Bifurcation to Expanded H-mode Pedestal Width and Improved Performance with Lithium Injection in DIII-D

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Lithium injection into the DIII-D tokamak excited a long-lived edge-localized instability that correlated with a rapid doubling of the width of the edge transport barrier region, i.e. the pedestal. This and other profile changes resulted in extended edge-localized mode (ELM) free periods with steady radiated power; the edge pressure and energy confinement increased by 100% and 60% above the ELMY H-mode. These plasmas were limited by onset of giant ELMs. The stability improvement enabling access to improved pedestals is consistent with observed profile changes and ideal MHD calculations.