



Global hybrid simulations of planetary plasma environment

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Planetary environments are strongly affected by their interaction with the solar wind. Global simulations can provide a three-dimensional description of the dynamic and the structure of the ionized environment in the vicinity of the planets or moons. This theoretical approach sets back the in situ observations in a global frame, helps us in the interpretation and may specify the physical processes involved. We present three-dimensional and multi-species hybrid models devoted to study the interaction between the solar wind, or the Saturn's magnetospheric plasma, and the neutral environment of Mars and Titan. These simulation models succeed to reproduce the main properties of the observations obtained by the different spacecrafts orbiting around Mars, or by the Cassini's spacecraft near Titan. These results emphasize the importance of the kinetic behaviour and the multi-species features in such environments. An extension of these hybrid models, and the problems related, on the solar wind interaction with the magnetosphere of Mercury and at term with the Earth's magnetosphere, will also be discussed.