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On neutral solar wind flux to be measured at Solar Orbiter's perihelion

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Neutral hydrogen is flowing together with the ionized solar wind, but it has basically different characteristics in its phase space distribution function. As a matter of fact, contrary to the ionized component, neutrals can cover long distances on ballistic trajectories, unmodified by magnetic and electric fields. Consequently, once decoupled from protons, neutral hydrogen atoms retain information on the three-dimensional distribution of hydrogen at the level where they are generated as the proton velocity distribution is frozen within the generated neutrals and transferred up to our observation point.

In the present study, we examine the properties of the neutral solar wind distribution coming from fast and slow solar wind. Using different models of solar wind expansion, we simulate neutral hydrogen flux to be measured by Solar Orbiter at a perihelion distance of 48 R_S, showing flux distributions as a function of energy, elevation and azimuthal angles and heliocentric distance.