

Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

X-ray Absorption Near-Edge Spectroscopy (XANES) of Warm Dense Silicon Dioxide KYLE ENGELHORN, LBNL, BYOUNG-ICK CHO, Gwangju Institute of Science and Technology, BEN BARBREL, UC Berkeley, VANINA RECOULES, CEA, DAM, DIF, STEPHANE MAZEVET, LUTH Observatoire, DENISE KROL, UC Davis, ROGER FALCONE, UC Berkeley, PHIL HEIMANN, SLAC — The electronic structure of warm dense silicon dioxide has been investigated by X-ray Absorption Near-Edge Spectroscopy (XANES). An ultrafast optical laser pulse isochorically heats a thin sample. The measured XANES spectra are compared with simulations generated by molecular dynamics and density functional theory. Three new features are observed: a peak below the band gap, absorption within the band gap and a broadening of the absorption edge. From comparison with the calculations, the peak below the band gap provides a measurement of the electron temperature while the spectral features above the O K-edge constrain the ion temperature. Further, the absorption within the gap presents evidence for broken Si-O bonds. The XANES is interpreted as that of a non-equilibrium liquid.

Kyle Engelhorn
LBNL

Date submitted: 11 Jul 2014

Electronic form version 1.4