Abstract Submitted
for the SHOCK07 Meeting of
The American Physical Society

A new experimental design for laser-driven shocks on precompressed and preheated water samples. ARNAUD SOLLIER, ERIC AUROUX, JEAN-SÉBASTIEN VAUTHIER, CEA/DIF, B.P. 12, 91680 Bruyères-le-châtel, France, MICHEL BOUSTIE, HONGLIANG HE, THIBAUT DE RESSÉGUIER, PATRICK BERTERRETCHE, Laboratoire de Combustion et de Détonique (UPR du CNRS n9028), ENSMA, B.P. 40109, 86961 Futuroscope Cedex, France, NICOLAS DESBIENS, EMERIC BOURASSEAU, JEAN-BERNARD MAILLET, CEA/DIF, B.P. 12, 91680 Bruyères-le-châtel, France — High energy lasers are now widely used to study the dynamic properties of matter up to very high pressures. Generally, such experiments employ a sample initially at normal density and standard pressure, therefore providing data on the principal Hugoniot. In this work, a special vessel has been used to statically compress and pre-heat water samples up to about 300 bar and 300°C, before they were shocked with an energetic laser. This configuration allows to reach states lying above the water Hugoniot in the temperature-pressure diagram, which are representative of the thermodynamic parameters of water in the detonation products of high explosives. We describe the method to achieve off principal Hugoniot data and report the first experiments which were performed on the LCD's laser system at low shock pressure (2 GPa). The results are compared with the Sesame tables and with Monte Carlo calculations performed using a TIP4P potential.

Arnaud Sollier
CEA/DIF, B.P. 12, 91680 Bruyères-le-châtel, France

Date submitted: 21 Feb 2007 Electronic form version 1.4