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The Effects of Beam Polarization and Orientation on Convective and Absolute Two-Plasmon Decay Driven by Multiple Laser Beams
R.W. SHORT, J.F. MYATT, J. ZHANG, A.V. MAXIMOV, D.T. MICHEL, D.H. FROULA, Laboratory for Laser Energetics, U. of Rochester — There is now much evidence that two-plasmon decay in direct-drive geometries is a collective process, in which a given set of decay waves is driven by two or more laser beams.[1,2] Since the single-beam decay is maximized on a hyperbola lying in the plane of polarization of the beam, maximum gain for the multibeam process is constrained to the vicinity of the intersection of the hyperbolas corresponding to the beams involved. As a result, the nature of the decay depends on the relative orientations and polarizations of the beams. It is found that when the polarizations of two beams lie in the plane of their wave vectors, they drive a collective mode with a large-plasmon wave vector **k**, while when they are polarized out of this plane the collective mode is at small **k**. In the latter case the instability can be absolute. For more general polarizations or when polarization smoothing is used both types of decay may be present. The small-**k** instability is less affected by imperfect symmetry of the beams, and its gain increases relative to the large-**k** instability as the number of beams increases. 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]T. Michel *et al.*, "Experimental Demonstration of the Two-Plasmon-Decay Common-Wave Process," to be published in Physical Review Letters.

R.W. Short
Laboratory for Laser Energetics, U. of Rochester

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