

**FIELD REVERSED CONFIGURATION (FRC)  
FORMATION, TRANSLATION AND COMPRESSION\***

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Experiments on FRC formation and translation into the interior of a metal shell or liner have been conducted at AFRL. Flux exclusion, collimated light, and interferometer data on magnetized plasma injection will be presented. These are a pre-requisite for FRC compression by liner implosion, experiment progress on which will also be presented. FRC translation, capture, and compression experiments all use primarily axial  $\sim 2$  Tesla guide and mirror fields established inside the liner, using  $\sim 5$  millisecond rise time discharges into an array of pulsed magnet coils surrounding the liner implosion portion of the device. A 12 MA, 4.5 MJ axial discharge drives the liner implosion for compression experiments. The FRC capture experiments use 3 capacitor discharges into a segmented theta coil surrounding the FRC formation region to establish a bias field, accomplish pre-ionization of deuterium gas, and provide the reverse field main theta discharge ( $\sim 1$  Megamp) which forms the FRC. This is aided by two cusp field discharges. The guide and mirror fields enable translation of the FRC and its capture in the liner interior region. Diagnostics include pulsed power (current and voltage), magnetic field, field exclusion, He Ne laser interferometry, imaging and spectroscopy, radiography, and both activation and time-of-flight neutron detection. Design features and operating parameters are guided by 2D-MHD simulations.

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