Abstract Submitted
for the SHOCK11 Meeting of
The American Physical Society

Analysis and modelling of laser ramps and shocks in Ti and Zr with phase transition OLIVIER HEUZE, CEA/DAM, DAMIAN SWIFT, LLNL — Laser energy deposit can produce shock waves or ramps in condensed matter and provides interesting possibilities to study material properties under dynamic pressures. When phase transitions occur, the experimental signal becomes very difficult to analyze: shocks can or cannot be splitted at each phase transition and the slope of ramps interact with phase transition kinetics. The analysis of these experiments requires a good knowledge of phase transition thermodynamics i.e. an accurate multiphase equation of state. During the last years, laser experiments with phase transition were performed at LLNL on Ti and Zr, while a general model of multiphase equation of state for hydrocode was developped at CEA. The aim of the present study was to check the ability of this equilibrium equation of state to describe qualitatively and quantitatively the experimental signal. The parameter for Ti and Zr were adjusted on static data. A good agreement has been found between most experiments and calculations, validating the reproducibility of the experiments and the calculation model and parameters. In some cases, different slopes in the signal show obvious kinetik effects.

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Date submitted: 23 Feb 2011 Electronic form version 1.4