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Controlling DIII-D QH-Mode Particle and Electron Thermal Transport with ECH[1] 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, UCLA, G. WANG, GA, L. ZENG, E.J. DOYLE, UCLA, 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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