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Exploring the limits of the "SNB" multi-group diffusion nonlocal model JONATHAN BRODRICK, CHRISTOPHER RIDGERS, York Plasma Institute, Department of Physics, University of York, Heslington, York, YO10 5DD, UK, ROBERT KINGHAM, Plasma Physics Group, Room 724 Blackett Laboratory, Imperial College London, London SW7 2AZ, UK — A correct treatment of nonlocal transport in the presence of steep temperature gradients found in laser and inertial fusion plasmas has long been highly desirable over the use of an ad-hoc flux limiter. Therefore, an implementation of the "SNB" nonlocal model (G P Schurtz, P D Nicolaï & M Busquet Phys. Plas. 7 4238 (2000)) has been benchmarked against a fully-implicit kinetic code: IMPACT. A variety of scenarios, including relaxation of temperature sinusoids and Gaussians in addition to continuous laser heating have been investigated. Results highlight the effect of neglecting electron inertia $\left(\frac{\partial \mathbf{f_1}}{\partial t}\right)$ as well as question the feasibility of a nonlocal model that does not continuously track the evolution of the distribution function. Deviations from the Spitzer electric fields used in the model across steep gradients are also investigated. Regimes of validity for such a model are identified and discussed, and possible improvements to the model are suggested.

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