

Abstract Submitted
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Stability Studies of Compact Toroid Plasmas in MRX S.P. GERHARDT, PPPL, M. INOMOTO, Osaka University, M. YAMADA, H. JI, PPPL, A.J. CARVER, U. of Wisconsin, Madison, A. KURITSYN, B. MCGEEHAN, Y. REN, PPPL — A series of recent experiments in the MRX device have focused on the stability of compact toroid plasmas formed by spheromak merging. The equilibrium field is produced by three independent coil sets, allowing flexibility in the plasma shape and external field decay index. The stability of the plasma is studied using internal and external arrays of magnetic pick-up coils. The ion temperature and toroidal plasma rotation are monitored via Doppler spectroscopy with either an optical probe (local measurement) or line-integrated measurements (global measurements). Our FRC plasmas tend to develop instabilities, but careful shaping of the equilibrium field enables a longer lived plasma. In particular, an external field decay index much greater than zero is required to form longer-lived plasmas. Detailed results from the magnetic measurements and comparisons with rigid-body stability theory will be shown. The rigid-body analysis of figure-8 coil stabilization has been expanded to include the effects of a distributed current profile, and a set of “figure-8” coils has been designed to stabilize global motions. The design of these coils and results (as available) will be shown. This work is funded by the Department of Energy.

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