

Abstract Submitted  
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**Focusing Intense Charged Particle Beams with Achromatic Effects for Heavy Ion Fusion**<sup>1</sup> JAMES MITRANI, IGOR KAGANOVICH, PPPL, Princeton, NJ, 08540 — Final focusing systems designed to minimize the effects of chromatic aberrations in the Neutralized Drift Compression Experiment (NDCX-II) are described. NDCX-II is a linear induction accelerator, designed to accelerate short bunches at high current. Previous experiments showed that neutralized drift compression significantly compresses the beam longitudinally ( $\sim 60\times$ ) in the  $z$ -direction, resulting in a narrow distribution in  $z$ -space, but a wide distribution in  $p_z$ -space. Using simple lenses (e.g., solenoids, quadrupoles) to focus beam bunches with wide distributions in  $p_z$ -space results in chromatic aberrations, leading to lower beam intensities ( $\text{J}/\text{cm}^2$ ). Therefore, the final focusing system must be designed to compensate for chromatic aberrations. The paraxial ray equations and beam envelope equations are numerically solved for parameters appropriate to NDCX-II. Based on these results, conceptual designs for final focusing systems using a combination of solenoids and/or quadrupoles are optimized to compensate for chromatic aberrations. Lens aberrations and emittance growth will be investigated, and analytical results will be compared with results from numerical particle-in-cell (PIC) simulation codes.

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