Slow modulation of SOL turbulence on W7X as measured by A-BES diagnostics

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Various low frequency (~200 Hz) edge fluctuations were observed on the W7X stellarator. ELM-like events in "high iota" discharges[1] were seen on multiple diagnostics and an oscillation in the gradient of the light profile of the A-BES signal during FTM configurations. This profile variation is in strong correlation with a well-localized modulation of the fluctuation power in the 5-20 kHz band which was observed only in SOL channels without any precursor.

In this study we examine multiple shots with a focus on the changes in plasma parameters and investigate the occurrence of this phenomenon in various configurations. We create density reconstructions to observe changes in the actual profile. Cross-spectrum and cross-phase analysis are conducted to uncover the radial and temporal characteristics of these oscillations, particularly looking for intermittency. Conditional averaging technique is used to uncover systematic characteristic during these periods. We compare the results to other diagnostics especially various magnetic coils to investigate if there is any coupled fluctuations in plasma current.