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Study of Core and Edge Gradients in Positive and Negative Triangularity Shaped Discharges in DIII-D[1] RUIFENG XIE, MAX AUSTIN, UT-Austin, ALESSANDRO MARINONI, MIT, DIII-D TEAM — Plasma shaping, in particular triangularity (δ), has been shown to influence turbulence levels and energy confinement in experimental tokamak plasmas. The effects of triangularity on gradients and edge transport in DIII-D have been studied using precise equilibrium reconstructions created with the EFIT code with constraints from ONETWO modeling. It has been observed that, in matched negative (NT) and positive triangularity (PT) L-mode discharges, NT plasmas have on average similar a/L_{Te} and 65% higher a/L_{Ti} in the region $0.6 < \rho < 1.0$. For L-mode NT compared to H-mode PT discharges with comparable heating input, NT plasmas have on average 40% higher a/L_{Te} and 85% higher a/L_{Ti} in the same region, which may indicate a higher critical gradient and gives the same T_e and T_i values at the core. Instead of the exponential profile shape expected for stiff transport models with a/L_{Te} independent of radius, we observe regions at the edge of L-mode plasma with a linear dependence of T_e on ρ that have been characterized as depicting non-stiff transport.[2] Consequently, these results offer an insight to the improved confinement obtained in NT discharges.

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[2]Sauter O., et al., **Phys. Plasmas** 21, 055906 (2014)

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