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Evolution of the MHD turbulence properties in the inner heliosphere with the PSP/SolO alignment data

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Radial alignments between pairs of spacecraft is the only way to observationally investigate the turbulent evolution of the solar wind as it expands throughout interplanetary space. On September 2020 Parker Solar Probe (PSP) and Solar Orbiter (SolO) were nearly perfectly radially aligned, with PSP orbiting around its perihelion at 0.1 au (and crossing the nominal Alfvén point) and SolO at 1 au. PSP/SolO joint observations of the same solar wind plasma allow the extraordinary and unprecedented opportunity to study how the turbulence properties of the solar wind evolve in the inner heliosphere over the wide distance of 0.9 au. The radial evolution of (i) the MHD properties (such as radial dependence of low- and high-frequency breaks, compressibility, Alfvénic content of the fluctuations), (ii) the polarization status, (iii) the presence of wave modes at kinetic scale as well as their distribution in the plasma instability-temperature anisotropy plane are just few instances of what can be addressed. Of furthest interest is the study of whether and how the cascade transfer and dissipation rates evolve with the solar distance, since this has great impact on the fundamental plasma physical processes related to the heating of the solar wind. In this talk I will present some of the results obtained by exploiting the PSP/SolO alignment data.

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