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The Channeling Effect in the Underdense Plasma G. LI, C. REN, V.N. GONCHAROV, Laboratory for Laser Energetics, U. of Rochester, W.B. MORI, U. of California, Los Angeles — In the fast-ignition approach to laser fusion, the nonlinear effects could greatly weaken the ignition laser in the underdense plasma. One way to overcome this is to send a channeling pulse to open a clear path for the ignition pulse. The PIC code *OSIRIS* is used to simulate the laser–plasma interaction in 2-D space for the channeling process. For a typical run, the laser intensity is 1×10^{19} W/cm^2($\lambda = 1.06$ μm) with a spot size of 14 μm, and the density profile is taken from *LILAC* simulations.Two-step simulations are carried out. In the first step, the density changes from 0.1 to 0.3 n_c within 477 μm $\times$ direction length. In the second step, the density changes from 0.3 to 1.0 n_c within 523 μm $\times$ direction length. Hosing, filaments, and self-focusing are observed. The channel created from the ponderomotive force, however, displays a remarkable regularity, showing that the channeling process has a self-healing characteristic. The channeling speed is also measured. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement Nos. DE-FC52-92SF19460 and DE-FC02-04ER54789.

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