DPP15-2015-000629

Abstract for an Invited Paper
for the DPP15 Meeting of
the American Physical Society

Non-equilibrium Warm Dense Gold: Experiments and Simulations

ANDREW NG, University of British Columbia

This talk is an overview of a series of studies of non-equilibrium Warm Dense Matter using a broad range of measured properties of a single material, namely Au, as comprehensive benchmarks for theory. The measurements are made in fs-laser pump-probe experiments. For understanding lattice stability, our investigation reveals a solid phase at high energy density. This leads to the calculation of lattice dynamics using MD simulations and phonon hardening in DFT-MD simulations. For understanding electron transport in two-temperature states, AC conductivity is used to evaluate DFT-MD and Kubo-Greenwood calculations while DC conductivity is used to test Ziman calculations in a DFT average atom model. The electron density is also used to assess electronic structure calculations in DFT simulations. In our latest study of electron kinetics in states with a non-Fermi-Dirac distribution, three-body recombination is found to have a significant effect on electron thermalizaiton time. This is driving an effort to develop electron kinetics simulations using the Boltzmann equation method.