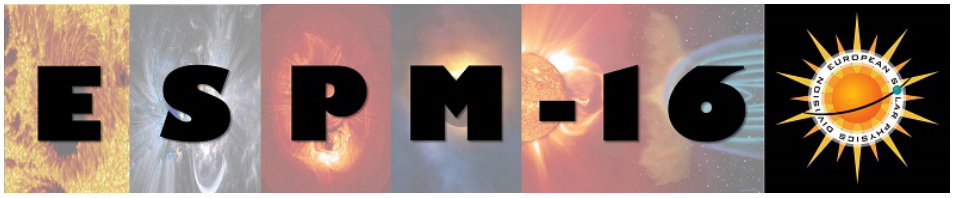

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Characterising upflows in coronal holes and the quiet Sun

Monday, 6 September 2021 10:58 (13 minutes)

Recent observations from Parker Solar Probe and Solar Orbiter have emphasised the importance of small and short-lived phenomena in the solar atmosphere. The former has revealed a highly dynamic structure in the solar wind's magnetic field, which are referred to as switchbacks. The latter has shown small extreme-ultraviolet brightenings in the solar corona, which were labelled campfires.
We have analysed 14 coronal upflows, which were derived as blue shifts in spectroscopic data and examined the potential sources for each upflow. This was done by using Hinode/EIS rasters and calculating the Doppler velocities for the Fe XII line. Then events, which are stronger blue-shifted than -6 km/s were extracted. Those blue-shift events in Hinode/EIS were then compared to SDO/AIA data in all extreme-ultraviolet wavelength bands. We could identify sources for 12 out of 14 events. Besides classical jets, four events are associated with bright points and seven events are connected to small scale sources. They are either short and faint brightenings or eruptions. Those small-scale events usually last for less than 25 minutes. In a last step those events were examined in Hinode/XRT and SDO/HMI data to get a better understanding.
Our work has shown that small-scale features, which are so faint and short-lived that they would usually be missed in imaging data can produce strong upflows. Their driving mechanisms and potential contribution to the solar wind however is not understood yet.

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