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Theory Experiment

The Effect of Plasma Collisionality on Pedestal Current Density in DIII-D,* D.M. Thomas, A.W. Leonard, T.H. Osborne, R.J. Groebner, W.P. West, and K.H. Burrell, *GA*– The stability of the H-mode pedestal is dependent on the edge pressure gradient and the edge current density. These terms are naturally coupled through neoclassical (Pfirsch-Schluter and bootstrap) effects. On DIII-D, local measurements of the edge current density using an injected lithium beam have confirmed the close spatial and temporal correlation that exists between the measured current density and the edge pressure in H- and QH-mode pedestals, as determined using Thomson scattering and charge exchange recombination spectroscopy. In this work we investigate the behavior of the edge current for DIII-D pedestals which have a range of values for the ion and electron collisionalities (ν_i^* , ν_e^*) due to shaping and fuelling effects. Such changes in the edge collisionality are expected to significantly alter the level of the bootstrap current from the value predicted from the collisionless limit, and hence should affect the pedestal stability limits. We also discuss the extent to which the measurements agree or disagree with specific bootstrap models.

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