

Abstract Submitted
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Kinetic Effects of Energetic Particles on Nonlinear Resistive MHD Stability¹ R. TAKAHASHI, D.P. BRENNAN, University of Tulsa, C.C. KIM, University of Washington — Kinetic effects of energetic particles can play a crucial role in the stability of the 2/1 tearing mode in tokamaks (JET, JT-60U, and DIII-D), where the fraction of energetic particle $\beta_{frac} = \beta_h/\beta$ is high. Using model equilibria based on experimental reconstructions, it has been shown that energetic particles have significant damping and stabilizing effects at experimentally relevant $\beta_{NSG}\beta_{frac}$, and S , and weaker damping and stabilizing effects in the ideal unstable regime, and excite a real frequency of the 2/1 mode [1,2]. Initial nonlinear and two-fluid effects are now investigated. A qualitative extrapolation of these results is discussed for what to expect from energetic particle effects on resistive MHD modes in ITER.

[1] R. Takahashi, *et al.*, Phys. Rev. Lett. 102, 135001 (2009).

[2] R. Takahashi, *et al.*, Nucl. Fusion 49, 065032 (2009).

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