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# Variations of helium abundance in the solar wind and its changes across IP shocks

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The relative abundance of helium in the solar wind mediates the physical processes ongoing at the Sun surface. The ratio of alpha and proton densities is believed to characterize the source of the currently observed solar wind stream. Thus abrupt changes of this ratio are usually associated with encounters of the boundary between flux tubes emanating from different sources. However, a preliminary analysis of the data from the BMSW instrument (the Spektr-R spacecraft) shows that the He abundance can rapidly vary over much shorter time scales and we suggest that the differential motion of the proton and alpha solar wind components provides the driving energy for turbulence that is able to create the observed fast changes of the alpha/proton ratio. The differential velocity would significantly change across interplanetary shocks, whereas the density ratio does not. Thus, to separate the changes corresponding to flux tube crossings from those caused by turbulence within these flux tubes, we analyze the fast variations of helium/proton ratios prior to and after IP shocks. We compare measurements of two spacecraft (Spektr-R around the Earth, and Wind in L1 point) across the interplanetary shocks and focus on the variations of the helium abundance in a connection with the changes of the alpha/proton differential velocity. The two-case study is complemented with statistical analysis of correlations between related quantities.