

Particle transport in DIII–D discharges with internal regions of enhanced confinement and counter injected neutral beams

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An analysis of experimentally measured particle transport in tokamak plasmas with negative central magnetic shear is presented. The analysis is presented in terms of a simple model for turbulent transport which allows the separation of diagonal and off diagonal terms and allows the direct comparison of particle and energy transport. Comparing the measured fluxes to the fluxes predicted by a simple quasi analytical model which specifies a relation between the diagonal and off diagonal terms allows an understanding of the reason for the difference between energy and particle fluxes. In the center of discharges with a region of enhanced confinement (or internal transport barrier), the ion thermal diffusivity becomes small and comparable to neoclassical values and the particle diffusivity also becomes small and approaches the neoclassical values.

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