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[ ] Theory [X] Experiment

Effect of Fast Ion Distribution on Resistive Wall Mode Stability,* J.M. Hanson, J. Berkery, G.A. Navratil, S.A. Sabbagh, F. Turco, *Columbia U.*; M.J. Lanctot, *Lawrence Livermore National Laboratory*; H. Reimerdes, *EPFL-Centre de Recherches en Physique des Plasmas*; I. Chapman, Y. Liu, *Euratom/CCFE Fusion Association*; M. Okabayashi, *Princeton Plasma Physics Laboratory*; G.L. Jackson, R.J. La Haye, E.J. Strait, *General Atomics* – DIII-D experiments with off-axis NBI yield evidence for the impact of passing fast ions on resistive wall mode (RWM) stability. The fast ion radial and pitch angle distribution can be modified in DIII-D by off-axis neutral beam injection (NBI). Off-axis injection results in an increased fraction of passing ions relative to on-axis injection. RWM stability is assessed by measuring the plasma response to a slowly rotating n=1 perturbation. The plasma response decreases in amplitude as the fraction of off-axis neutral beam injected ions is increased at constant normalized beta, implying increased RWM damping. Transport and stability modeling using a fixed pressure profile also indicate increased RWM damping with off-axis NBI, due to increased damping from passing fast ions. While previous investigations have confirmed the importance of trapped thermal and fast ions, this result is the first experimental evidence of the significance of passing fast ions for RWM stability.

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