

DRIFT COMPRESSION AND FINAL FOCUS OPTIONS FOR HEAVY ION FUSION*

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In the currently envisioned configurations for heavy ion fusion, it is necessary to longitudinally compress the beam bunches by a large factor after the acceleration phase. A one-dimensional warm fluid model in the longitudinal direction has been developed to study the self-similar drift compression schemes and pulse shaping methods. In the transverse direction, the beam size will increase in a periodic quadrupole lattice due to the increasing space-charge force as the beam is compressed. To actively control the beam size, a non-periodic quadrupole lattice has been designed to provide a larger focusing force along the beam path. Four time-dependent magnets are introduced in the upstream of drift compression to focus the entire pulse onto the same focal spot. Drift compression and final focusing schemes are developed for a typical heavy ion fusion driver and for the Integrated Beam Experiment (IBX) currently being designed by the Heavy Ion Fusion Virtual National Laboratory.

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