Tests for Krook model for nonlocal heat transport in laser produced plasmas

D. COLOMBANT, W. MANHEIMER, M. KESKINEN, Plasma Physics Division, Naval Research Laboratory, Washington, DC, V. GONCHAROV, Laboratory for Laser Energetics, University of Rochester, Rochester, NY — A Krook model has recently been proposed [1] for solving the problem of electron energy transport in laser produced plasmas. In this work, we report on comparisons of this model with 1) a more complete Fokker-Planck model and 2) an experiment performed at NRL [2]. A simple test problem solved with a Fokker-Planck code was first considered by Matte and Virmont [3]. It consists of a pure heat transport problem in a uniform plasma slab between two thermostatic walls at different temperatures. The normalized slab length (L/λ where λ is the average electron mean free path) varies from order 1 to a few hundreds. The comparison with experiment involves the back side temperature measurement behind a 58 µm plastic foil after the passage of a laser-produced shock wave. Results from these two comparisons will be presented and outline for further work will be discussed.


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