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Category Number and Subject:

Theory     Experiment

**Comparison of Fluctuation Characteristics in High  $q_{min}$  and Low  $q_{min}$  Steady-State Scenario Plasmas on DIII-D,\*** Y. Zhao, Z. Yan, G.R. McKee, *U. Wisc.*; C.T. Holcomb, *LLNL*; J.R. Ferron, *GA*; W.W. Heidbrink, *UCI* — Experiments investigating the impact of the safety factor ( $q$ ) profile on transport and confinement have been carried out in steady-state scenario plasmas on DIII-D. The minimum safety factor was varied between  $q_{min} \sim 1.4$  and  $q_{min} \sim 2.3$  ( $q_{95} = 6.5$ ) using off-axis neutral beam current drive and early beam injection during moderately high beta plasmas ( $\beta_N \sim 2.3$ .) The steady-state scenario plasmas with high  $q_{min}$  have significantly lower global energy confinement. Long wavelength density fluctuations are measured with a 2D BES array located at  $\rho \sim 0.35-0.85$  (scanned during a set of three repeat discharges). The normalized ( $\tilde{n}/n$ ) density fluctuation amplitude integrated over 50-2500 kHz is found to be nearly double at higher  $q_{min}$  in the region of  $0.5 < \rho < 0.85$ , which is consistent with the lower confinement at high  $q_{min}$ . In addition, a set of discrete coherent modes associated with energetic particle driven instabilities is observed in this frequency range.

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