

Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Target FRC Formation and Foil Liner Implosion Demonstrations for the Foil Liner Compression Experiment GEORGE VOTROUBEK, JOHN SLOUGH, DAVID KIRTLEY, CHRIS PIHL, MSNW LLC, RICHARD MILROY, GEORGE MARKLIN, University of Washington — The Foil Liner Compression Experiment aims to demonstrate the compression of a Field Reversed Configuration (FRC) plasma with megagauss fields generated by an imploding foil liner. The liner is driven by a theta-pinch coil using sub-megajoule energies. This energy limit and the FRC lifetime at smaller scale (\sim a few cm) must be balanced against the liner mass (and thickness), implosion velocity and liner material properties to arrive at the optimal system parameters. A two pronged experimental effort is underway: 1) formation of the target FRC utilizing FRC merging, 2) demonstration of an efficient foil liner implosion resulting in the high implosion velocities needed for compression. The FRC formed through merging of two supersonic FRCs creates a well positioned, stationary target suitable for compression. Foil liner dynamics have been studied with the aid of FEM analysis (ANSYS), where liner properties and initial implosion field strength can easily be varied, and have been found to agree with experimental results. Details of the experimental setup and results will be detailed. In addition, numerical codes are being developed to provide accurate and predictive capabilities of the plasma/foil liner compression. These efforts will also be discussed.

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Date submitted: 27 Jul 2011

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