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Enhanced H-mode pedestals with lithium injection in DIII- D^1 T.H. OSBORNE, General Atomics — ELM-free H-mode periods with increased pedestal pressure and width were observed on DIII-D when density fluctuations localized near the separatrix were present. Lithium powder injection increased the duration of these enhanced pedestal phases, and also the likelihood of a transition to this regime. The fluctuations, $\tilde{n}/n \sim 0.1$, f ~ 80 kHz, occur in bursts every ~ 1 ms, with frequency varying within each burst. The mode propagates in the electron diamagnetic drift direction with $k_{\theta}\rho_s \sim 0.1 - 0.2$, consistent with a trapped electron or micro-tearing instability. The radial structure of the mode indicates outward radial propagation, and its presence correlates with flattening of the pressure profile near the separatrix. This flattening moves the pedestal high pressure gradient region inward, allowing higher pedestal pressure at the peeling-ballooning stability limit. Lithium injection at a level sufficient for triggering the extended enhanced phases resulted in significant lithium in the plasma core, but carbon and other higher Z impurities as well as radiated power levels were reduced, while recycling of the working deuterium gas appeared to be unaffected.

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