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Category Number and Subject: 5.6.2 DIII-D Tokamak

[ ] Theory [x] Experiment

Development of Low Rotation Target Discharges for RWM Feedback Stabilization Using Non-Resonant Magnetic Fields,* G.L. Jackson, R.J. La Haye, J.T. Scoville, E.J. Strait, *GA*, A.M. Garofalo, G.A. Navratil, H. Reimerdes, *Columbia U.,* M. Okabayashi, *PPPL* – Advanced Tokamak scenarios in burning plasma devices ($\beta_N >$ β_N, with) require resistive wall mode (RWM) stabilization either by rapid toroidal rotation (v_ϕ) or feedback control using a magnetic coil set. Present modeling predicts v_ϕ in ITER is not sufficient for RWM stabilization. A DIII-D program goal is to demonstrate feedback stabilization at low rotation. DIII-D is configured with all neutral beam injectors in the same direction so this large momentum input must be counteracted with an externally applied torque to achieve low v_ϕ. Both n=2 and n=3 magnetic braking (non-resonant with the n=1 RWM) have been used to attempt to produce low rotation target plasmas. We will discuss the use of external (C-coil) and internal (I-coil) picture frame coils to reduce the toroidal rotation at the m/n=2/1 flux surface to values below ω_{crit}, ($\omega_{crit} \sim 0.02\ \omega_{alfvén}$) and, in particular, the influences of coil current, q_{edge}, and n_e in obtaining low rotation with β_N above the no-wall limit. The non-resonant fields reduce ELM amplitude and we will present these observations.

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