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☐ Theory ☒ Experiment

Recent Progress on QH-Mode Plasma Studies in DIII-D,*

P. Gohil, K.H. Burrell, G.L. Jackson, W.P. West, *General Atomics*, T.A. Casper, *Lawrence Livermore National Laboratory*, E.J. Doyle, *University of California-Los Angeles* – Experiments have been performed on DIII-D in order to achieve the following objectives: (a) determine the role of edge current in the edge stability of QH-mode plasmas; (b) investigate high density operation in QH-mode plasmas; (c) evaluate the beta limit at high density; (d) determine the parametric dependence of the structure of the edge radial electric field, E_r , in QH-mode plasmas; (e) use of control tools (ECH, pellet injection) to affect the plasma profiles and increase the beta limit in QH-mode plasmas; (f) determine the variation in the impurity transport at the plasma edge for the ELMy and quiescent phases of QH-mode plasmas. The main results from these experiments will be presented. For example, the use of ECH and pellet injection to control the density peaking factor in high density QH-mode plasmas has led to a slight increase in the achievable beta. Also, ELM and EHO stability appear to be very sensitive to upward and downward plasma current ramps. Stability analysis and modeling are underway to reveal the resultant variation in the edge stability.

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