Abstract Submitted
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M-shell transmission measurements of gadolinium in LTE at 30 eV ROBERT HEETER, BRIAN WILSON, SCOTT ANDERSON, JOHN CASTOR, KEVIN FOURNIER, CARLOS IGLESIAS, STEVE MACLAREN, MARILYN SCHNEIDER, Lawrence Livermore National Laboratory — X-ray transmission opacity measurements provide a stringent test of the modeling of partly-stripped ions in high-temperature plasmas. While good agreement has been reached in studies of n=1 to n=2 (K-shell) and n=2 to n=3 (L-shell) absorption spectra, there remain significant differences between various models' predictions of the n=3 to n=4 (M-band) opacities of lanthanide elements such as gadolinium (Z=64) at temperatures in the range 25-50 eV. For example, spin-orbit splitting, orbital relaxation and configuration interaction all produce measurable signatures in the predicted M-band absorption spectra of gadolinium. Using the Omega laser facility, hohlraum experiments have been performed to study the X-ray transmission of plastic-tamped gadolinium samples in the photon energy range 1200-1400 eV at temperatures around 30 eV. The sample density and temperature were measured independently on the same laser shot. The M-band spectra of Gd are presented and compared with opacity code predictions, and some implications are discussed. This work was performed under the auspices of the U.S. Department of Energy by University of California, Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

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