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Concept for Increased Neutron Yield and Potential ICF Ignition at the NIF[1] R E OLSON, B M HAINES, C DI STEFANO, H F ROBEY, R R PETERSON, R J LEEPER, LANL, G E KEMP, C B YEAMANS, B E BLUE, LLNL — In recent experiments at the NIF, near-record neutron yields have been measured in modest convergence Polar Direct Drive (PDD) implosions of DT gas-filled capsules using only 55% to 75% of the available NIF laser energy [1]. These experiments represent the highest efficiency conversion of NIF laser energy to thermonuclear fusion output demonstrated to date. We propose to increase the yield still further by including a liquid DT layer on the inner surface of a large PDD capsule. The use of PDD enables ˜10X more energy absorbed by the capsule (compared to indirect drive), and the use of a DT liquid layer [2] (rather than a DT ice layer) enables layered implosions with the reduced convergence [3] required for adequate symmetry with PDD. In this talk, we will compare the PDD DT liquid layer approach to the indirect drive DT ice layer concept and present a preliminary ignition design that has a modest convergence with conservative implosion parameters. 1. Elijah Kemp *et al*, "Development of high-efficiency, non-cryogenic, direct-drive neutron sources on the NIF," YO6.00014, 61st APS-DPP meeting (2019). 2. R. E. Olson *et al.*, "First Liquid Layer ICF Implosions at the NIF," *Phys. Rev. Lett.* 117, 245001 (2016). 3. B. M. Haines *et al.*, "The effects of convergence ratio on the implosion behavior of DT layered ICF capsules," *Phys. Plasmas* 24, 072709 (2017).

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