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Effect of the q and E×B Shear Profiles on Confinement and Stability of ELMing H–mode Discharges[1] B.W. RICE, T.A. CASPER, B.W. STALLARD, LLNL, J.R. FERRON, C.M. GREENFIELD, G.L. JACKSON, R.J. LA HAYE, T.C. LUCE, E.J. STRAIT, GA, R. MAINGI, M.R. WADE, ORNL — Previous experiments in DIII–D and other tokamaks have demonstrated improved fusion performance in L–mode and ELM-free H–mode discharges with negative or weakly positive central magnetic shear and large E×B shear in both high and low triangularity shapes. To date, the improved performance has been transient, being limited by MHD stability. Recently, we have investigated the effect of shaping the q profile and the E×B shear profile on confinement and stability in quasi steady-state (>1 s) discharges with an ELMing H–mode edge. The divertor cryo-pump is used to maintain low density which enables larger E×B shear to be obtained, while early beam injection is used to modify the q profile. In initial experiments, the best results were obtained with q_0 slightly above one, where $\beta_N \sim 2.8$ and $H_{ITER89p} \sim 2.4$ were maintained for 1.5 s with type I ELMs. This value of β_N exceeds the neoclassical tearing mode limit; the absence of these modes may be due to the lack of a sawtooth trigger.

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