1].

[1]J. T. Karvonen and I. J. Maasilta, Phys. Rev. Lett. **99**, 145503 (2007).

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