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Ramifications of driven spontaneous flow and turbulent transport on cross-correlation functions in the Large Plasma Device GIOVANNI ROSSI, DAVID SCHAFFNER, TROY CARTER, DANNY GUICE, University of California Los Angeles — Spontaneous edge transport barriers that reduce cross-field turbulent transport are observed in the Large Plasma Device (LAPD) at UCLA. In this experiment, recently installed limiter plates form a collimating circle, which when biased relative to the plasma source cathode, drive azimuthal flow at the edge of these limiters and the plasma. These azimuthally symmetric E×B shear flows, thought to be zonal flows, have an associated shear decorrelation mechanism and localized, nonuniform radial electric field, giving them the potential to improve confinement. With increasing bias', the radial electric field is able to penetrate further until there is a sudden steepening of the the density profile, lending forth to an increase in radial particle confinement similar to that of an L-H mode transition found in toroidal fusion devices. Through varying bias' and plasma parameters, we are able to observe the effects of turbulent transport and spontaneous driven flows on two-dimensional cross-correlation measurements. Using these investigations we compare the results from cross-correlation planes against traditional flow generation theories to determine the meaning of energy transfer for reducing turbulent transport, such as via elongation and tilting of embedded eddies due to zonal-flow vorticity.

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