

## **Fluctuations, turbulence and related transport in the TORPEX simple magnetized toroidal plasma**

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Progress in understanding fluctuations, turbulence and related transport in magnetized plasmas is achieved in the basic plasma physics experiment TORPEX via high-resolution measurements of plasma parameters and wave fields throughout the plasma cross-section. Full spatio-temporal imaging of the electrostatic fluctuations is performed, using a multiple probe array or via conditional sampling of data obtained from movable probes.

Electrostatic drift and interchange instabilities are characterized in terms of dispersion relation, driving mechanisms, and development into turbulence. Measurements of density fluctuation time series across the plasma cross-section in a variety of plasma conditions reveal universal aspects such as a quadratic relation between skewness and kurtosis. Blobs are observed to carry plasma from the high to the low-field side of the machine. The blob generation and ejection are related to a strongly sheared  $\mathbf{E} \times \mathbf{B}$  flow. The blob effect on cross-field transport is investigated in details. Future research lines, such as active control of drift and interchange spectra using tunable antennas, optical turbulence imaging, and the study of the interaction of supra-thermal ions with turbulence, will be discussed.