



## MAG and ELS investigation of proton cyclotron waves upstream of Venus

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### Abstract

As a new feature at Venus, proton cyclotron waves (PCW) were recently detected in the upstream region by the magnetometer MAG aboard the Venus Express spacecraft. The PCW waves are characterized by their occurrence at the local proton cyclotron frequency and by their left-hand polarization, both in the spacecraft frame. PCWs are observed in and upstream of the foreshock region over a large volume of space, up to large distances from the planet ( $\sim 9 R_V$ ). They are a direct indication of planetary pick-up protons from the exosphere of Venus and the loss of hydrogen to interplanetary space.

Increased time resolution and longer observations times in the appropriate spatial region by the electron spectrometer (ELS--part of the plasma experiment, ASPERA) now enable investigation of the PCW signature in the ELS data. Cases, in which data are simultaneously available from both instruments are investigated and the respective parameters compared.

