



Venus-solar wind interaction in a quasi-neutral hybrid model

E. Kallio, R. Järvinen and P. Janhunen

Finnish Meteorological Institute, Space Research Unit, P.O.BOX 503, FIN-00101 Helsinki, Finland (Esa.Kallio@fmi.fi)

Neither Venus nor Mars has a strong global intrinsic magnetic field and therefore the solar wind can flow close to the planets in high neutral density regions. Because of the formed direct interaction between the atmosphere/exosphere and the solar wind, the ionized atmospheric neutrals can be picked up by the solar wind. Charge exchange between solar wind protons and planetary neutrals, instead, produce energetic neutral hydrogen atoms (H-ENA) which are the manifestation of the direct interaction between the solar wind and planetary neutrals. Picked-up planetary O⁺ ions in turn form energetic neutral oxygen atoms (O-ENA) via charge exchange process. The ion escape, H-ENAs, O-ENAs and electrons will be investigated at Venus and Mars by two identical instruments: ASPERA-4 on VenusExpress and ASPERA-3 on MarsExpress.

We present a status report of the modelling project to develop a self-consistent, global quasi-neutral hybrid (ions are particles, electrons a fluid) simulation to study the Venus-solar wind interaction and, in particular, the forthcoming ASPERA-4 and magnetic field measurements. In the presentation we show quasi-neutral hybrid model runs to study basic 3-D features of the Venusian plasma and magnetic field environment. Finally implications for the forthcoming VenusExpress particle and magnetic field measurements are discussed.