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[ ] Theory [x] Experiment

Hybrid-Like Discharges With 2/1 Flux-Pumping Due to ELM-NTM Coupling in DIII-D,* J.D. King, C.J. Lasnier, M.J. Lanctot, M.A. Makowski, C.T. Holcomb, S.L. Allen, W.H. Meyer, *LLNL*; R.J. La Haye, C.C. Petty, T.H. Osborne, R.J. Groebner, T.C. Luce, *GA*; F. Volpe, *U Wisc-Madison*; M.E. Austin, *U Texas-Austin*; E.C. Morse, *UC Berkeley* – Edge localized mode (ELM)-neoclassical tearing mode (NTM) coupling pumps poloidal flux from the core to the edge in hybrid discharges, contributing to flattening of the safety factor profile and avoidance of sawteeth. Direct motional Stark effect diagnostic analysis of internal magnetic field pitch angles show 2/1 NTMs exhibit stronger magnetic flux-pumping than typical hybrids, albeit at lower beta. This 2/1 flux-pumping is present during partial electron cyclotron current drive NTM suppression. This finding may lead to an alternative discharge with normalized fusion performance exceeding that required for Q_{fus}=10 operation in ITER. The strength of flux-pumping increases with beta and proximity of the NTM to the ELMing pedestal. Individual ELM-NTM coupling events are successfully modeled using the modified Rutherford equation (MRE).

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