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Extrapolating the kinetic effects of energetic particles on resistive MHD stability to ITER[1] D.P. BRENNAN, R. TAKAHASHI, University of Tulsa, C.C. KIM, University of Washington — The effects energetic particles have on MHD instabilities is a key issue in the physics of burning plasma experiments such as ITER. Recent results indicate kinetic effects of energetic particles can play a crucial role in the stability of the m/n=2/1 tearing mode, especially in ITER where $\beta_{frac} = \beta_h/\beta$ is high (β_h is energetic particle β). Using realistic equilibria based on experimental reconstructions, the non-ideal MHD stability of the n=1 and 2 modes is calculated at a series of q_{min}, β, β_{frac}, and $S=\tau_R/\tau_A$, including the δf kinetic-MHD model in the 3-D extended MHD code NIMROD. Eigenvalue based computations using PEST-III and DCON give context to these results, and provide a basis for extrapolation. It is observed that for high q_{min} the particles have significant stabilizing effects, while at low $q_{min} \gtrsim 1$ the interaction of the particles with the non-resonant response on axis causes destabilization of resistive modes. The requirements for directly computing energetic particle effects on resistive MHD modes in the burning plasma parameter regime are discussed.

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