

Abstract Submitted  
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**Turbulence investigations at Wendelstein 7-X** OLAF GRULKE, THOMAS WINDISCH, GAVIN WEIR, RALF KLEIBER, JOSEFINE PROLL, PAVLOS XANTHOPOULOS, MPI for Plasma Physics, W7-X TEAM TEAM — A key design aspect of the Wendelstein 7-X stellarator, which went into operation in 2015, has been its optimization with respect to MHD stability and neoclassical transport. Based on fundamental theoretical investigations and numerical simulation results, it is evident that the neoclassically optimized geometry impacts the evolution of turbulence, potentially reducing also the anomalous transport. The experimental verification of those results is, however, challenging due to the expected poloidal localization of fluctuations and toroidal ballooning effects. This paper presents initial results obtained in the limiter configuration of the first operation phase. For the upcoming operation phase, the full island divertor configuration will be realized and the capabilities of fluctuation diagnostics at Wendelstein 7-X will be greatly enhanced. They cover different regions in radial, poloidal and toroidal space and allow for a more detailed connection to the simulation results. The details of the diagnostics layout are presented and the priorities of the experimental program are highlighted.

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