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High confinement in negative triangularity discharges in DIII- D^1 M.E. AUSTIN, U. Texas, A. MARINONI, MIT, M.L. WALKER, Gen. Atomics, M.W. BROOKMAN, U. Texas, J.S. DEGRASSIE, A.W. HYATT, C.C. PETTY, K.E. THOME, Gen. Atomics, T.L. RHODES, C. SUNG, UCLA, O. SAUTER, SPC — Discharges with negative triangularity (δ) shape have been created in DIII-D with H-mode-like confinement (H_{98v2} = 1.2) and high normalized beta ($\beta_{\rm N}$ = 2.6) with L-mode-like edge pressure profiles and no ELMs. These inner-wall-limited plasmas with $\delta = -0.4$ had the same global performance as a positive triangularity ($\delta = 0.4$) ELMing H-mode discharge with the same $I_{\rm p}$, elongation and area. Preliminary fluctuation data shows negative δ plasmas have lower turbulence levels, typically reduced by 20%, in the outer region of the plasma, 0.7 < r/a < 1.0, compared to equivalent positive δ discharges. Correspondingly, transport analysis indicates reduced ion and electron diffusivities for negative δ compared to the positive δ cases. Also, the positive triangularity discharges had 30-50% lower neutron rates as the identically heated negative triangularity ones, due primarily to impurity retention and deuterium dilution. These results show that negative triangularity is a viable candidate for reactor scenarios with its high confinement, ELM-mitigated characteristics plus a more economical and effective option for divertor placement.

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