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[ ] Theory [X] Experiment

Controlling DIII-D QH-Mode Particle and Electron Thermal Transport with ECH,* D.R. Ernst, *MIT*; K.H. Burrell, *GA*, T.L. Rhodes, *UCLA*, W. Guttenfelder, *PPPL,* G.R. McKee, *U. Wisc*.; B.A. Grierson, *PPPL,* C. Holland, *UCSD*; A. Dimits, *LLNL*; C.C. Petty, *GA*; L. Schmitz, G. Wang, L. Zeng, E.J. Doyle, *UCL*A; M.E. Austin, *U. Texas* – Quiescent H-mode core particle transport and density peaking are locally controlled by modulated electron cyclotron heating (ECH) at $\rho \sim 0.2$. Gyrokinetic simulations show density gradient driven trapped electron modes (TEMs) are only unstable in the inner core, where the density profile flattens in response to ECH. Thus α-heating could reduce density peaking, providing burn control. Density fluctuations from Doppler backscattering intensify at TEM wavenumbers $k_\theta \rho_s \sim 0.8$ during ECH, while new quasi-coherent modes are observed with adjacent toroidal mode numbers consistent with TEMs. Separately, ECH at two-deposition locations ($r/a \sim \rho = 0.5$ & 0.7) varied the electron temperature gradient. A jump in "heat pulse" diffusivity during the scan indicates a critical gradient was crossed.

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