

Abstract Submitted
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Energetic Particle and Varying Aspect Ratio Effects on Resistive and Ideal MHD Modes¹ MICHAEL HALFMOON, University of Tulsa, D.P. BRENNAN, Princeton University, J.M. FINN, Los Alamos National Laboratory — The effect of energetic particles on MHD mode stability is strongly dependent on the aspect ratio of the equilibrium configuration in the high beta and Lundquist number regimes. Advances in computational analysis have made it possible to simulate toroidal MHD equilibrium and stability with the high degree of precision necessary to study these effects in detail. We first obtain a full MHD stability analysis in beta vs. aspect ratio of a circular cross section configuration, with monotonic $q > 1$ and monotonic pressure, using PEST-III and NIMROD. We then include energetic particle effects using the δf hybrid kinetic-MHD particle in cell model in the NIMROD code. By mapping out the stability results and comparing with reduced analyses we form a basis for understanding the particle damping or driving effects and the underlying physics of particle-mode interactions.

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Michael Halfmoon
University of Tulsa

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