Abstract Submitted for the DPP20 Meeting of The American Physical Society

The Formation and Structure of Warm Dense Silicon Dioxide PHILIP HEIMANN, MIANZHEN MO, HAE JA LEE, BOB NAGLER, ADRIEN DESCAMPS, XIAOZHE SHEN, MIKE KOZINA, SIEGFRIED GLENZER, SLAC - Natl Accelerator Lab, ROGER FALCONE, U C Berkeley, GILLISS DYER, SLAC - Natl Accelerator Lab, VANINA RECOULES, CEA — Silicon dioxide is a major constituent of the earth's crust and mantle as well as a common material for optics. X-ray absorption spectroscopy measurements have indicated that warm dense SiO2 is either a semimetal or has a significant metallic component. Ultrafast electron diffraction was performed on amorphous silicon dioxide foils irradiated by femtosecond optical pulses. From the electron diffraction patterns, pair distribution functions were calculated showing a reduction of the Si-O peak. The results are compared with molecular dynamics calculations, which predict structures with broken Si-O bonds. In addition, the time scale for the formation of the warm dense state was observed indicating a non-thermal phase transition.

> Philip Heimann SLAC - Natl Accelerator Lab

Date submitted: 29 Jun 2020

Electronic form version 1.4