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Self-Consistent Short Laser Pulse Absorption and Particle Transport with KALOS WOJCIECH ROZMUS, MARK SHERLOCK, TONY BELL, Blackett Laboratory, Imperial College, London, SW7 2AZ — A new version of the numerical code KALOS has been developed to solve the Vlasov-Fokker-Planck equation for electrons coupled self-consistently to Maxwell's equations to describe EM wave propagation. KALOS represents the electron distribution function in momentum space by an expansion in spherical harmonics. Its unique features make possible simultaneous investigations of laser energy absorption at the target surface and the transport of heat into the dense target. The collisional evolution of thermal particles, including the return current of cold electrons is also accurately modeled. We report here on results obtained in one spatial dimension for the absorption of femtosecond laser pulses in dense plasmas at moderate laser intensities ($\sim 10^{16}$ W/cm^2). In this regime the electron distribution function is modified at the target surface by strong inverse bremsstrahlung heating and inside the target by non-SH heat flow. The code results are compared to theoretical predictions which treat the problem as the heating of an inhomogeneous hot-spot region coupled to a propagating electron heat wave into the dense target. We have studied this absorption and energy transport for different density gradient scales and laser intensities. To describe absorption and hot electron transport for oblique incidence we have used the standard approach involving a Lorentz transformation to a frame moving along the target surface.

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