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New evaluation of N^+, N_2^+ and N_2^{++} ion-molecule reactions relevant for the chemistry of Titan's ionosphere

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In the next weeks and years, the Cassini-Huygens mission will bring some new discoveries on the upper atmosphere of Titan. In this context, it is important to well caracterize the ion production and decay processes for a good understanding of the ionosphere chemistry.

In Titan's ionosphere, the dissociative and non-dissociative photoionisation of N_2 by solar vacuum ultra-violet are the principal processes responsible for the production of N^+, N_2^+ and N_2^{++} primary ions during the day. We will first discuss how these processes can lead to species with internal excitation (electronic and/or vibrational) and also with translational energy [1-3].

The subsequent reactions of these primary ions have been measured in laboratory experiments [1,4] and compared to the literature values [5-7] used in ionospheric models. We will show how the rate constants and the branching ratios to secondary products can be strongly affected by the primary ion internal and translational energy. Consequences on the ionospheric models are discussed.

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