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Signatures of kinetic instabilities in the solar wind

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We report an analysis of ion distribution functions based on Ulysses data, focusing on the proton temperature anisotropy and on the differential velocity between ion populations. The observed distributions show the presence of several non-thermal features, suggesting that different kinetic interactions are at work in shaping the proton distribution functions with heliocentric distance. The stability of the plasma, composed by the core and beam proton populations and the alpha particles, is investigated with respect to kinetic instabilities driven by temperature anisotropies and/or by drift velocities between different species. Signatures of those processes in the observed magnetic spectra are also discussed. We find a good agreement between particle and magnetic field data in identifying the activity of kinetic instabilities during the solar wind expansion.