Two-Fluid Calculations of the 1/1 Internal Kink[1] E C HOWELL, C R SOVINEC, University of Wisconsin-Madison — The nonlinear evolution of the 1/1 internal kink mode is usually responsible for sawtooth activity in tokamaks. Energetic particles and two-fluid drifts in large experiments can temporarily stabilize the kink mode. This leads to less frequent but larger giant sawtooth events. Comprehensive simulation of the giant sawtooth requires modeling and verifying both effects. Two-fluid linear calculations of the 1/1 kink are performed using the NIMROD code [Sovinec and King, JCP 229, 5803]. Cylindrical screw-pinch equilibria are used to verify the two-fluid kink calculations with respect to analytic dispersion relation [Zakahrov and Rodgers, PFB 4, 3285]. Comparisons are also made to the analytic dispersion relation in [Ara et al., AoP 112, 443], which is only valid in the low pressure limit. The stability of the two-fluid internal kink is also studied in toroidal geometry using both model equilibria and equilibria based on experimental reconstructions.

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