Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

High Energy Density Sciences with High Power Lasers at SACLA

RYOSUKE KODAMA, Osaka University — One of the interesting topics on high energy density sciences with high power lasers is creation of extremely high pressures in material. The pressures of more than 0.1TPa are the energy density corresponding to the chemical bonding energy, resulting in expectation of dramatic changes in the chemical reactions. At pressures of more than TPa, most of material would be melted on the shock Hugoniot curve. However, if the temperature is less than 1eV or lower than a melting point at pressures of more than TPa, novel solid states of matter must be created through a pressured phase transition. One of the interesting materials must be carbon. At pressures of more than TPa, the diamond structure changes to BC and cubic at more than 3TPa. To create such novel states of matter, several kinds of isentropic-like compression techniques are being developed with high power lasers. To explore the "Tera-Pascal Science," now we have a new tool which is an x-ray free electron laser as well as high power lasers. The XFEL will clear the details of the HED states and also efficiently create hot dense matter. We have started a new project on high energy density sciences using an XFEL (SACLA) in Japan, which is a HERMES (High Energy density Revolution of Matter in Extreme States) project.

Ryosuke Kodama
Osaka University

Date submitted: 08 Jul 2013 Electronic form version 1.4