Contribution ID: **3235** Type: **not specified**

P2.1028 Insights into divertor profiles and fluctuations from two-dimensional probe measurements on the TCV tokamak

Tuesday, 9 July 2019 14:00 (2 hours)

See full abstract here
http://ocs.ciemat.es/EPS2019ABS/pdf/P2.1028.pdf

We will present first results from the fast-moving Reciprocating Divertor Probe Array (RDPA). This novel diagnostic provides two-dimensional (2D) Langmuir probe measurements across the TCV divertor plasma up to the X-point, enabling unprecedented insights into divertor profiles and fluctuations. The 2D region is covered in the poloidal plane by combining the fast vertical motion (up to 35cm into the plasma) and a radial array of 12 rooftop Mach probes (1cm radial resolution). The plunge duration is typically 0.35s, the maximum speed can be as high as 2.5m/s and the maximum acceleration reaches 80m/s^2 thanks to a linear electric motor. The diagnostic has been installed in 2018 and tested in the TCV December campaign (15 successful shots, ~10s spent in the plasma). The acquisition frequency for both voltage and current LP measurements was 200 kHz in the December 2018 campaign and will be increased to 2 MHz for the upcoming experiments in 2019. The voltage sweeping frequency has been increased up to 6 kHz in order to reduce the effect of probe arcing. These first experiments have predominantly been performed in L-Mode with a plasma current of IP=320kA and for different densities, accessing both attached and detached divertor conditions. The measurements reveal that in attached conditions, the electron temperature is approximately constant (~30eV) along the outer divertor leg. Near detachment, an abrupt parallel drop in electron temperature and pressure by ~50% is seen halfway along the outer divertor leg. This “thermal front” moves up towards the X-point after the onset of detachment. In both attached and detached conditions, the width of the ion saturation current profile increases along the divertor leg towards the target by a factor of ~2-3x. The role of fluctuations, both due to turbulence and sawtooth crashes, in determining the SOL broadening and the thermal front position will also be discussed.

Presenter: DE OLIVEIRA, H. (EPS 2019)

Session Classification: Poster P2

Track Classification: MCF