Statistical description of transport in terms of probability distribution functions: experiments in tokamaks (JET) and stellarators (TJ-II)

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The statistical properties of turbulence and the radial propagation of transport events have been investigated in the plasma boundary region in the JET tokamak and in the TJ-II stellarator. The investigation of the dynamical interplay between fluctuation in gradients, turbulent transport and radial electric fields has shown that these parameters are strongly coupled both in tokamak and stellarator plasmas. The dynamical relation between fluctuations in gradients and transport is strongly affected by the presence of sheared poloidal flows, heating power and the proximity to instability thresholds. Experimental results show a link between the radial velocity and the size of transport events.

Recently, the dynamical coupling between turbulent transport and parallel flows has been investigated in the plasma boundary region of the JET tokamak. Experimental results show that there is a dynamical relationship between transport and parallel flows. As the size of transport events increases parallel flows also increase. These results show that turbulent transport can drive parallel flows in the plasma boundary of fusion plasmas. This new type of measurement is an important element to unravel the overall picture connecting radial transport and flows in fusion plasmas.