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MTF-FRC Optimization via Single Mode Interferometry[1] G.D. ROSSI, T.P. INTRATOR, LANL, J. SEARS — Containment of thermonuclear fusion is a key challenge in the ongoing pursuit of sustainable fusion energy. Over the last decades, various approaches to achieve this goal have been developed. One such method for producing laboratory fusion conditions at lower costs than conventional approaches is magnetized target fusion (MTF). MTF lies between the domains of low-pressure magnetic fusion energy (MFE) and high-pressure inertial confinement fusion (ICF) by first forming an intermediate magnetized plasma which is subsequently quasi-adiabatically compressed by an imploding flux conserving shell (liner), thus achieving the necessary pressures and temperatures required for DT fuel ignition. In our experiment (FRX-L), a field reversed configuration plasma (FRC) with closed magnetic flux surfaces and high plasma pressure equilibrium is first created in a quartz tube and later translated via a plasma injector array of theta coils into a metal liner where it is later compressed via a high current implosion mechanism. For our experiment we describe the development of a fiber-coupled interferometer in order to measure the FRC as it is translated into the liner. This will be important as we optimize the formation and translation of an FRC suitable to subsequent liner implosion compression.

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