

Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Guide and Mirror Magnetic Field Diffusion Calculations for the FRC Compression Heating Experiment (FRCHX) at AFRL MATTHEW DOMONKOS, Air Force Research Laboratory, DAVID AMDAHL, Numerex, JAMES DEGNAN, Air Force Research Laboratory, MICHAEL FRESE, Numerex, DONALD GALE, CHRIS GRABOWSKI, SAIC, ROBIN GRIBBLE, THOMAS INTRATOR, Los Alamos National Laboratory, GERALD KIUTTU, Varitech — Calculations of the guide and mirror applied magnetic field diffusion were conducted using a commercially available generalized finite element solver. As part of the integrated FRC compression heating experiment (FRCHX), an applied magnetic field captures the translating FRC in the liner region long enough to enable compression. Solenoidal coils inject the necessary magnetic field prior to liner implosion. Since the liner implosion is underway before the FRC is injected, the magnetic flux that diffuses into the liner is compressed, and the calculations must account for the liner motion. A generalized finite element code, using appropriate simplifying assumptions, aided the design of the guide and mirror coils for the FRCHX. The code was used to determine that the Shiva Star return conductor needs to be slotted to permit magnetic field diffusion. In addition the liner motion was approximated to evaluate the field within the liner during implosion. This work is funded by the U.S. Department of Energy Office of Fusion Energy Sciences.

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Date submitted: 21 Jul 2007

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