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Energetic Particle Effects on Resistive MHD Instabilities with Varying Aspect Ratio[1] MICHAEL HALFMOON, DYLAN BRENNAN, University of Tulsa, CHARLSON KIM, University of Washington — Advances in computational analysis have made it possible to simulate toroidal MHD equilibrium and stability, including physics outside of the MHD description, with a high degree of precision. Such simulations have recently begun to explore the interaction between non-Maxwellian particle distributions and resistive MHD stability. This project consists of an analysis of the interaction of a slowing down distribution of energetic particles with a m/n=2/1 resistive instability as a function of varying aspect ratio. Using the TOQ, PEST-III and NIMROD codes we initially characterize the MHD stability of the 2/1 mode without particles, and examine the particle effects with the NIMROD code. The equilibrium has a circular cross section and a Bessel function current derived from a linear perturbation in flux, allowing comparison to an analytic result at infinite aspect ratio. Methods and motivations for developing energetic particle effects into the PEST-III code are also discussed.

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