Two-Plasmon-Decay Hot-Electron Distributions from Bremsstrahlung Measurements

J.F. MYATT, D.H. EDGELL, W. SEKA, A.V. MAXIMOV, R.W. SHORT, Laboratory for Laser Energetics, U. of Rochester — Preheat caused by hot electrons from the two-plasmon-decay (TPD) instability has been implicated in the reduction of fuel areal density $\rho R$ in direct-drive implosions on OMEGA. Hard x-ray measurements have been performed using a four-channel, hard x-ray detector (HXRD) with surrogate targets at an intensity of $5 \times 10^{14}$ W/cm$^2$. A bremsstrahlung model has been developed assuming that the electrons are produced within a cone of half-angle $\theta$ and exponentially distributed in energy, characterized by $T_{hot}$. The angular-dependent signals of the HXRD channels are consistent with $T_{hot} = 120\pm20$ keV and a half-angle of $\theta = 10\pm5^\circ$. The possible origin of such a distribution and its implications will be discussed. 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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Date submitted: 16 Jul 2008