

Abstract Submitted
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Investigation of the Variation of Measured Particle Diffusion Coefficient¹ M. MAUEL, D. GARNIER, M. DAVIS, Columbia University, J. ELLSWORTH, R. BERGMANN, J. KESNER, P. WOSKOV, MIT — Measurements of the time evolution of the plasma density profile with a levitated dipole in LDX determine the radial particle diffusivity, provided the ionization source is known. In discharges where the particle ionization source appears to be at the outer plasma edge, we observe an anomalous inward particle pinch leading to centrally peaked plasma profiles. The observed inward pinch corresponds to a particle diffusivity that is independent of or varies weakly on radius. In these circumstances, the magnitude of the diffusion coefficient is equal to the value estimated from the turbulent electric field fluctuations measured at the edge with an array of floating potential probes, or $D \approx R^2 \langle E_\phi^2 \rangle \tau_c$, where τ_c is the correlation time. The fluctuation level varies as the plasma density, gas fueling, and microwave heating power changes. We discuss the relationship between fluctuations and particle transport and describe the relationship between particle diffusivity and fluctuation level for several conditions.

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