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Impact of local turbulence on Neoclassical Tearing Mode stability in the DIII-D Tokamak[1] L. BARDOCZI, T.L. RHODES, T.A. CARTER, W.A. PEEBLES, N.A. CROCKER, UCLA, G. MCKEE, U.W.-Madison — We report the first experimental observation of local, Ion Temperature Gradient (ITG) scale turbulence accelerating the growth of large Neoclassical Tearing Mode (NTM) islands. Saturated islands respond with the peaking of the O-point electron temperature T_e to Edge Localized Modes (ELM). In sync the island width w shrinks by as much as 30% suggesting a key role of the T_e peak in NTM stability (via a modified bootstrap current). The T_e peak then relaxes via anomalous transport and w recovers. ITG-scale turbulence $\tilde{n}$ is reduced at the O-point of flat islands [1] but $\tilde{n}$ is restored when T_e is peaked offering an explanation for the anomalous transport. Therefore, these measurements indicate that $\tilde{n}$ accelerates NTM recovery after an ELM crash via relaxing T_e at the O-point. The key physics of the relationship between the T_e peak and NTM stability has potentially far-reaching consequences, such as NTM control via pellet injection in large fusion devices, for example in ITER.

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