Abstract Submitted
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Advances in Vlasov-Fokker-Planck Simulation of Nanosecond Laser-Plasma Interactions[1] CHRISTOPHER RIDGERS, ROBERT KINGHAM, Imperial College London — We have developed the first computational tool which is ideally suited to modelling the effects of non-local transport (i.e. departures from Braginskii's transport theory) and self-generated magnetic fields over nanosecond timescales in two spatial dimensions. The current code is a significant development of an existing VFP code (IMPACT[1]) that has been modified to allow hydrodynamic motion of the ions; this allows for more realistic plasma simulation over the timescales of interest. We briefly outline the procedure by which one includes the effect of moving ions in the Vlasov-Fokker-Planck (VFP) equation. We investigate the suppression of non-local heat flow, by externally applied magnetic fields, in long-pulse laser produced plasmas[2,3]. The effects of resistive diffusion, 'frozen-in' flow and Nernst advection determine the evolution of the spatial structure of the magnetic field – under the action of laser heating – and are included in our model. The exact profile of the magnetic field affects the degree of importance of non-local heat flow and so is part of our discussion. [1] R.J. Kingham & A. Bell, Journal of Computational Physics, Vol. 194, p1, 2004. [2] G. Gregori *et al*, Physical Review Letters, Vol. 92, No. 20, p205006-1, 2004. [3] D.H. Froula *et al*, submitted to Physical Review Letters, Spring 2006.

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