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Testing the relative importance of ion diffusive transport and turbulent mixing with separated-reactant capsules[1] NELSON HOFFMAN, ALEX ZYLSTRA, Los Alamos National Laboratory — Two recent capsule implosion shots at OMEGA, employing separated reactants (tritium gas surrounded by a layer of deuterated CD plastic) [A. B. Zylstra et al., in preparation], afford a simple test for distinguishing the importance of ion diffusive transport vs. turbulent mixing in the implosions. One capsule had a CD layer that was twice as thick as the other capsule: 0.3 μm vs 0.15 μm. Simulations using a turbulent-mix model together with an ion-diffusion model indicate that the thick-CD capsule would be expected to give higher DT yield than the thin-CD capsule, owing to the larger quantity of D available to mix with T. By contrast, simulations using the ion-diffusion model alone indicate that the thin-CD capsule would give the higher DT yield, owing to the fact that (a) it was driven somewhat harder than the thick-CD capsule and (b) only an extremely thin layer on the inside of the CD contributes significantly to the DT yield for either capsule, so the thickness difference is irrelevant. Measurements showed that in fact the thin-CD capsule gave higher DT yield, supporting the importance of ion diffusive transport in such capsule implosions.

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