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Tripling the energy coupling efficiency from hohlraum to capsule on NIF* Y. PING, V. SMALYUK, P. AMENDT, R. TOMMASINI, J. FIELD, S. KHAN, E. DEWALD, F. GRAZIANI, S. JOHNSON, O. LANDEN, A. MACPHEE, N. NIKROO, J. PINO, S. PRISBEY, J. RALPH, R. SEUGLING, D. STROZZI, R. TIPTON, LLNL, Y. KIM, E. LOOMIS, E. MERRITT, D. MONTGOMERY, LANL, N. KABADI, B. LAHMANN, R. PETRASSO, MIT — In the current cylindrical-hohlraum indirect drive schemes for ICF, a strong limitation is the inefficient (˜10%) energy coupling from hohlraum to capsule, typically less than 200 kJ with laser drive energies up to 1.8 MJ. We report a NIF experiment demonstrating ˜30% energy coupling to an aluminum capsule in a rugby-shaped gold hohlraum (Ping, Smalyuk, Amendt, et al. Nature Physics 2019). Based on x-ray radiography measurements, the shell kinetic energy reaches 34 kJ with 1MJ drive at 0.7x subscale, consistent with ˜300 kJ capsule energy coupling. More experiments were performed recently at larger, 0.9x scale with 1.5 MJ laser drive. The nuclear bang time and the shell velocity from simulations agree well with experimental data, indicating ˜450 kJ coupling with 1.5MJ drive while keeping good shell symmetry. This high coupling efficiency can substantially increase the tolerance to residual imperfections and improve the prospects for ignition, both in mainline single-shell hot-spot designs and potential double-shell targets. * This work was performed under the auspices of the US DOE by LLNL under contract number DEAC52- 07NA27344, with partial support from the DOE OFES ECRP program.

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