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Mars-Solar wind interaction : energization of planetary plasma

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Abstract

In order to better represent Mars-solar wind interaction, modeling efforts have been conducted to develop a generic 3D multi-species parallel simulation model of plasma planetary environments [1]. In practice, the model is derived from a first version described in [2] A better description of the ionosphere was also implemented including ionospheric chemistry, electrical conductivities, and a drag force modeling the ion-neutral collisions in the ionosphere. This new version of the code, named LatHyS (Latmos Hybrid Simulation), is here used to describe the fate of heavy planetary ions.

Evidences of escaping planetary ions have been reported from missions as Mars-Express [3] and MAVEN [4,5]. Our goal is to infer the significance of the acceleration mechanism responsible for the energization of heavy planetary ions in the Martian environment [6]. We used the LatHyS model [7] to characterize the contribution of the different terms in the electric field Ohm's law and the related acceleration mechanisms.

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