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Application of gyrokinetic "fingerprints" in identifying microinstabilities in DIII-D pedestals[1] MICHAEL HALFMOON, DAVID HATCH, MIKE KOTSCHENREUTHER, SWADESH MAHAJAN, EHAB HASSAN, Institute for Fusion Studies, OAK NELSON, FLORIAN LAGGNER, AHMED DIALLO, Princeton Plasma Physics Laboratory, RICHARD GROEBNER, General Atomics — Advances in gyrokinetic codes, along with analytic techniques for mode identification based on a "fingerprints" method have found the significance of Micro-Tearing Modes (MTM) and electron temperature gradient (ETG) modes in driving the energy losses within the Edge Transport Barriers (ETB) of fusion experiments operating in the ELMy H-mode regime. Gyrokinetic simulations using the GENE code [1] are performed using equilibrium EFIT profiles constructed from experimental data. Nonlinear local simulations of DIII-D shots 174082 and 174092 have shown that electron heat flux has only minor contributions from ETG turbulence, allowing for the presence of MTM's and neoclassical effects to account for observed energy losses. The increased particle sources in shot 174092 leads to additional transport mechanisms. The MTM instabilities found in simulations of shot 174082 are consistent with an observed magnetic fluctuation, having a frequency in the electron diamagnetic direction and range. Simulation results have also shown that kinetic-ballooning modes (KBM) can contribute to particle losses in pedestals. Fluctuations linked to KBM's and MTM's provides a useful "fingerprint" in distinguishing these two modes, and can be used in a quasilinear prediction of transport channels.

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