## Abstract Submitted for the DPP13 Meeting of The American Physical Society

The Electronic Structure of Warm Dense Silicon Dioxide PHILIP HEIMANN, SLAC National Accelerator Laboratory, KYLE ENGEL-HORN, Lawrence Berkeley National Laboratory, BYOUNG-ICK CHO, Gwangju Institute of Science and Technology, VANINA RECOULES, CEA, DAM, DIF, STEPHANE MAZEVET, LUTH, Observatoire de Paris, DENISE KROL, Department of Chemical Engineering and Materials Science, UC Davis, ROGER FAL-CONE, Lawrence Berkeley National Laboratory — Silicon dioxide is an important material for optics as well as for the earth's crust and mantle. We present an xray absorption spectroscopic study of warm dense silicon dioxide performed at the Advanced Light Source. A femtosecond optical pulse is used to isochorically heat the silicon dioxide sample. A custom x-ray streak camera is employed to detect the oxygen K edge x-ray absorption spectrum with 2 ps time resolution. The heated silicon dioxide spectra are compared with calculations based on molecular dynamics and density functional theory, which determine the electronic density of states and transition matrix elements at elevated temperatures. Three new features are observed in the high temperature absorption spectra: a peak below the band gap, absorption within the gap and a broadening of the absorption edge. All three of these features are present in the calculated spectra as well. The magnitude of the absorption peak below the band gap is sensitive to the electronic temperature. The broadening of the absorption edge is only observed in the simulations with high ionic temperature.

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