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Density-Modulation-Induced Absolute Laser-Plasma-Instabilities in Inertial Confinement Fusion JUN LI, RUI YAN, CHUANG REN, Department of Mechanical Engineering, University of Rochester — Fluid simulations show that when a static sinusoidal density modulation is superimposed on a linear density profile, convective instabilities can become absolutely unstable. This conversion can occur for two-plasmon-decay and stimulated Raman scattering instabilities under realistic direct-drive inertial confinement fusion conditions and can affect hot-electron generation and laser-energy deposition. Analysis of the three-wave model shows that a sufficiently large change of the density gradient in a linear density profile can turn convective instabilities into absolute ones. An analytical expression is given for the threshold of the gradient change, which depends only on the convective gain. This work was supported by DOE under Grant No. DE-SC0012316; by NSF under Grant No. PHY-1314734; and by Laboratory for Laser Energetics. The research used resources of the National Energy Research Scientific Computing Center.

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