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Extended MHD Simulations of Interchange Modes in Spheromak Equilibria[1] E.C. HOWELL, C.R. SOVINEC, University of Wisconsin-Madison — Numerical computation is applied to investigate two-fluid effects on resonant modes in spheromak equilibria using the NIMROD code (nimrodteam.org). Equilibria represent decaying spheromak conditions, when pressure profiles are peaked and MHD stability has a strong effect on confinement [E.B. Hoper etal., POP **15**, 032502 (2008)]. Both linear growth rate scaling studies and mode structure indicate ideal behavior. Linear growth rates are computed using both ion gyroviscosity and a two-fluid Ohm's law and compared with growth rates computed using resistive MHD. For smaller toroidal mode numbers (n<15) the two-fluid physics has minimal effect on the growth rate (1-5%) and can be either stabilizing or destabilizing. For intermediate toroidal mode numbers (n=16-30) the two-fluid physics has predominantly stabilizing effects and growth rates are damped by 10-75%. Maximum damping is observed when the mode rotation rate is grater than the resistive MHD growth rate. The effects of altering the equilibrium density and of equilibrium diamagnetic flows are investigated.

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