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Fast electron heating of dense plasma relevant to shock ignition[1]
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With an intensity in the range of 10^{16} W/cm^2, the ignitor pulse in shock-ignition inertial confinement fusion is well above the threshold of parametric instabilities. Simulations (e.g. Klimo et al. 2011 Phys. Plasmas 18 082709) indicate that a significant amount of energy will be deposited in energetic electrons with energies <100 keV and it has been proposed that these may play a beneficial role in enhancing the ignitor shock. Simulations by Gus'kov et al. (Phys. Rev. Lett. 109 255004 (2012)) show that, under shock-ignition relevant conditions, a mono-energetic electron beam can drive strong shocks in a uniform plasma. We extend this study to the more realistic case of a Maxwellian energy distribution in the fast electron population. Having a distribution of electron mean-free-paths results in a more extended heating profile compared to a mono-energetic beam. However, we show it is still possible to launch strong shocks in this more realistic scenario and achieve equivalent pressures. The peak pressures achieved compare well with analytic scalings.

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