Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Time-resolved X-ray Absorption Spectroscopy for Electron Transport Study in Warm Dense Gold[1] JONG-WON LEE, LEEJIN BAE, GIST / IBS, South Korea, KYLE ENGELHORN, LBNL, USA, PHILIP HEIMANN, SLAC, USA, YUAN PING, LLNL, USA, BEN BARBREL, LBNL, USA, AMALIA FERNANDEZ, MARTHA ANNE BECKWITH, LLNL, USA, BYOUNG-ICK CHO, GIST / IBS, South Korea, GIST TEAM, IBS TEAM, LBNL COLLABORATION, SLAC COLLABORATION, LLNL COLLABORATION —
The warm dense Matter represents states of which the temperature is comparable to Fermi energy and ions are strongly coupled. One of the experimental techniques to create such state in the laboratory condition is the isochoric heating of thin metal foil with femtosecond laser pulses. This concept largely relies on the ballistic transport of electrons near the Fermi-level, which were mainly studied for the metals in ambient conditions. However, they were barely investigated in warm dense conditions. We present a time-resolved x-ray absorption spectroscopy measured for the Au/Cu dual layered sample. The front Au layer was isochorically heated with a femtosecond laser pulse, and the x-ray absorption changes around L-edge of Cu, which was attached on the backside of Au, was measured with a picosecond resolution. Time delays between the heating of the 'front surface' of Au layer and the alternation of x-ray spectrum of Cu attached on the 'rear surface' of Au indicate the energetic electron transport mechanism through Au in the warm dense conditions.

[1]IBS (IBS-R012-D1) and the NRF (No. 2013R1A1A1007084) of Korea

Jong-Won Lee
Gwangju Inst of Sci
Tech

Date submitted: 17 Sep 2015 Electronic form version 1.4