

Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

3D Instability and Subsequent Saturation of an Electron Beam Penetrating an Overdense Plasma A.G. SGRO, Los Alamos National Laboratory — When an electron beam encounters an over dense plasma, the beam is quickly destabilized and dispersed. However, it was shown previously¹ by means of 2D simulations that over long time scales the beam ejects background electrons from the region where the beam is propagating, leaving background ions to neutralize the beam charge, thus stabilizing the beam propagation. The present paper extends these simulations to 3D. It is shown that 3D modes, including non axial kink modes, grow and disperse the beam to the diameter of the simulation box, and just as in the 2D simulations, over long time scales the beam also ejects background electrons from the region where the beam is propagating, thereby stabilizing the propagation in 3D also. These simulations thus show that the stable beam propagation at longer times that was found in the 2D simulations is also found when 3 dimensional perturbations are excited.

¹A. G. Sgro and T. J. T. Kwan, Phys. Plasmas 10, 849 (2003)

A. G. Sgro
Los Alamos National Laboratory

Date submitted: 19 Jul 2005

Electronic form version 1.4