

## Turbulence investigation in TJ-K and ASDEX Upgrade

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The typical properties of drift-wave turbulence have been observed in the low-temperature plasma of the torsatron TJ-K [1]. The dimensional similarity of TJ-K plasmas with the edge of fusion devices suggests that turbulence is dominated by drift waves in both cases. This behaviour is also predicted by numerical simulations using the GEM code [2].

In this contribution, plasma turbulence is investigated at the transition from the edge to the scrape-off layer (SOL) by means of Langmuir probes. Electrostatic fluctuations on both sides of the separatrix are measured, in the low-temperature plasma of TJ-K and the hot plasma of the divertor tokamak ASDEX Upgrade (AUG). A linear probe array for use with the movable midplane manipulator of AUG was designed and built. Similar investigations were carried out in limited TJ-K plasmas with an increased SOL.

The results from both devices support the concept of dimensional similarity. Of special interest are the abrupt changes of the poloidal phase velocities, shown in Fig. 1. They switch from the electron-diamagnetic drift direction in the confined plasma to the ion-diamagnetic drift direction in the SOL. The poloidal correlation length increases close to this shear layer and radial inward transport has been observed. These findings agree with earlier results from biasing experiments in TJ-K [3]. The probability density functions of the ion-saturation current fluctuations indicate that the intermittency in the SOL originates from the shear layer. The potential-density cross phase close to zero in AUG across the entire radial sweep is also consistent with drift-wave turbulence and, hence, with turbulence studies from TJ-K.

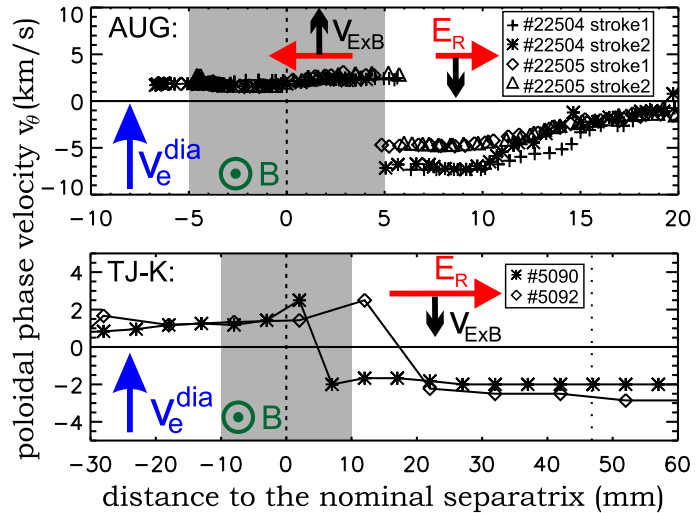


Figure 1: Poloidal phase velocities observed in ASDEX Upgrade and TJ-K. The direction of propagation changes close to the separatrix. The gray area indicates the uncertainty of the separatrix position.

## References

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- [2] B. Scott, Phys. Plasmas **12**, 102307 (2005)
- [3] M. Ramisch *et al*, Plasma Phys. Control. Fusion **49**, 777 (2007)