Multiscale Solar Wind Turbulence Properties inside and near Switchbacks measured by Parker Solar Probe

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Parker Solar Probe (PSP) routinely observes magnetic field deflections in the solar wind at distances less than 0.3 au from the Sun. These deflections are related to structures commonly called 'switchbacks' (SBs), whose origins and characteristic properties are currently debated. Here, we use a database of visually selected SB intervals - and regions of solar wind plasma measured just before and after each SB - to examine plasma parameters, turbulent spectra from inertial to dissipation scales, and intermittency effects in these intervals. We find that many features, such as perpendicular stochastic heating rates and turbulence spectral slopes are fairly similar inside and outside of SBs. However, important kinetic properties, such as the characteristic break scale between the inertial to dissipation ranges differ inside and outside these intervals, as does the level of intermittency, which is notably enhanced inside SBs and in their close proximity, most likely due to magnetic field and velocity shears observed at the edges. We conclude that the plasma inside and outside of a SB, in most of the observed cases, belongs to the same stream, and that the evolution of these structures is most likely regulated by kinetic processes, which dominate small scale structures at the SB edges.