

## Occurrence and evolution of switchbacks: PSP Observations

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Since its launch, the Parker Solar Probe (PSP) mission revealed the presence of numerous fascinating phenomena occurring closer to the Sun, such as the presence of ubiquitous switchbacks (SBs). The SBs are large magnetic field deflections of the local magnetic field relative to a background field. We investigated the statistical properties of the SBs during the first 11 encounters between 13.3 and 70 Solar Radii using data from the SWEAP and FIELDS suites onboard PSP. We find that the occurrence rate of small deflections with respect to the Parker spiral decreases with radial distance ( $R$ ). In contrast, the occurrence rate of the large deflections (SBs) increases with  $R$ , as does the occurrence rate of SB patches. We also find that the occurrence of SBs correlates with the bulk velocity of the solar wind, i.e., the higher the solar wind velocity, the higher the SB occurrence. For slow wind, the SB occurrence rate shows a constantly increasing trend between 13.3 and 70 solar radii. However, for fast wind, the occurrence rate saturates beyond 35 solar radii. Sub-Alfvenic regions encountered during encounters 8-10 have not shown significant SBs. This analysis of the PSP data hints that some of the SBs are decaying and some are being created in-situ. We discuss the different possible mechanisms which could explain the observed switchbacks behavior.