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L-Mode NCS Discharges with Expanded Radius[1] M. MAKOWSKI, T.A. CASPER, J. JAYAKUMAR, B.W. RICE, Lawrence Livermore National Laboratory, C.M. GREENFIELD, T.S. TAYLOR, A.D. TURNBULL, General Atomics — Negative Central Shear (NCS) discharges with an L–mode edge achieve neoclassical ion thermal confinement in the core and, in some cases, neoclassical particle confinement as well. This regime can lead to an attractive AT scenario with good core confinement while maintaining low p' and bootstrap current on the edge. The viability of this approach depends on whether the region of good confinement in the core can be expanded to larger radius. Increased $\rho(q_{\min})$ has been obtained by injecting ~ 5 MW of neutral beam power into the early phase of a current ramp. L–mode edge NCS discharges with $\beta_N = 2.7$, $q_{\min} = 2.7$, and $\rho(q_{\min}) = 0.65$ have been achieved. The duration is limited by the onset of strong MHD activity. Stability analysis shows that $n = 1$ modes are unstable without a wall for low m numbers. However, when a conducting wall is added, these modes are all marginally stable. In contrast to typical L–mode discharges, these NCS discharges demonstrate a somewhat broader and flatter pressure profile, consistent with the observed stability.

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