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P2.1099 Upstream and downstream properties of turbulent transport at tokamak COMPASS

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Turbulent transport in the Scrape-Off Layer (SOL) is an important issue in contemporary tokamak physics due to its role in deteriorating plasma confinement and enhancing the plasmawall interaction. This work compares turbulence properties on two poloidal locations, the outer midplane (upstream) and the divertor target (downstream), and interprets their similarities and differences in terms of parallel transport of turbulent structures. The experimental data was measured at tokamak COMPASS, Prague, using Langmuir and ball-pen probes mounted on a reciprocating manipulator or embedded into a divertor tile. The analysis input are mainly measurements of the ion saturated current I_(sat), supplemented by measurements of the electron temperature T_e with high temporal resolution (several μs) using the ball-pen/Langmuir probe technique [1]. To compare the upstream and downstream fluctuations of these quantities, several techniques are employed. Probability distribution functions (PDF) of the fluctuations are drawn, together with the skewness and kurtosis profiles, and their dependence on the plasma collisionality is investigated. To estimate the blob coherence along the field line, correlation of upstream and target fluctuations is attempted; however, uncertainties in the magnetic equililibrium reconstruction prove to be a major challenge in this task. The importance of T_e fluctuations on the I_(sat) ∝ n_e \sqrt(T_e) PDF is investigated, and it is found to be quite large, distorting the exponential tail of ne fluctuations into a more general shape.

References
[1] J. Adamek et al, Review of Scientific Instruments 87, 043510 (2016)

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