

Abstract Submitted  
for the DPP07 Meeting of  
The American Physical Society

**Acceleration Gap Effects on the Longitudinal Compression of Intense Ion Beams in the Neutralized Drift Compression Experiment<sup>1</sup>**

ADAM SEFKOW, RONALD DAVIDSON, Princeton Plasma Physics Laboratory — Longitudinal compression of space-charge-dominated ion beams to high currents in nanosecond pulses for warm dense matter and heavy ion fusion applications is achieved by imposing a time-dependent velocity tilt to the charge bunch across the acceleration gap of a linear induction accelerator. The subsequent neutralization of the beam by a pre-formed plasma allows the intense charge bunch to compress above the traditional space-charge limit for quiescent propagation and longitudinal focusing. The detailed physics and implications of acceleration-gap effects and focusing aberration on optimum current compression are reviewed. Quantitative examples using particle-in-cell simulations explore the dependency of the axial compression on effects such as the finite-size acceleration gap, voltage waveform, and the beam's initial temperature, pulse length, intended fractional velocity tilt, kinetic energy uncertainty, and distribution function.

<sup>1</sup>Research supported by the U.S. Department of Energy under the auspices of the Heavy Ion Fusion Science Virtual National Laboratory

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Date submitted: 19 Jul 2007

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