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The FRCHX Plasma Injector System[1] CHRIS GRABOWSKI, JAMES DEGNAN, MATTHEW DOMONKOS, EDWARD RUDEN, Air Force Research Laboratory-Kirtland, GLEN WURDEN, THOMAS WEBER, Los Alamos National Laboratory — The Field-Reversed Configuration Heating Experiment (FRCHX) has been developed in collaboration between the Air Force Research Laboratory (AFRL) and Los Alamos National Laboratory (LANL) to form high density field-reversed configuration (FRC) plasmas intended for adiabatic compression to high energy density conditions. The FRC is first formed via reversed-field theta pinch in Deuterium background plasma. Once formed it is translated a short distance and trapped by a magnetic well within an aluminum solid liner, where it is diagnosed and/or compressed by implosion of the liner. Lifetime of the FRC's poloidal flux affects peak density, temperature, and neutron yield during compression. Despite recent improvements, a significantly longer lifetime is still needed. The merging of two counter-propagating high density FRC plasmas within a central trapping/compression region is proposed. Poloidal flux lifetimes 2 to 3 times longer with embedded fields of 4-5 T, densities $> 1 \times 10^{17}$ cm^{-3}, and temperatures (Te+Ti) > 500 eV are projected. These parameters surpass any achieved previously with uncompressed FRC plasmas. An overview of the proposed FRC merging system will be given with further details of projected FRC parameters anticipated.

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