Abstract Submitted
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Studies of Turbulence, Transport and Flow in the Large Plasma Device[1] TROY CARTER, DAVID SCHAFFNER, GIOVANNI ROSSI, BRETT FRIEDMAN, Dept. of Physics and Astronomy, UCLA, MAXIM UMANSKY, LLNL, DANIEL GUICE, STEVE VINCENA, JIM MAGGS, Dept. of Physics and Astronomy, UCLA, MILO TAYLOR, Berry College, JOSEPH GIBSON, Oxford University, ELI HAIMS, Columbia University — The LArge Plasma Device (LAPD) at UCLA is a 17 m long, 60 cm diameter magnetized plasma column with typical plasma parameters $n_e \sim 1 \times 10^{12}\text{cm}^{-3}$, $T_e \sim 10\text{eV}$, and $B \sim 1\text{kG}$. Recently, the capability to continuously vary the edge flow and flow shear has been developed in LAPD using biasing of an annular limiter. Spontaneous flow is observed in the ion diamagnetic direction (IDD), biasing tends to drive flow in the opposite direction, allowing a continuous variation of flow from the IDD to the electron diamagnetic direction, with near-zero flow and flow shear states achieved along the way. Enhanced confinement and density profile steepening is observed with increasing shearing rate; degraded confinement is observed at near-zero shear. Particle flux and radial correlation length are observed to decrease with increasing shear. The decrease occurs with shearing rates which are comparable to the inverse turbulent autocorrelation time in the zero flow state. LAPD turbulence has been modeled using the 3D Braginskii fluid turbulence code BOUT++. Good qualitative and semi-quantitative agreement is found between BOUT++ simulations and LAPD experimental measurements.

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