Abstract Submitted
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Oxygen opacity experiments for stellar interiors. JAMES BAILEY, G.P. LOISEL, T. NAGAYAMA, G.S. DUNHAM, S.B. HANSEN, T. GOMEZ, Sandia National Laboratories, H. HUANG, C. MONTON, General Atomics, D.E. WINGET, M. MONTGOMERY, University of Texas, Austin, R.F. HEETER, LLNL, T.J. PERRY, D.P. KILCREASE, C.J. FONTES, LANL, C. BLANCARD, PH. COSSE, G. FAUSSURIER, J.-C. PAIN, F. GILLERON, CEA — Testing oxygen opacity calculations is important for understanding the Sun and white dwarf stars. Near the solar convection zone base, T_e~180 eV, n_e ~9e22 electrons/cc, and oxygen is mostly H-like or fully-stripped. Highly-ionized oxygen produces a relatively simple opacity spectrum, but its calculation relies on untested approximations for continuum lowering and line broadening. We initiated stellar oxygen opacity measurements on Z with progress in two key areas: i) target fabrication and ii) extending the measurement spectral range. We created SiO_2 half-moon samples with oxygen areal density greater than 1e19 atoms/cm^2 and successfully recorded transmission through the heated sample on Z. The 6-18.5 Angstrom spectral range includes the critical oxygen bound-free absorption, the Ly beta transition, and the opacity window region on the short wavelength side of the Ly alpha line. The Si K-shell spectrum is less perturbed by density effects and provides plasma diagnostic information. Experimental results and prospects for refining stellar interior calculations will be discussed. Sandia National Laboratories is a multimission laboratory managed and operated by NTESS LLC, a wholly owned subsidiary of Honeywell International Inc. for the U.S. DOE's NNSA under contract DE- NA0003525.

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