First results on the plasma fluctuations of the TORPEX device in the new magnetic field configurations.

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The TORoidal Plasma EXperiment (TORPEX) is a basic plasma physics device where a Simple Magnetized Torus configuration (SMT) can be obtained superimposing a small vertical magnetic field component on the main toroidal field, resulting in open magnetic helical field lines. This configuration reproduces some of the main features of a tokamak plasma edge, including density and magnetic field gradient and curvature. In the last years, a complete study of electrostatic fluctuations and turbulence has been completed on TORPEX, taking advantage of its high degree of plasma reproducibility and of its extended diagnostic set.

To produce magnetic field configurations closer to those accessible with tokamaks, a new system has recently been implemented. This consists in a toroidal copper wire suspended inside the vacuum vessel by four vertical supports and four horizontal supports to keep fix its position. A dedicated external power supply provides a current up to 1kA that flows in the wire, generating a poloidal magnetic field. This opens the possibility of investigating plasma fluctuations in the presence of a rotational transform in either confined regions with closed magnetic flux-surfaces, or Scrape-Off Layer (SOL) regions with open field lines. A set of poloidal coils for the vertical magnetic field component permits several magnetic field configurations, from plasma limited by the vessel itself (on the high- or low-field side), to more complicated solutions of Single or Double-Null X-points, or even advanced divertor concepts, such as magnetic Snowflakes. The toroidal in-vessel copper wire system will be presented. The characterization of the main background plasma parameters in some of the new magnetic field configurations will be shown, as well as the spectral and statistical analysis of the fluctuations.

This work was supported in part by the Swiss National Science Foundation.

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