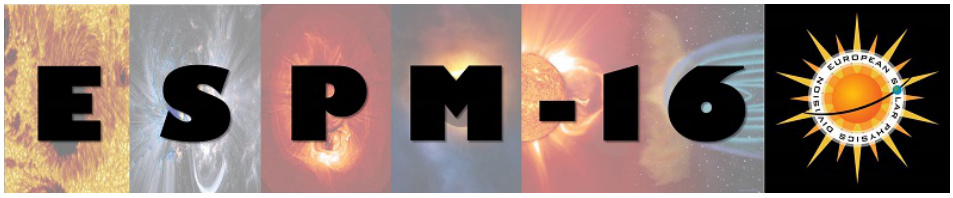

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Turbulence properties of magnetic clouds and their sheath regions: Parker Solar Probe and Wind comparison

Wednesday, 8 September 2021 17:09 (13 minutes)

Magnetic clouds are large-scale transient structures in the solar wind with low plasma β, low-amplitude magnetic field fluctuations, and twisted field lines with both ends often connected to the Sun. We analyse the normalised cross helicity, σc, and residual energy, σr, in magnetic clouds observed at sub-1 au heliocentric distances by Parker Solar Probe (PSP), and compare to clouds observed at 1 au by the Wind spacecraft. Magnetic clouds commonly display low values of |σc|, indicating that the Alfvénic wave flux parallel and anti-parallel to the mean field is approximately balanced. This low |σc| is likely caused by the closed field structure of magnetic clouds, and is in contrast to the generally higher |σc| found on the open field lines of the solar wind. These properties are compared to those found in the compressed and heated sheath regions upstream of the clouds: sheaths tend to have more solar wind-like turbulence properties.

Student poster?

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