

Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Simulations of Self-Pinching Heavy-Ion Beams¹ R.H. COHEN, A. FRIEDMAN, D.P. GROTE, LLNL, B.G. LOGAN, J.-L. VAY, LBNL — An un-neutralized ion beam is subject to a self-pinching force and electrostatic defocusing, and normally the latter wins. However, if the transverse electrostatic forces can be reduced sufficiently, a net pinching can occur. There has been interest recently in utilizing this concept for heavy-ion fusion applications. We consider several approaches to reducing electrostatic defocusing. Two that have particular promise are use of closely spaced conducting foils transverse to the beam propagation direction, and introduction of a counterstreaming relativistic electron beam in a guide magnetic field. We present electromagnetic particle simulations (with the WARP code) that demonstrate pinching with both approaches. The conducting foil approach yields cleaner focusing in an idealized simulation, but is subject to limitations from non-ideal effects including field-emission of electrons and knock-on electrons.

¹Work performed for USDOE under contracts DE-AC52-07NA27344 at LLNL and DE-AC02-05CH1123 at LBNL.

Ronald Cohen
LLNL

Date submitted: 20 Jul 2011

Electronic form version 1.4