ELECTRON-PHONON COOLING POWER IN ANDERSON INSULATORS

M.V.Feigel'man[1], V.E.Kravtsov[2,1]

[1]L.D.Landau Institute for Theoretical Physics, Chernogolovka, Moscow region, Russia
[2]International Center for Theoretical Physics, Trieste, Italy
e-mail: feigel@landau.ac.ru

A theory for electron-phonon energy exchange in Anderson insulators with long localization length is developed. The major contribution to the cooling power as a function of electron temperature is shown to be directly related to the correlation function of the local density of electron states, which is enhanced near the localization transition by multi-fractality and by the presence of Mott's resonant pairs of states. The theory we develop explains huge enhancement of the cooling power observed in insulating Indium Oxide films as compared to predictions of standard theory for disordered metals.