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## EX/P2-08: Long-pulse Stability Limits of ITER Baseline Scenario Plasmas in DIII-D

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Long duration plasmas, stable to  $m/n=2/1$  tearing modes (TM), with an ITER similar shape and an ITER similar value of  $I_{p/aB_T}$  have been demonstrated in DIII-D, evolving to stationary conditions with the most stable operating point at  $\beta_N$  approximately 2. Lower  $\beta_N$ , corresponding to an ITER baseline scenario 2 value of 1.8, led to a higher probability of  $m/n=2/1$  tearing modes, which is the opposite of predictions from neoclassical tearing mode theory. These plasmas ( $\Delta t_{\text{duration}} \leq 7.5$  s and  $\leq 11\tau_R$ ), without electron cyclotron current drive (ECCD) for TM mitigation, have extended shorter pulse experiments in which the internal inductance was continually evolving [1] often until rotating  $m/n=2/1$  TMs or locked modes occurred, which are a concern for ITER operation.

Although long-pulse plasmas have reached stationary conditions, in some cases with similar programming  $m/n=2/1$  TMs and locked modes limited the duration, indicating operation near stability limits. In addition to the plasmas described above, the use of ECCD, broadly deposited near  $q=3/2$ , allowed stable operation in plasmas with reduced torque which were otherwise found to be  $2/1$  TM unstable. We note that direct stabilization of  $2/1$  TMs was not attempted in these experiments.

With one toroidal row of the DIII-D internal coil set ( $n=3$  configuration) and broad ECCD for  $2/1$  TM mitigation, edge localized mode suppression with periods up to 1 s was observed ( $q_{95}=3.15$ ) in plasmas with an ITER similar shape.

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[1] F. Turco and T.C. Luce, Nucl. Fusion 50 (2010) 095010.

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