Abstract Submitted
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Calculation of two-fluid resonant modes in spheromaks[1] E.C. HOWELL, C.R. SOVINEC, University of Wisconsin-Madison — Numerical computation is applied to investigate two-fluid effects on resonant modes in spheromaks using the NIMROD code [C.R. Sovinec et. at., Phys. Plasmas 10(2003)]. Earlier whole-device simulations of SSPX show that MHD stability has a strong influence on confinement during the sustained decay phase [E.B. Hooper et. al., POP 15, 032502 (2008)]. Recent computations of spheromak equilibria in a cylindrical domain with prescribed peaked pressure profiles show ideal interchange behavior. A moderate reduction of growth rate ($10 - 70\%$) for intermediate toroidal mode numbers ($n = 16 \sim 20$) is observed when two-fluid effects are included [E.C. Howell and C.R. Sovinec, APS 2009]. Here, we consider more realistic pressure and safety-factor profiles from 3D self-consistent nonlinear MHD simulations. Linear analyses of axisymmetric equilibria reconstructed from the simulations are performed, and growth rates calculated using both ion gyroviscosity and a two fluid Ohm's law are compared with resistive MHD results.

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