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Two-Plasmon-Decay Instability and Stimulated Brillouin Scattering in Direct-Drive ICF Plasmas A.V. MAXIMOV, J.F. MYATT, R.W. SHORT, W. SEKA, R. YAN, Laboratory for Laser Energetics, U. of Rochester — In direct-drive inertial confinement fusion (ICF) experiments on the OMEGA Laser System, both the two-plasmon-decay instability (TPD) and the stimulated Brillouin scattering (SBS) are observed.[1,2] The importance of these two instabilities for direct-drive ICF implosions is based on the fact that the TPD may lead to generating fast electrons and that SBS may facilitate the power transfer between the crossing laser beams. On OMEGA and on the National Ignition Facility, the laser–plasma interactions are driven by multiple crossing laser beams, randomized in space with distributed phase plates and randomized in time with smoothing by spectral dispersion. A model has been developed for the saturation of the TPD instability caused by the ion-acoustic modes and applied for crossed-beam interaction conditions. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

[1]C. Stoeckl *et al.*, Phys. Rev. Lett. **90**, 235002 (2003).
[2]W. Seka *et al.*, Phys. Plasmas **16**, 052701 (2009); W. Seka *et al.*, ibid. **15**, 056312 (2008).

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