Abstract Submitted
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Comparing MHD simulations of RFP plasmas to RELAX experiments[1] K.J. MCCOLLAM, D.J. DEN HARTOG, C.M. JACOBSON, J.P. SAUPPE, University of Wisconsin, S. MASAMUNE, A. SANPEI, Kyoto Institute of Technology — Standard reversed-field pinch (RFP) plasmas provide a nonlinear dynamical system as a validation domain for numerical MHD simulation codes, which can be applied to general toroidal confinement scenarios including tokamaks. Using the NIMROD code, we calculate linear stability and simulate the nonlinear evolution of plasmas similar to those in the RELAX RFP experiment, whose relatively modest Lundquist numbers of order 10^4 make the simulations tractable given present computing resources. The chosen RELAX cases cover a broad range of RFP reversal parameters and have also been previously simulated with the MIPS code (N. Mizuguchi *et al.*, TH/P3-26, IAEA FEC, 2012). Experimental diagnostics that can be used for validation purposes include Thomson scattering for electron temperature, interferometry for electron density, SXR imaging, and external and internal magnetic probes. RELAX's small aspect ratio (≈ 2) motivates a comparison study using toroidal and cylindrical geometries in NIMROD.

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