

Investigation of inter-ELM bursts in the JET scrape-off layer

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Occasionally appearing strong inter-ELM bursts have been observed in the scrape-off layer (SOL) of JET plasmas. In order to evaluate their impact on the main wall and divertor, these bursts are studied in high-triangularity discharges with the help of the upgraded Lithium beam diagnostic [1]. The typical parameters of the discharges were $B_t=2.2$ T, $I_p=2.2$ MA, $P_{NBI}=13.5$ MW, $P_{ICRH}\approx 1-2$ MW. The outer strike point of this plasma configuration was located in the corner of the JET divertor ensuring maximum pumping of the neutral gas.

The bursts were rare (between 0 and 10 burst events in an inter-ELM period, $f_{ELM}=30$ Hz) when the plasma was fueled weakly and the pumping was maximized in the high field side, too (called corner-corner configuration). Although these bursts significantly increased the density in the far SOL at around the top of the plasma they caused hardly recognizable enhancement in BeII (527nm) line intensities measured at the divertor. The latter signals are typically used at JET to identify the ELM-induced plasma-wall interaction there. This fact might indicate that the bursty events are transported to the main chamber wall.

In the case of medium fueling not only the ELM frequency ($f_{ELM}=80$ Hz) but also the burst frequency increased, it became such high that individual event identification became impossible. It is not clear whether their average behavior was entirely responsible for the observed density increase in the far SOL or other processes also contributed to this phenomenon.

When the position of the inner strike point was lifted up to a vertical tile not only the stationary density profiles and the ELM frequency ($f_{ELM}=15$ Hz) changed but also the events behaved differently: their appearance seemed to be synchronized to an oscillation in the BeII signal and occasionally resulted in bursts also in this signal.

Similar bursts have also been observed in the ELM cycle of AUG plasmas with the help of a fast sweeping reflectometer [2], thus the comparison of the two measurements is planned.

[1] D. Refy et. al., accepted by Rev. Sci. Instrum (2018)

[2] P. Hennequin et. al., EPS 2017, Belfast, P1.167