



## **Mars corona : non thermal sources of hot heavy species.**

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We have studied the production of hot O and C atomic and hot molecular species through dissociative recombination of O<sub>2</sub><sup>+</sup> and CO<sup>+</sup>, photodissociation of CO, and sputtering of the atmosphere by incident energetic ions. Sputtering by the O<sup>+</sup> pick up ions is constrained by a 3D hybrid code (Modolo et al 2005) which provides the flux of incident energetic ions impacting the exobase. Production and collisional thermalisation in a 1D multispecies CO, O, CO<sub>2</sub> martian upper atmosphere between 110km and 400km of hot particles are described by using an adapted Direct Simulation Monte Carlo (DSMC) approach. Neutral density profiles and velocity distributions at different altitudes between 270km and 6000km of the hot component of the martian thermosphere / exosphere are calculated. Velocity distributions, atmospheric loss and density profiles will be described for O, C, CO and CO<sub>2</sub>, at solar minimum and maximum conditions. Expected measurements done by a mass spectrometer on an aeronomical orbiter will be estimated and their putative consequence on our knowledge on the formation of the martian corona on the history of the martian atmospheric loss will be underlined.