Abstract Submitted
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Three-dimensional computation of toroidal two-fluid internal kink[1] C.R. SOVINEC, E.C. HOWELL, P. ZHU, University of Wisconsin-Madison — An important outcome of the four-field model is the transition from current-sheet to x-point reconnection during the nonlinear stage of the 1/1 mode in a cylinder [1]. A signature of the transition is a nonlinearly enhanced growth rate computed from the kinetic energy. The results have been confirmed with a full two-fluid model [2]. Here, we generalize the full-model single-helicity cylindrical analysis to three dimensions and toroidal geometry using the NIMROD code. Cylindrical 3D computations maintain helical symmetry; no secondary instabilities arise. Toroidal results are similar, at least in the absence of equilibrium diamagnetic rotation. The nonlinearly increased growth rate in kinetic energy and transition to x-point reconnection are obtained. A sharp but short-lived drop in n=1 magnetic energy also occurs with the two-fluid model at the peak of the n=1 kinetic energy. [1] A. Y. Aydemir, Phys. Fluids B 4, 3469 (1992). [2] K. Germaschewski, Bull. Am. Phys. Soc. 53, no. 14, 80 (2008).

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