Abstract Submitted
for the SHOCK13 Meeting of
The American Physical Society

**Physical Sate of Shocked Silica Aerogel** CARL GREEFF, JOHN BENAGE, KATERINA FALK, CHRISTOPHER FRYER, Los Alamos National Laboratory, THOMAS BOEHLY, CHAD MCCOY, LLE, University of Rochester — We have performed laser driven shock experiments on silica aerogel of initial density 0.2 g/cc. These experiments employed streaked optical pyrometry as a temperature diagnostic. The Hugoniot states accessed have densities between the critical density and the crystal density, and temperatures of a few eV. These densities are high enough that bonding is non-negligible and the electronic spectrum is strongly modified from that of the constituent atoms. The temperature is high enough for electronic excitation to be important, but low compared to the full ionization limit. We examine the physical basis of Sesame equation of state models in this regime with special attention to uncertainty in the calculated temperature. We present new results from quantum molecular dynamics simulations for the structural and electronic properties in the shocked state, and use these results to improve the Sesame models.

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Date submitted: 22 Feb 2013 Electronic form version 1.4