Abstract Submitted
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Laser Channeling and Hosing in Fast Ignition G. LI, C. REN, R. YAN, University of Rochester, J. TONGE, W.B. MORI, UCLA — We present recent two-dimensional (2D) and three-dimensional (3D) particle-in-cell (PIC) simulation results for laser channeling in mm-scale underdense plasmas. The mm-scale 2D simulations show many new phenomena including plasma buildup to above critical density in front of the laser, laser hosing/refraction, channel bifurcation and self-correction, and electron heating to relativistic temperatures. The channeling speed is much less than the linear group velocity of the laser. A scaling from the simulations shows, that low-intensity channeling pulses are preferred to minimize the required energy. Significant improvement of the transmission of the ignition pulse in a preformed channel has been demonstrated. The 3D PIC simulations show that the channeling speed is larger in 3D than in 2D due to stronger laser self-focusing. Laser hosing in both transverse planes simultaneously was also observed in these 3D PIC simulations for the first time. This work was supported by DOE under Grants No. DE-FC02-04ER54789 and DE-FG02-06ER54879.

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