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Helical phase lag between coupled nonlinear resistive MHD instabilities in toroidal flow shear[1] D.P. BRENNAN, University of Tulsa, S.E. KRUGER, Tech-X Corporation, R.J. LA HAYE, General Atomics — Nonlinear initial value computational analyses are presented detailing the reconnection on rational surfaces driven by a fast growing 1/1 internal kink mode in the presence of flow shear. The flow is included in the equilibrium solutions, which is crucial in initial value computations using the NIMROD code. The driven 3/2 mode is the chosen focus of the analyses. The effects of sub-sonic flow on the onset are detailed, where both the inner layer physics and the coupling between surfaces are investigated in the nonlinear driven stage of the n=2 mode. This is done in part by determining the helical phase between components of the mode. Simulations of the nonlinearly coupled onset and evolution of these instabilities are combined with reduced analytic analyses and linear computational results to gain an intuitive understanding of the physics behind these competing influences and experimental observations.

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