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Measuring the character of mix in directly driven ICF implosions with pure tritium gas and a deuterated shell D.C. WILSON , P.S. EBEY, A. NOBILE, JR., J.H. COOLEY, Los Alamos National Laboratory, T.C. SANGSTER, W.T. SHMAYDA, M.J. BONINO, D. HARDING, V. YU. GLEBOV, F.J. MARSHALL, Laboratory for Laser Energetics, U. of Rochester, R.A. LERCHE, Lawrence Livermore National Laboratory — We have designed, built, and fielded a unique experiment to measure the character and time dependence of atomic mix in directly driven plastic capsules. The DT yield, ion temperature, and time history of the burn are measured in two types of capsules, a reference capsule of 15-24 μm thick plastic (CH) and an experimental capsule of the same thickness but with a 1μm thick deuterated plastic (CD) layer on the inner surface. Both capsules are filled with 10 atm of nearly pure tritium gas containing $\sim$0.2 atm % deuterium. Without atomic mix the DT yield of the experimental capsule should be comparable to the reference capsule. Measured yields of the CD capsules were 24 to 110 times larger than the CH capsules confirming the dominant role of atomic mix. By using a mix model to degrade the performance of the CH capsules to observed, and then comparing the results of that model, which assumes 100% atomic mix, on the CD capsule, we can estimate the amount of atomic mix. We conclude atomic mix accounts for 40-75% of the mixing. Non-atomic or "chunk" mix accounts for the rest. This work is funded by the U.S. DOE at Los Alamos and the U. of Rochester.

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