SIMULATIONS OF NEUTRALIZED FINAL FOCUS*

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In order to drive an inertial fusion target with heavy ion beams, the beam radius must be focused to < 3 mm and the pulselength must be compressed to < 10 ns. The typical scheme for temporal pulse compression makes use of a head-to-tail ion velocity tilt to compress the beam as it drifts and beam space charge to stagnate the compression. Beam compression in a neutralizing plasma does not require stagnation of the compression enabling a much more robust method. A final pulse shape at the target can be programmed by an applied energy tilt. In this paper, neutralized drift compression is investigated with a particle-in-cell code. The sensitivity of compression to beam momentum spread, plasma and magnetic field conditions is studied. Representative examples will be shown, such as neutralized drift compression in the Integrated Beam Experiment (IBX) accelerator. Application to a driver final focus system for an accelerator using modular solenoid technology[1] and assisted pinched transport [2] is discussed. Using the 3-D parallel LSP[3] code, we discuss issues associated with self-field generation, stability and the vacuum-to-neutralized transport transition.

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3. T. P. Hughes, S. S. Yu, and R. E. Clark, *Physics Review ST-AB* 2, 110401 (1999); D. R. Welch, D. V. Rose, B. V. Oliver, and R. E. Clark, *Nuclear Instruments & Methods in Physics Research A* 464, (2001), 134. LSP is a software product of Mission Research Corporation (http://www.mrcabq.com).