

Abstract Submitted  
for the DPP07 Meeting of  
The American Physical Society

**Control of the Fast Electron Beam Divergence for Fast Ignition Inertial Fusion** P. NORREYS, Rutherford Appleton Laboratory — The fast electron beam divergence in intense laser plasma interactions is a vital ingredient in determining the success of fast ignition inertial fusion- If it is too large, then the short pulse laser energy required to generate the temperatures needed for hot spark formation becomes impractical to implement on ignition scale facilities. In this talk, I will review the recent experiments performed on the Vulcan PW laser facility to investigate this question. The pulse duration was changed from 0.5 ps - 10 ps and a wide range of plasma diagnostics were fielded. An intensity dependence to the beam divergence has been identified for the first time from these measurements. Simulations show this effect is caused by Rayleigh-Taylor-like rippling of the critical density surface. I will present new ideas on how the divergence can be controlled and the fast electron transport collimated. These are supported by analytic theory and validated by hybrid Vlasov-Fokker-Planck and hybrid particle-in-cell modelling..

Robert Bingham  
Rutherford Appleton Laboratory

Date submitted: 15 May 2007

Electronic form version 1.4