

Abstract Submitted  
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**Collective Focusing of Intense Ion Beam Pulses for High Energy Density Physics Applications**<sup>1</sup> MIKHAIL A. DORF, (LLNL), IGOR D. KAGANOVICH, EDWARD A. STARTSEV, RONALD C. DAVIDSON, (PPPL) — The collective focusing concept in which a weak magnetic lens provides strong focusing of an intense ion beam pulse carrying an equal amount of neutralizing electron background is investigated by making use of advanced particle-in-cell (PIC) simulations and reduced analytical models. The original analysis by Robertson [Phys. Rev. Lett. **48**, 149 (1982)] is extended to the parameter regimes of particular importance for several high energy density physics applications. The present paper investigates: (a) the effects of a moderately strong magnetic field,  $\omega_{ce} \geq \omega_{pe}$ ; (b) suppression of the applied magnetic field due to the presence of the beam self-fields generated when  $r_b \geq c/\omega_{pe}$ ; and (c) the influence of a finite-radius conducting wall around the beam cross section. Here,  $r_b$  is the beam radius,  $c$  is the speed of light, and  $\omega_{ce}$  and  $\omega_{pe}$  are the electron cyclotron and electron plasma frequencies, respectively.

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