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NIF Polar-Drive High DT-Yield Exploder-Pusher Designs Modeled Using Pump-Depletion in DRACO J.A. MAROZAS, P.W. MCKENTY, T.J.B. COLLINS, R.J. ROSENBERG, P.B. RADHA, S.P. REGAN, E.M. CAMPBELL, LLE, B. BLUE, L. DIVOL, W.W. HSING, G.E. KEMP, C.B. YEAMANS, H.D. WHITLEY, LLNL — Exploding-pushers (XP) using a 1.1-MJ pulse produced the highest polar-direct-drive (PDD) DT-yield (1.1 10^{16}) on the National Ignition Facility (NIF). The NIF-PDD XP targets provide a high-yield neutron source and a platform to develop predictive inertial confinement fusion modeling. The XP designs revealed the necessity to enhance the crossbeam energy transfer (CBET) algorithm to implement a scalable pump-depletion model in the 2-D code *DRACO* that physically limits growth, naturally controlling CBET gain that would otherwise permit unbounded gain of the Randall formulation. The pump-depletion model accurately reproduces NIF-PDD XP implosions and serves as a design tool for enhanced performance XP designs predicted to yield >3 10^{16} neutrons using NIF's current optics. Designs using enhanced NIF optics are predicted to produce DT-yields >100 kJ. The CBET pump-depletion model will be described and the XP design simulations discussed. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856.

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