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Electron Temperature Critical Gradient and Transport Stiffness on DIII-D[1] C.C. PETTY, S.P. SMITH, T.C. LUCE, R. PRATER, GA, T.L. RHODES, G. WANG, L. ZENG, UCLA, C.H. HOLLAND, UCSD, M.E. AUSTIN, UT-Austin, G.R. MCKEE, Z. YAN, U. Wisc. Madison — Experiments on DIII-D have measured the electron temperature critical gradient by varying the electron cyclotron heating (ECH) profile on a shot-by-shot basis using five gyrotrons, while a sixth gyrotron was modulated to simultaneously measure the electron transport stiffness. In L-mode plasmas at a normalized radius around ρ=0.6-0.7, the electron temperature critical scale length decreased from L_{Te}=0.26 m at a plasma current of 0.8 MA to L_{Te}=0.19 m at 1.2 MA. The electron transport stiffness, a parameter obtained by fitting the data to a critical gradient model, was weaker by up to a factor of 5 at the higher plasma current. Plasmas with co-neutral beam injection in addition to ECH had similar dependences of the critical L_{Te} and transport stiffness on plasma current. The measured electron temperature critical gradients, transport stiffness and turbulence characteristics will be compared to transport simulations by the GYRO and TGLF codes, especially in regard to understanding the origin of the "edge shortfall" in the predicted heat flux that occurs for many L-mode plasmas.

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