Overview of High-density FRC Research on FRX-L at Los Alamos National Laboratory*

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We provide an overview of the FRX-L (Field Reversed configuration eXperiment – Liner) experiment at Los Alamos National Laboratory, including the design goals, plasma physics, engineering and diagnostic approach, and the most recent data. FRX-L is a magnetized-target injector for magnetized-target fusion (MTF) experiments. It was designed with the goal of producing high-density ($n \sim 10^{17}$ cm⁻³) FRCs and translating them into an aluminum *liner* (1-mm thick, 10-cm diameter cylindrical shell) for further adiabatic compression to fusion conditions. Although operation at these high densities leads to shorter FRC lifetimes, our application requires that the plasma live only long enough to be translated and compressed, or on the order of 20-30 µs. Careful study of FRC formation in situ will be performed in the present experiment to differentiate between effects introduced in future experiments by translation, trapping, and compression of the FRC. A review of the MTF concept and how FRX-L applies to it is presented, along with current results on the optimization of the FRC formation process on FRX-L.

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