# Observation of Inward Turbulent Particle Flux Against the Density Gradient with Spatially Distinct Multiple Free-energy Sources

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A fluctuation-driven particle flux that transports plasma against the mean density gradient develops when pressure-gradient driven collisional drift waves generate a sufficiently strong radially sheared azimuthal flow in a cylindrical magnetized plasma. At the shear layer the turbulent stress acts to nonlinearly reinforce the shear flow, while between the shear layer and the peak density gradient the flow nonlinearly drives the fluctuations which give rise to the inward particle flux. Conditional sampling and high speed imaging shows that high (low) density turbulent structures, or blobs (holes), move up (down) the gradient, and the mean gradient steepens. The observations show that spatially separated multiple free-energy sources can drive non-diffusive transport processes that affect global plasma equilibrium. Possible links to transport barrier formation in toroidal confinement devices and space plasma physics systems are discussed.