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Turbulence and intermittency of electron density fluctuations in the inner heliosphere: Solar Orbiter first data.

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The recently released spacecraft potential measured by the RPW instrument onboard Solar Orbiter has been used to estimate the solar wind electron density in the inner heliosphere. Selected intervals have been extracted to study and quantify the properties of turbulence. Empirical Mode Decomposition was used to obtain the generalized marginal Hilbert spectrum, equivalent to the structure functions analysis, additionally reducing issues typical of nonstationary time series. Results show the presence of a well defined inertial range with Kolmogorov scaling. However, the turbulence shows intermittency only in part of the samples, while other intervals have homogeneous scale-dependent fluctuations. These are observed predominantly during intervals of ion-frequency wave activity. Comparisons with compressible magnetic field intermittency (from the MAG instrument) and with an estimate of the solar wind velocity (using electric and magnetic field) are also provided to provide general context and help determine the cause for the absence of intermittency.

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