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The Krook Collision Model as a template for calculating Electron Thermal Flux in Laser Produced Plasmas[1] WALLY MANHEIMER, R.S.I. (consultant to NRL), DENIS COLOMBANT, Plasma Physics Division, Naval Research Laboratory, VALERI GONCHAROV, LLE, University of Rochester — This paper explores what appears to be a new and promising model for electron energy transport in laser produced plasmas, a Krook model for electron electron collisions. This model treats the collison operator as $-\nu(f - f_{max})$. It is particularly simple in that it involves no velocity derivatives and can be treated as a steady-state problem on the ion fluid time scale. In fact in some cases, one can calculate analytically steady-state solutions in the nonlocal limit. However this formulation is also inherently problematical in that if ν depends on particle velocity, it is not necessarily particle or energy conserving. However, using it to compute only energy flux does maintain the overall conservative nature of the fluid simulation. In some ways, a Krook model may even be more accurate than a Fokker-Planck simulation because of the rather small values of the Coulomb logarithm over large regions of the plasma. This paper will present analytic and numerical aspects of our recent investigation of the Krook model.

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