Abstract Submitted
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**Confinement Optimization by Controlling q-shear in DIII-D Steady-State Discharges**[1] M. MURAKAMI, J.M. PARK, ORNL, M. YOSHIDA, QST, B.A. GRIERSON, PPPL, G.R. MCKEE, UWisc, C.T. HOLCOMB, LLNL, O. MENEGHINI, C.C. PETTY, GA — Recent experiment in DIII-D to study effects of varying shear of safety factor (q) on transport and fluctuations showed that negative shear (NS) discharges formed an internal transport barrier inside $\rho = 0.5$, resulting in substantial improvement in ion confinement in the core, and reduced amplitudes of broad turbulent (low- to mid-k) spectra compared with those for the positive shear (PS) discharges. Previous DIII-D experiments under similar conditions but with higher on-axis NBI powers and reversed-$B_T$ direction ($\bigtriangledown$B drift toward upper single null divertor rather than lower single null divertor), showed longer confinement improvement periods with broad NS q-profile. Measured transport characteristics are analyzed in both experiments and compared with predictions of theory-based transport models using the integrated plasma simulation frameworks (OMFIT/IPS). Based on such validated transport models, predictions of prolonged confinement improvement with better sustained ITB using higher powers of off-axis NBI and ECCD available in DIII-D will be discussed.

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