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Low fuel convergence path to ignition on the NIF[1] M.J SCHMITT, KIM MOLVIG, T.A. GIANAKON, C.N. WOODS, N.S. KRASHENINNIKOVA, S.C. HSU, D.W. SCHMIDT, E.S. DODD, ALEX ZYLSTRA, B. SCHEINER, Los Alamos Natl Lab, P. MCKENTY, E.M. CAMPBELL, D. FROULA, R. BETTI, T. MICHEL, U Rochester Lab Laser Energetics — A novel concept for achieving ignition on the NIF is proposed that obviates current issues plaguing single-shell high-convergence capsules. A large directly-driven Be shell is designed to robustly implode two nested internal shells by efficiently converting 1.7MJ of laser energy from a 6 ns, low intensity laser pulse, into a 1 ns dynamic pressure pulse to ignite and burn a central liquid DT core after a fuel convergence of only 9. The short, low intensity laser pulse mitigates LPI allowing more uniform laser drive of the target and eliminates hot e-, preheat and laser zooming issues. Preliminary rad-hydro simulations predict ignition initiation with 90% maximum inner shell velocity, before deceleration Rayleigh-Taylor growth can cause significant pusher shell mix into the compressed DT fuel. The gold inner pusher shell reduces pre-ignition radiation losses from the fuel allowing ignition to occur at 2.5keV. Further 2D simulations show that the short pulse design results in a spatially uniform kinetic drive that is tolerant to variations in laser cone power. A multi-pronged effort, in collaboration with LLE, is progressing to optimize this design for NIF's PDD laser configuration.

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