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Measurements of the Two-Plasmon-Decay Generated, Hot-Electron Fraction as a Function of the Quarter-Critical Density Scale Length D.H. EDGELL, D. HABERBERGER, S.X. HU, D.T. MICHEL, J.F. MYATT, D.H. FROULA, Laboratory for Laser Energetics, U. of Rochester — Simulations suggest that direct-drive implosions on the National Ignition Facility (NIF) will develop density scale lengths of the order of 500 μm that lead to large two-plasmon–decay (TPD) common-wave gains. The scale length was varied on OMEGA EP experiments using targets with different radii of curvature, including some negative curvature (concave) targets that achieved NIF density scale length. By varying the target curvature, the density scale length (L) was increased from 100 μm to 500 μm while maintaining a nearly constant ratio of laser intensity (I) to electron temperature (T). The TPD threshold is predicted to scale as T/(IL). Over this range, the fraction of laser energy converted to hot electrons is measured to increase rapidly from 0.005% to 2.1%. These results will be compared to the gains calculated by a 3-D multibeam TPD model. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.

D.H. Froula
Laboratory for Laser Energetics, U. of Rochester

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