Abstract Submitted
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Probing Electron Temperature Critical Gradients in Experiment and Simulation[1] S.P. SMITH, T.C. LUCE, J.C. DEBOO, C.C. PETTY, K.H. BURRELL, R.E. WALTZ, G.M. STAEBLER, J. CANDY, General Atomics, C. HOLLAND, UCSD, O. MENEGHINI, ORNL, A.E. WHITE, MIT, T.L. RHODES, L. SCHMITZ, E.J. DOYLE, J.C. HILLESHEIM, G. WANG, L. ZENG, UCLA, G.R. MCKEE, Z. YAN, U Wisc-Madison — In DIII-D, localized electron cyclotron heating (ECH) is used to probe the critical gradient of, and onset of stiffness in, the electron temperature T_e profile. While keeping the total injected ECH power constant, the deposition profile was varied to investigate the relationship between the T_e gradient and the electron power balance heat flux. A critical temperature gradient was observed, above which both the heat diffusivity and the T_e fluctuations increase sharply. To compare to modeling, efforts have been made to produce the most realistic equilibrium reconstructions by using kinetic pressure constraints and motional Stark effect measurements of the local magnetic pitch. With these reconstructions, the gyrokinetic stability codes GYRO and TGLF predict that there is a critical T_e gradient, similar to the experimentally observed gradient, above which electron modes exist and whose growth rates dominate over the ion growth rates.

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