Tokamak divertor plasma turbulence and resultant Transport

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The divertor volume is a key part of a tokamak, controlling the primary interface between the plasma and the outside world. In order for a tokamak based fusion reactor to succeed, the divertor must survive, however heat fluxes in a reactor scale device will make this challenging. To understand the challenge at hand a detailed knowledge of all transport processes bringing heat and particles to the divertor surface is required. These include transport from the core plasma into the exterior region, called the scrape-off layer, and transport along magnetic field lines into the divertor volume. A detailed physics basis for these processes exists after decades of research. Once in the divertor volume, cross-field transport can re-distribute plasma across magnetic field lines to spread heat and particles. This plays a critical role in several aspects that affect the machine, but this transport is poorly understood. The work presented in this lecture paves the way for a detailed understanding of these transport mechanisms, which are rooted in turbulence driven locally in the divertor.