Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Non-equilibrium Warm Dense Matter: Electron-Ion Dynamics of Pumped Nanofoils[1] YUAN PING, TADASHI OGITSU, ALFREDO CORREA, ERIC SCHWEGLER, GILBERT COLLINS, LLNL, JUN ZHOU, JIANMING CAO, Florida State Univesity, BYOUNG-ICK CHO, KYLE ENGELHORN, PHILIP HEIMANN, ROGER FALCONE, LBNL/UC Berkeley — In 2006, it was reported that the dielectric function of laser-excited gold nanofoils exhibits a peculiar behavior; the interband transition peak of gold is enhanced and undergoes a clear red shift [PRL **96**, 255003 (2006)]. In 2009, based on ultrafast electron diffraction measurements on pumped gold nanofoils, it was reported that the time evolution of the Debye-Waller factor is too slow to be explained by a two-temperature model that included temperature dependent el-ph coupling. This anomaly has been attributed to a phonon hardening process caused by high electron temperatures (a few eV) [Science **323**, 1033 (2009)]. Later, it was pointed out that at such a high electron temperatures the dielectric function of gold calculated by first-principles DFT simulations does not reproduce the enhanced and red-shifted interband transition peak and an alternative explanation was proposed to reconcile the discrepancies where the effect of ejected electrons was addressed [HEDP **6**, 246 (2010)]. In this talk, we will discuss recent experimental/theoretical efforts to further examine the issues relevant to this problem, el-ph coupling, dynamics of ejected electrons, and ballistic transport of electrons [submitted to HEDP; PRL **106**, 167601(2011)].

[1]Prepared by LLNL under Contract DE-AC52-07NA27344.

Tadashi Ogitsu
LLNL

Date submitted: 21 Nov 2011 Electronic form version 1.4