BOUNDARY LAYER IN THE VENUS IONOSHEATH:
EVIDENCE FROM THE VENUS EXPRESS PLASMA DATA

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Measurements conducted with the ASPERA-4 instrument in the Venus Express spacecraft further support the presence of a plasma transition located at the flanks of the Venus ionosheath downstream from the bow shock and that had been inferred in the data obtained from previous missions at Venus. Across this transition there are sudden changes in the plasma properties including lower speed and density values as well as higher temperatures of the shocked solar wind in its downstream side. In addition there is evidence that the planetary ion component becomes enhanced in the downstream side of that transition with fluxes that lead to significantly larger densities than those measured in the upstream side. That plasma transition has been interpreted as representing the outer extent of a viscous boundary layer formed by the transport of solar wind momentum to the Venus upper ionosphere, and the ASPERA-4 data provide for the first time information on the kinetic properties of the planetary ion population that is seen to stream mostly in the solar wind direction but with values that remain smaller than those of the solar wind. From the analysis of a collection of orbits with evidence of that transition it has been possible to derive that its position varies significantly with the downstream distance from the planet. Furthermore it has also been found that the momentum flux of the dominant component of planetary ions measured downstream from the plasma transition can be accounted for from the momentum flux of the solar wind protons. In most cases the latter quantity represents 80 to 90 % of the incident momentum flux of the solar wind and implies that there is an approximate balance in the momentum between both populations as would result from the transport of solar wind momentum

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