David S. Montgomery (this one)
Eric Loomis
Elizabeth Merritt
Evan Dodd

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Kinetic Energy Transfer Process in a Double Shell Leading to Robust Burn[1] D.S. MONTGOMERY, W.S. DAUGHTON, B.J. ALBRIGHT, D.C. WILSON, E.N. LOOMIS, E.C. MERRITT, E.S. DODD, R.C. KIRKPATRICK, R.G. WATT, Los Alamos National Laboratory, M.D. ROSEN, Lawrence Livermore National Laboratory — A goal of double shell capsule implosions is to impart sufficient internal energy to the D-T fuel at stagnation in order to obtain robust α-heating and burn with low hot spot convergence, C.R. < 10. A simple description of the kinetic energy transfer from the outer shell to the inner shell is found using shock physics and adiabatic compression, and compares well with 1D modeling. An isobaric model for the stagnation phase of the inner shell is used to determine the ideal partition of internal energy in the D-T fuel. Robust burn of the fuel requires, at minimum, that α-heating exceeds the rate of cooling by expansion of the hot spot so that the yield occurs before the hot spot disassembles, which is then used to define a minimum requirement for robust burn. One potential advantage of a double shell capsule compared to single shell capsules is the use of a heavy metal pusher, which may lead to a longer hot spot disassembly time. We present these analytic results and compare them to 1D and 2D radiation-hydrodynamic simulations.

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David Montgomery
Los Alamos National Laboratory

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