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Overview of the MARBLE Mix and Burn Campaign[1] B. J. ALBRIGHT, T. J. MURPHY, M. R. DOUGLAS, T. CARDENAS, J. H. COOLEY, T. H. DAY, C. DI STEFANO, R. A. GORE, M. A. GUNDERSON, J. R. HAACK, B. M. HAINES, C. E. HAMILTON, Y. KIM, P. M. KOZLOWSKI, M. N. LEE, J. A. OERTEL, R. E. OLSON, R. B. RANDOLPH, Los Alamos National Laboratory, R. C. SHAH, Laboratory for Laser Energetics, J. M. SMIDT, D. N. WOODS, L. YIN, Los Alamos National Laboratory — MARBLE is a separated reactants campaign on the NIF to investigate the effects of heterogeneous mix on thermonuclear burn. In MARBLE experiments, a two-shock laser-driven implosion compresses Si-doped plastic capsules filled with deuterated plastic foam and cryogenic hydrogen-tritium gas fills. Embedded in the foam are "macro-pores," engineered voids in the foam of known sizes and locations, which allow for control over the levels of heterogeneity prior to hydrodynamic mixing. In MARBLE implosions, the ratio of DT to DD neutron yield is measured, from which the degree of atomistic mix can be deduced. The MARBLE team has successfully demonstrated for the first time an ability to control plasma heterogeneity and study in a quantitative way the effects on thermonuclear burn. These data provide a unique means of validating mix and burn models in multi-physics ICF design codes such as the LANL xRAGE code.

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Brian Albright
Los Alamos National Laboratory

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