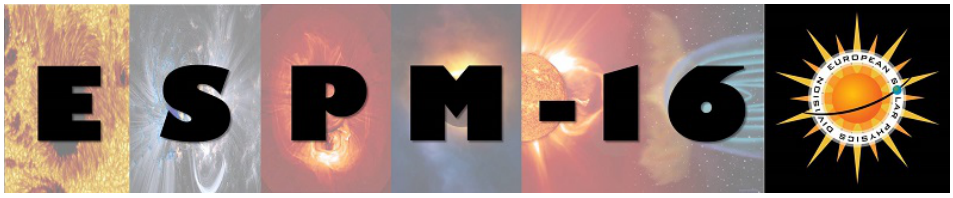

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Effects of the chromospheric Lyα line profile shape on the determination of the solar wind outflow velocity using the Doppler dimming technique

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The determination of solar wind outflow velocity is fundamental to probe the mechanisms of wind acceleration in the corona. Using the Doppler dimming technique, we studied the effects that the chromospheric Lyα line profile shape causes on the determination of the outflow speed of coronal HI atoms. Starting from UV observations (SOHO/UVCS) of the coronal Lyα line and simultaneous measurements of pB (LASCO/SOHO and Mk3/MLSO), we analysed the impact of the pumping chromospheric Lyα line profile through measurements from SOHO/SUMER, UVSP/SMM and LPSP/OSO-8, taken from representative on-disk regions and as a function of time during the solar activity cycle. In particular, we considered the effect of four chromospheric line parameters: line width, depth of the central reversal, asymmetry and distance of the peaks. We find that the range of variability of these parameters is of about 50% for the width, 69% for the depth of the central reversal, 15% for the asymmetry, and 50% for the distance of the peaks. We derive that the variability of the pumping Lyα profile affects the estimates of the coronal HI velocity by about 5-10%. Therefore, this uncertainty is smaller than other physical quantities uncertainties, and a constant in time and unique shape of the Lyα profile over the solar disk can be adopted to estimate the solar wind outflow velocity.

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