Abstract Submitted
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Single-shot Ellipsometry of Shocked Iron to 275 GPa SEAN GRANT, University of Texas at Austin, TOMMY AO, Sandia National Laboratories, AARON BERNSTEIN, University of Texas at Austin, JEAN-PAUL DAVIS, Sandia National Laboratories, TODD DITMIRE, University of Texas at Austin, DANIEL DOLAN, Sandia National Laboratories, JUNG-FU LIN, University of Texas at Austin, ANDREW PORWITZKY, CHRISTOPHER SEAGLE, Sandia National Laboratories — We have studied the properties of iron under shock conditions using time-resolved ellipsometry, a technique that probes the dielectric value of materials under dynamic conditions, on the STAR gas gun facility at Sandia National Laboratories. We performed experiments on a two-stage gas gun ranging from the $\alpha - \epsilon$ transition (75 GPa) to the solid-liquid transition (275 GPa). For the first time, we report the dielectric results of shocked iron at those conditions. In addition, the time-resolved ellipsometry diagnostic is being implemented on the Sandia pulsed power Z-machine. The goal of upcoming Z experiments will be to employ the shock-ramp technique to reach pressure and temperature conditions relevant to the Earth core, and to use ellipsometry to obtain the iron electric conductivities needed for benchmarking material models. Sandia National Laboratories is a multi-mission laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energys National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND2017-1952 A

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