Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Separation of d and t ions in exploding pusher simulations CLAUDIO BELLEI, P.A. AMENDT, S.C. WILKS, Lawrence Livermore National Laboratory, M.G. HAINES, Imperial College London, D.T. CASEY, C.K. LI, R. PETRASSO, Massachusetts Institute of Technology — It is shown by means of hybrid particle-in-cell simulations that convergence of the spherical shock wave that propagates through the inner gas of an exploding pusher experiment is accompanied by separation of d and t ions across the shock front. Deuterons run ahead of the tritons and reach the center ∼100 ps before the tritons. The rising edge of the DD and TT fusion rate is also temporally separated by the same amount, which should be a measurable observable in experiments and would be a direct proof of the "stratification conjecture" [1,2]. Moreover, decoupling of the d and t ions, in terms of both density and temperature, leads to a degradation of the DT fusion yield around shock flash. This suggests the necessity of including multiple-species effects in ICF simulations. This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344 and supported by LDRD 11-ERD-075.

[1] P. Amendt et al, Phys. Plasmas 18, 056308 (2011).
[2] D. T. Casey, et al., PRL 108, 075002 (2012)

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Date submitted: 18 Jul 2012 Electronic form version 1.4