



Ion flow patterns near Mars, Venus and a small scale comet: similarities and differences

Hans Nilsson, Gabriella Stenberg Wieser, Diana Rojas-Castillo, Mats Holmström, Yoshifumi Futaana, and Etienne Behar

Institutet för Rymdfysik, Kiruna, Sweden (hans.nilsson@irf.se)

Using data from the ASPERA-3 (Mars) and ASPERA-4 (Venus) instruments we have investigated the ion flow patterns near Mars and Venus. For both planets heavy ions move more radially in the magnetosheath than does light ions. This is consistent with ion pick up in the magnetosheath, and heavy ions moving along the solar wind electric field. In the magnetotail the ion flow patterns of the two planets are fundamentally different. At Mars the heavy ions (at energies detectable with ASPERA-3) move more or less straight tailward on average. The light ions have an inward component, moving towards the center of the tail. At Venus the heavy ions move towards the center of the tail. The light ions at Venus have a component towards the center of the tail just like at Mars. The net effect is that at Mars the light ions move more towards the center of the tail than the heavy ions, whereas the situation is the opposite at Venus. We discuss these differences, and also compare with the ion dynamics observed at comet 67P using the RPC-ICA instrument on Rosetta, which is close to identical to the ion sensors of ASPERA 3 and 4. By comparison with the situation at a small scale comet we try to elucidate the role of the scale of the system in terms of ion gyro radius.