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Structure of Edge Turbulence in the HSX Stellarator CARSTEN LECHTE, WALTER GUTTENFELDER, JOE TALMADGE, DAVID ANDERSON, HSX Plasma Laboratory, University of Wisconsin-Madison — The magnetic field of HSX has a unique helical quasisymmetry, which can be broken by a set of auxiliary field coils. Hydrogen plasmas, produced by up to 130 kW of ECRH power at 5 kG, exhibit turbulent behavior which is diagnosed by a 16-pin Langmuir probe moved radially in the plasma, while a reference probe stays fixed in space. Measurements of plasma density and potential are processed with correlation analysis and conditional sampling to find the structure of particle transport events ("blob") at the plasma edge ($r/a > 0.6$). The density-potential crossphases are used to classify the underlying instabilities (i.e. drift wave vs. interchange.) First results from inside the separatrix show blobs with 2–2.5 cm diameter moving along with the bulk plasma rotation. The crossphase is small, hinting at drift wave dynamics. When a strong radial electric field is imposed on the plasma (via a bias probe), the radial correlation length is halved and the poloidal $E \times B$ rotation is increased.

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