HIFAN 1690a

Simulating Acceleration Schedules for NDCX-II

Authors:

W.M. Sharp
(Lawrence Livermore National Laboratory)

A. Friedman
(Lawrence Livermore National Laboratory)

D.P. Grote
(Lawrence Livermore National Laboratory)

E. Henestroza
(Lawrence Berkeley National Laboratory)

M.A. Leitner
(Lawrence Berkeley National Laboratory)

W.L. Waldron
(Lawrence Berkeley National Laboratory)

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.

Prepared by LLNL under Contract DE-AC52-07NA27344.
Supported by the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.