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Category Number and Subject: 5.6.2 DIII-D Tokamak

[ ] Theory [x] Experiment

**Evidence for Relation Between Electron Temperature and Density in the H-mode Pedestal,*** R.J. Groebner, A.W. Leonard, M.A. Mahdavi, T.H. Osborne, P.B. Snyder, D.M. Thomas, *GA,* M.E. Fenstermacher, *LLNL* – Data from the DIII-D tokamak show that there might be a fundamental link between the electron temperature and electron density profiles in the H-mode pedestal. At the point of steepest density gradient in the pedestal, the electron temperature scale length $L_{Te}$ is observed to be approximately linearly proportional to the electron density scale length $L_{ne}$, as the scale lengths change during the ELM-free phase of an H-mode discharge. The ratio of $L_{ne}$ to $L_{Te}$, also called $\eta_e$ is found to be in the range of 1-3 at this position in the pedestal. Likewise, $\eta_e$ is found to be in the range of about 1-3 throughout the region of steep density gradient in the pedestal. One interpretation of these results is that the density gradient controls the shape of the electron temperature profile through the mechanism of electron temperature gradient (ETG) turbulence. However, a version of the ETG theory, valid for conditions of the pedestal, does not exist; thus more definitive tests cannot be performed at this time.

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