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Theory Experiment

Rotation in the Plasma Flow Frame of Marginal Neoclassical Tearing Mode Islands in DIII-D and NSTX,* R.J. La Haye, R.J. Buttery, *General Atomics*; S.P. Gerhardt, *PPPL*; S.A. Sabbagh, *Columbia U.* – Small island effects inhibit the pervasive occurrence of neoclassical tearing modes. $m/n=2/1$ or $3/1$ islands are reduced (by decreasing β and thus the destabilizing bootstrap current density) to the self-stabilization size (“marginal point”) in DIII-D and NSTX [1]. Non-zero island propagation in the plasma flow frame can produce a stabilizing polarization current provided it occurs in the direction of (but does not exceed) the ion diamagnetic drift [2]. This “polarization threshold” naturally scales as a characteristic island size of several times the ion banana width, which is consistent with experiment. Comparison of measurements in DIII-D and NSTX discharges of similar cross-section (but different aspect ratio) with polarization current theory will be presented.

- [1] R.J. La Haye, et al., Proc. 38th EPS Conf. on Plasma Phys., Strasbourg, France, 2011, P2.088.
[2] K. Imada and H.R. Wilson, Proc. 38th EPS Conf. on Plasma Phys., Strasbourg, France, 2011, O3.116.

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