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P5.1059 Turbulent fluctuations in the edge of the W7-X as measured by the alkali beam emission spectroscopy

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Early turbulence measurements in W7-X stellarator by means of poloidal correlation reflectometry [1] have revealed some important characteristics of turbulent density fluctuations such as the perpendicular ExB velocity and the decorrelation times in low density (0.6 10^19 - 2 10^19 m^-3) discharges. In a more recent study [2], the 3D filamentary structure of turbulent fluctuations in the edge / SOL plasma has been observed using fast visible cameras. The observed filaments have large correlation times (≈ 200 s) and rotate poloidally with a advection velocity consisted with a radial electric field of Er ≈ 5000 V/m. The poloidal mode number has been also estimated as being between 10 and 20. In the present contribution we present a systematic study of the fluctuation data measured by the alkali beam emission spectroscopy diagnostics in the 2018 W7-X campaign. The main focus is on the statistical analysis of intermittent filamentary structures. We show the variation of the distribution functions, the waiting times and the filament correlation times as a function of the radial position in different W7-X configurations and different densities. Using the conditional average technique the radial propagation velocity can also be estimated.

References
[1] A. Kramer-Flecken et al., Nuclear Fusion 57, 066023 (2017)
[2] G. Kocsis et al., 43rd European Physical Society Conference on Plasma Physics (EPS), (2018)

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