

Abstract Submitted
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Simulations of a Relativistic Electron Beam Penetrating an Overdense Plasma A.G. SGRO, Los Alamos National Laboratory — Previous¹ work by means of 2D simulations has shown that over long time scales an electron beam encountering an overdense background plasma ejects the background electrons from the region where the beam is propagating, leaving the background ions to neutralize the beam charge, thus stabilizing the beam. Subsequently, long timescale simulations with coarse spatial resolution were presented² which seemed to show that the 2D behavior carried over to 3D, although a firm conclusion was not possible because of the coarse resolution. The purpose present paper is to present simulations of the interaction between the beam and the overdense plasma in 3D with a finer spatial resolution than has been presented previously. These simulations reinforce the conclusion that the beam can propagate stably for long times. Three dimensional perturbations do not destabilize the beam. The beam essentially digs a hole in the background plasma through which it can propagate.

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

²A. G. Sgro, Bull. Am. Phys. Soc. 49 (11), 96 (2004).

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