# Solar Wind and Kronian Plasma Interactions with Neutral Environments of Mars and Titan

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Mars and Titan environments are strongly affected by their interaction with solar EUV and solar wind/kronian plasma when their atmospheres are not protected by an intrinsic magnetic field. These interactions have been investigated by means of three dimensional multispecies hybrid simulation models coupling charged and neutral species via three ionisation mechanisms: the absorption of solar extreme ultraviolet radiation, the impacts of solar wind/kronian plasma electrons, and the charge exchange between the ions and neutral atoms or molecules. This interaction modifies significantly the ionized environment and contributes to the atmospheric erosion. Due to the low gravity of the object, Titan and Mars possess an extended atmosphere. As a result the incident flow / atmospheric coupling can start relatively far from the object, injecting exospheric ions in the incoming flow leading to a mass-loading process. Despite the difference in composition and size of the objects, the induced magnetosphere of Mars and Titan present similarities.

Simulations results are presented to characterize the main features of the simulated plasma environments of Mars and Titan: the induced magnetic tail and the flow of incident plasma around Mars and Titan, as well as the wake and the acceleration of the planetary plasma. These results are compared to Mars-Express, Phobos-2 and Cassini observations. The role of kinetic effects and exosphere are emphasized.