

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Electronic Grüneisen Parameter in the Non-equilibrium Regime

JINCHENG WANG, CHUNLEI GUO, University of Rochester — The Grüneisen parameter is a fundamental parameter characterizing the relationship between thermal expansion and specific heat of a solid. Conventionally, electronic Grüneisen parameter γ_e is measured in a solid by minimizing the lattice contribution to thermal expansion at low temperatures, and the value of γ_e is believed to be a constant. In this report, we perform pump-probe experiments using surface plasmon as the probe technique to resolve the dynamics of acoustic phonons that are impulsively excited in Ag film using fs laser pulses. Our study shows that the conventional value of electronic Grüneisen parameter is not necessarily valid in thermal non-equilibrium distribution immediately following ultrafast pulse excitation. A revised γ_e is proposed here to precisely take into account the role of electron pressure in driving acoustic phonons in solids.

Chunlei Guo
University of Rochester

Date submitted: 01 Dec 2006

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