Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Spectroscopic Measurements of ICF Capsules Doped with Hi-Z Impurities.[1] JOHN BENAGE, GEORGE KYRALA, DOUGLAS WILSON, MARK GUNDERSON, Los Alamos National Laboratory, JOHAN FRENJE, RICHARD PETRASSO, M.I.T., WARREN GARBET, STEVEN JAMES, A.W.E., BARUCH YAAKOBI, L.L.E. — Energy exchange between ions, electrons, and radiation plays an important role in determining the temperature of the ions in an ICF capsule. Because the simulation codes that are used to design and predict ICF implosion experiments often have difficulty predicting the ion temperature correctly, we are embarking on a series of experiments investigating this physics using ICF capsules that have been doped with varying amounts of Hi Z gases. In this work, we have fielded thin l mm diameter glass shells filled with 6.7 atmospheres of D_2 and varying amounts of xenon and krypton gas to study the progression from non-equilibrium to equilibrium burn as the dopant gas concentration is increased. The shells also contained 3.3 atmospheres of 3He, which is used to measure the proton spectrum from the D3He reaction to measure the target temperature and ρR. Measurements of the neutron and proton yield were obtained, along with time-resolved x-ray images of the capsules and x-ray spectroscopy of the emission from the plasma. In this talk, we will discuss the results of these first experiments, focusing on the time-resolved x-ray spectroscopy.

[1]Work performed under the auspices of the DOE.

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Date submitted: 21 Jul 2006 Electronic form version 1.4