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Growth and Saturation of Two-Plasmon-Decay Instability Driven by Crossing Laser Beams in OMEGA Plasmas A.V. MAXIMOV, J.F. MYATT, R.W. SHORT, W. SEKA, C. STOECKL, J.A. DELETTREZ, Laboratory for Laser Energetics, U. of Rochester — Under the conditions of direct-drive inertial confinement fusion experiments on the OMEGA Laser System, the threshold of two-plasmon-decay (TPD) instability is typically exceeded, and the TPD instability can generate fast electrons that are important for target implosions.[1,2] The characteristic feature of OMEGA experiments and of experiments at the National Ignition Facility is that the laser–plasma interaction is driven by multiple crossing laser beams that are randomized in space because of distributed phase plates, and randomized in time because of smoothing by spectral dispersion. The thresholds and growth rates of TPD instability are calculated and compared with the results of the three-wave TPD model.[3] The saturation of TPD instability is found to be caused by low-frequency ion-acoustic perturbations driven by the laser beams and also by the ponderomotive force of plasma waves, including the Langmuir decay instability. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

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