Scrape-off layer (SOL) turbulence in tokamaks is characterized by intermittent transport events carrying particles and heat radially outwards. Single point measurements in the far SOL suggest that such events can reach magnitudes far above the mean density and temperature, leading to enhanced erosion and sputtering of material walls. In this contribution, we will investigate the rate at which density and temperature crosses a given threshold value and how long it stays above the threshold on average.

Single point measurements in the far SOL of the TCV, Alcator C-Mod and KSTAR tokamaks[1, 2, 3] have revealed fluctuations that are far from normally distributed, with positive skewness and flatness moments. Large amplitude fluctuations have been shown to have exponentially distributed amplitudes and waiting time between events, as well as a double exponential waveform. A stochastic model, based on exponentially decaying pulses with exponentially distributed amplitudes arriving according to a Poisson process, has been proposed[4] and has been shown to be in agreement with SOL fluctuation statistics. From this stochastic model, predictions for the rate of threshold crossings and average time above threshold can be derived[4, 5].

Recently, a dedicated dwell probe density scan of the Alcator C-Mod tokamak was performed. One shot was thoroughly investigated in [6]. In this contribution, threshold crossing statistics for density and temperature fluctuations in the density scan are investigated and compared.

References