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In this paper we reexamine the classical collisional absorption of intense laser light in a dense plasma. We consider heating and diffusion of electrons of various energies, the evolution to a non-Maxwellian electron distribution when $Zv_0^2/v_e^2 \gtrsim 1$, and the resulting changes to transport and other properties. For example, the inverse Bremsstrahlung absorption itself is reduced by a factor of two compared to the absorption in a Maxwellian plasma of the same thermal energy density. For materials with $Z{>>}1$, this represents a more significant non-linearity than found in the many other analyses for which the relevant parameter is v_0/v_e. (Here v_0 is the peak velocity of oscillation of the electrons in the high-frequency electric field, $v_e \equiv (T_e/m_e)^{1/2}$ is the electron thermal velocity, and Z is the ionization state.) Note also that enhanced isotropic ion fluctuations increase the scattering rate, as high Z does. The origin of this non-linearity is that, when $Zv_0^2/v_e^2 \gtrsim 1$, electron-electron collisions are not rapid enough to Maxwellianize the flat-topped velocity distribution produced by inverse Bremsstrahlung.

In the standard classical treatment, a Maxwellian electron distribution oscillates relative to the ions at frequency $\omega >> \tau_{ei}^{-1}$, where τ_{ei} is the electron-ion scattering time. For small v_0/v_e, the absorption rate is $\propto f_e(0)$, the distribution function evaluated at v=0, so it seems that only the slowest electrons contribute to absorption. By an analysis which requires no $\omega\tau_{ei}$ ordering we show that the absorption is in fact proportional to f evaluated not at v=0 but at the velocity for which $\omega\tau_{ei}(v) \cong 1$, i.e. the oscillation period and scattering times are matched.

The equation for evolution of $f_e(v,t)$, due to inverse Bremsstrahlung and e-e collisions, is derived and integrated numerically. We consider first the effect of inverse Bremsstrahlung alone. An initially monoenergetic distribution diffuses and slows in balance so that no net gain in kinetic energy results. When electrons reach slow velocities (such that $\omega\tau_{ei}(v) \lesssim 1$) their loss of energy is slowed while upward diffusion of faster particles continues. This is the meaning of the result that the absorption depends on f_e at low velocities. By the time the electrons have gained only 10% in energy, f_e is close to its late-time form, described by a similarity solution of the form $u^{-3}\exp(-v^5/5u^5)$, with $u^5 \propto t$. For this distribution, the absorption is only 49% of what it would be if e-e collisions enforced a Maxwellian distribution, and heat flow is reduced.

For moderate values of Zv_0^2/v_e^2, e-e collisions alter these results only slightly. For example, with $Zv_0^2/v_e^2=6$ the absorption is still only 49% of its Maxwellian value, and inverse Bremsstrahlung contributes equally with e-e collisions to diffusion of superthermals into the "tail" of the distribution.

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