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Measuring Lundquist number scaling in MST RFP plasmas[1] S.Z. KUBALA, University of Wisconsin - Madison, D.J. DEN HARTOG, UW-Madison, K.J. MCCOLLAM, University of Wisconsin - Madison, L.M. REUSCH, University of Wisconsin - Madison, Edgewood College, J.S. SARFF, University of Wisconsin - Madison — MHD turbulence appears in both natural and magnetic confinement settings, such as the solar wind, self-organization dynamics in the RFP and spheromak, and current disruptions in tokamak plasmas. Here we describe parameter scaling experiments aimed at understanding the underlying nonlinear MHD dynamics using RFP plasmas. Data have been gathered spanning the accessible parameter space in MST, from Lundquist number,$S \sim 10^4 - 10^7$, mainly along three constant ratios of line-averaged electron density to Greenwald density. A programmable power supply allowed data collection at low S, which overlaps with parameters available in numerical modeling, and quantitative comparisons will be made with results from the nonlinear MHD codes DEBS and NIMROD. Diagnostics utilized include the magnetic field coil array, Thomson scattering, far-infrared interferometry, charge exchange recombination spectroscopy, and soft x-ray diagnostics. High current data will be used to infer the effective charge state, Z_{eff}, on which S depends, via an integrated data analysis technique. Z_{eff} can then be scaled as appropriate at lower currents. This data set is one of the most extensive gathered for an RFP and will be accessible for future studies.

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