

## P4.1021 Analysis of density profiles inside magnetic islands with Alkali Beam Emission Spectroscopy at Wendelstein 7-X

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See full abstract here

<http://ocs.ciemat.es/EPS2019ABS/pdf/P4.1021.pdf>

The Alkali Beam Emission Spectroscopy (A-BES) system is a fast time-resolution diagnostic injecting a 60 keV Sodium atomic beam through the mid-plane of the W7-X stellarator [1]. It is capable of density reconstruction with a time resolution of 50  $\mu$ s and for the analysis of turbulent processes. The diagnostic was operated during the OP1.2 campaign at W7-X.

For the standard iota configuration the sodium beam crosses the O point of a magnetic island. The high sensitivity of the diagnostic in the island region suffices for an analysis of the transport processes in this region, which is the aim of the poster presentation. The reconstructed density profiles indicate a density-peak near the O-point of the island for a number of shots. An analysis for the dependence of the prominence of this peak on plasma parameters has been performed. Moreover, the temporal and spatial correlation function of the A-BES light profiles of outward propagating filaments indicates that their radial transport across the island is not straightforward: the time delay between the correlated fluctuations of the inner and outer sections of the island is less than between the inner section and the island O point. Therefore, in order to characterize the parallel transport, the Poincaré map of the magnetic field lines and the distribution of the connection lengths inside the island has been compared with the observed density profiles.

References

[1] Anda, G., Dunai, D., Lampert, M., Krizsanóczy, T., et al., Review of Scientific Instruments, 89(1), 013503 (2018).

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