

## Hybrid modelling studies of solar wind interactions at Venus and Mars

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### Abstract

We present hybrid modelling of solar wind interactions of unmagnetized Solar System bodies and, more specifically, we discuss the solar wind induced ion escape and the structure of induced magnetospheres at Venus and at Mars. The modelling work is based on the HYB hybrid simulation model family, which has been developed for over a decade at the Finnish Meteorological Institute (FMI) and has been used to study plasma environments of unmagnetized and weakly magnetized celestial objects. In the hybrid approach ions are treated as particles moving under the Lorentz force and self-consistently coupled to the electric and magnetic field via Maxwell's equations while electrons form a massless, charge-neutralizing fluid. Especially, the global HYB hybrid simulations have been used to interpret in situ observations made by the ASPERA plasma instruments on the Mars Express and the Venus Express missions. We discuss the recent results of our hybrid simulation studies of the solar wind interaction with Venus and Mars as well as the newest developments of our hybrid simulation model.