

Abstract Submitted  
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**Absorption Spectra of BaF<sub>2</sub>, Sm<sub>2</sub>O<sub>3</sub>, Sm, Gd, and Ho Plasmas**

MICHAEL MARTIN, UCLA, SERENA BASTIANI-CECCOTTI, Ecole Polytechnique — Knowledge of the opacities of high  $Z$  element plasmas is important in indirect drive ICF and the study of stellar evolution. There are few experimental measurements of this quantity, and its theoretical determination is difficult due to the number of possible bound electron configurations. This study aims to better the theoretical understanding of this parameter by looking at the 3d-4f transitions of BaF<sub>2</sub>, Sm<sub>2</sub>O<sub>3</sub>, Sm, Gd, and Ho plasmas at the LULI2000 facility. The plasmas are produced by radiative heating and are cold, 15 – 40 eV, and relatively dense,  $\sim .01\text{gm/cm}^3$ . A plasma is produced by a .5 ns laser pulse irradiating a gold hohlraum and then probed by an x-ray source created by a gold foil irradiated by a 10 ps laser pulse. The transmission is found with simultaneous source and absorption measurements by an x-ray spectrometer in the 8 - 20 Å range. We will compare the results with statistical atomic structure codes. From this experiment we will gain further insight into the spectral broadening of neighboring  $Z$  elements due to changing plasma temperature and into mixture thermodynamics. This is a first step towards an experimental study of astrophysical domains.

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