Mechanism for plasma blob generation and related transport in the TORPEX toroidal plasma

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Extensive experimental data from tokamaks, stellarators, reversed field pinches and basic linear devices reveal that intermittent particle and energy transport in the Scrape-Off-Layer (SOL) are associated with the propagation of *blobs.* Progress towards basic understanding of the mechanism for blob generation and of associated turbulent transport in magnetized toroidal plasmas is achieved in the TORPEX device (R=1m, a=0.2m) using an experimental setup in which blobs are produced under controlled laboratory conditions (see S. Muller, this conference).

A full spatio-temporal imaging of blobs and associated transport is obtained using conditional sampling of high spatial resolution data from movable electrostatic probes. In particular, the mechanism for plasma blob ejection is investigated using measurements of two-dimensional structures of electron density and temperature, plasma potential and velocity fields.

The blobs are observed to form from a radially elongated structure that is sheared off by the E*x*B flow. The structure is generated by an interchange wave that increases in amplitude and extends radially in response to an increase of the inverse radial pressure scale length. The dependence of the blob size upon the radial density gradient is discussed. Two mechanisms for the transport across the magnetic field can be clearly distinguished: one is the flux driven by the fluctuating density and potential associated with interchange modes; the other is generated by radially propagating intermittent high-density plasma structures (or blobs). Preliminary simulations of blob generation using a non-linear two-fluid numerical code are also presented.