Abstract Submitted
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Investigation of Inter-Ion Species Diffusion in Inertial Confinement Fusion Implosions[1] HANS W. HERRMANN, YONGHO KIM, NELSON M. HOFFMAN, MARK J. SCHMITT, GRIGORY KAGAN, STEVEN H. BATHA, Los Alamos Natl Lab, WARREN J. GARBETT, COLIN J. HORSFIELD, MICHAEL S. RUBERY, STEVEN GALES, AWE — Anomalous fusion yield degradation has been observed for gas fill mixtures in inertial confinement fusion (ICF) implosions. These mixtures have included D/3He [Rygg, et al., Phys Plasmas, **13**, 052702 (2006)], D/T/3He [Herrmann, et al., Phys Plasmas, **16**, 056312 (2009)], D/Ar [Lindl, et al., Phys Plasmas, **11**, 339-491 (2004)] and even D/T [Casey, et al., PRL **108**, 075005 (2012)]. Fuel ion segregation has been suggested as a possible cause [Amendt, et al., PRL **18**, 056308 (2011); Kagan, et al., Phys Ltr A 10.1016 (2014)]. Segregation may be caused by inter-ion species diffusion driven by gradients in plasma pressure, temperature and electric field, either across a relatively narrow shock boundary or across the entire interior of the compressed capsule. It is expected that lower Z &/or A ions will diffuse outward while higher Z &/or A diffuse inward. In the case of D/T/3He, the 3He diffuses inward to the hotter core, reducing the DT reactivity. A D/T/H mixture should result in H diffusing outward, leaving the hotter core D & T rich and hence enhance reactivity over the simulated expectation. Past results will be reviewed and plans for a hydro-equivalent comparison D/T/^{3}He and D/T/H will be presented.

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