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A Numerical Model for Two-Plasmon–Decay Hot-Electron Production and Mitigation in Direct-Drive Implosions J.F. MYATT, J.G. SHAW, A.A. SOLODOV, A.V. MAXIMOV, R.W. SHORT, W. SEKA, R.K. FOLLETT, D.H. EDGELL, D.H. FROULA, V.N. GONCHAROV, Laboratory for Laser Energetics, U. of Rochester — Hot-electron preheat, caused by laser–plasma instabilities, can impair the performance of inertial confinement fusion implosions. It is therefore imperative to understand processes that can generate hot electrons and to design mitigation strategies should preheat be found to be excessive at the ignition scale (laser–plasma interactions do not follow hydrodynamic scaling). For this purpose, a new 3-D model [laser-plasma simulation environment (*LPSE*)] has been constructed that computes hot-electron generation in direct-drive plasmas based on the assumption that two-plasmon decay is the dominant, hot-electron–producing instability.[1] It uses an established model of TPD-driven turbulence[2] together with a new GPU based hybrid particle method of hot-electron production. The time-dependent hot-electron power, total energy, and energy spectrum are computed and compared with data from recent OMEGA implosion experiments that have sought to mitigate TPD by the use of multilayered (mid-Z) ablators. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.

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