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Integrated simulations of indirect drive fast ignition targets* M.M. MARINAK, D. LARSON, H.D. SHAY, D. HO, Lawrence Livermore National Laboratory — To understand the dynamics of thermonuclear ignition and burn in fast ignition targets we require simulations that resolve both bulk plasma evolution and transport of fast electrons. The 2D/3D hybrid plasma simulation code Zuma has been integrated with the 2D/3D HYDRA multiphysics ICF code to simulate thermonuclear burn of indirect drive fast ignition targets. The implosion of the capsule mounted on a cone is simulated in HYDRA, which also contains all of the physics necessary to simulate thermonuclear ignition and burn. Zuma simulates the transport of hot electrons from where they are produced by a petawatt laser to their deposition in the dense fuel. Zuma treats the fast electrons kinetically, while the background high density plasma is modeled as a resistive fluid. Electrons from the petawatt laser deposit hundreds of KJ over 10 psec in a region of the fuel 50 microns in radius. Results for indirect drive fast ignition implosion designs considered for the National Ignition Facility will be presented. We consider the yields obtained for capsules having self-consistent implosion symmetry. These use a hot electron source having a realistic angular spread and energy distribution derived from particle in cell simulations. *This work was performed under the auspices of the Lawrence Livermore National Security, LLC, (LLNS) under Contract No. DE-AC52-07NA27344.

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