Abstract Submitted
for the SHOCK13 Meeting of
The American Physical Society

Modeling of laser-driven shocks into porous graphite GABRIEL SEISSON, DAVID HÉBERT, ISABELLE BERTRON, CEA CESTA, CS60001, 33116 Le Barp Cedex, France, LAURENT VIDEAU, PATRICK COMBIS, CEA DIF, 91297 Arpajon, France, LAURENT BERTHE, Laboratoire PIMM UPR8006, 151 bd de l'Hôpital, 75013 Paris, France, MICHEL BOUSTIE, Institut PPRIME UPR3346, 1 av Clément Ader, 86961 Futuroscope Cedex, France — This paper presents experiments of laser-driven shocks into a commercial grade of porous graphite. Intensities of about 3 GW.cm^{-2} led to pressures close to 3 GPa on the front surfaces of the 0.5 mm samples. The rear surface velocities, recorded by a Velocity Interferometer System (VISAR), ranged from 250 to 325 m.s^{-1}. Two classical models for porous materials are discussed. The first one uses plates of dense graphite spaced out in order to obtain the correct average density. The second one models a continuous material and includes an experimental compaction curve of our porous graphite. They were implemented into hydrocodes and both gave quite correct maximum free surface velocities and shock break-out instants. Nevertheless, the continuous representation appeared to be more efficient to reproduce the experimental free surface velocity ramp. Discussions on the laser-matter interaction modeling are also provided. Finally, a protocol for the simulation of future laser experiments is proposed.

Gabriel Seisson
CEA CESTA, CS60001, 33116 Le Barp Cedex, France

Date submitted: 19 Feb 2013 Electronic form version 1.4