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The Virtual National Laboratory for Heavy-Ion Fusion is developing a physics design for NDCX-II, an experiment to study warm dense matter heated by ions near the Bragg-peak energy. Present plans call for using about thirty induction cells to accelerate 30 nC of Li^{+} ions to more than 3 MeV, followed by neutralized drift-compression. To heat targets to useful temperatures, the beam must be compressed to a sub-millimeter radius and a duration of about 1 ns. An interactive 1-D particle-in-cell simulation with an electrostatic field solver, acceleation-gap fringe fields, and a library of realizable analytic waveforms has been used for developing NDCX-II acceleration schedules. Multidimensional simulations with WARP have validated this 1-D model and have been used both to design transverse focusing and to compensate for injection non-uniformities and 3-D effects. Results from this work are presented, and ongoing work to replace the analytic waveforms with output from circuit models is discussed.

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