Atmospheric Sputtering Model in the Titan Environment

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Atmospheric sputtering is a well-known process acting on planetary atmospheres in a similar way in which ion-sputtering acts on surfaces of airless bodies. By means of this process, solar/planetary energetic ions that impact on the upper regions of planetary atmospheres may cause evaluable escape. In fact, these energetic particles generate a collision cascade below the exobase , allowing a consistent flux outward from the atmosphere. The yield of the process may be relevant, depending on the number and the kind of the implied collisions

In this work we focus our attention on the study of the atmospheric sputtering process acting on the Saturn satellite Titan.

Titan does not possess an intrinsic magnetic field; for this reason, atmospheric sputtering is expected to act more uniformly on the whole atmosphere. On the other hand,Titan is embedded in the strong Saturnian magnetosphere for the most part of its orbit; hence, it may be exposed to both magnetospheric (10-100 keV) and solar wind (about 1 keV) ion precipitations, leading to different final escape rates.

To study this process we have developed a Montecarlo single-particle model. Results are shown and discussed here.