



## **The plasma environment of Venus: comparison of Venus Express ASPERA-4 measurements with 3D hybrid simulations**

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We use data of the ASPERA-4 ion and electron spectrometers onboard Venus Express (VEX) to determine the locations and shapes of the plasma boundaries (bow shock, ion composition boundary and mantle) at Venus and compare our fits with previous models obtained by PVO and Venera 9, 10 observations. We also investigate the variation of the terminator bow shock position as a function of the solar wind dynamic pressure and solar EUV flux. We compare the results with a 3D hybrid simulation, originally developed for the interaction of the solar wind with weak comets. In the hybrid model, ions are treated as particles moving in self-consistently generated electromagnetic fields and electrons are modeled as a massless charge neutralizing fluid. The planetary heavy ion plasma is generated by an oxygen ionosphere and exosphere adapted to a profile, which depends on the solar zenith angle (Chapman layer). The hot oxygen exosphere is modeled based on the electron density profile obtained from the VeRa experiment onboard VEX. The comparison of the model data with the boundary positions and plasma moments obtained by the ASPERA-4 experiment allows us evaluate the accuracy of the model which then can be used to estimate boundary positions and escape fluxes from the planet under conditions different from today.