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First observations of the Martian cold oxygen corona by IUVS/MAVEN

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The Mars Atmosphere and Volatile Evolution mission (MAVEN) has been recently inserted around Mars. This mission is motivated by the study of the Mars atmospheric erosion rates along its history. Most of the atmospheric erosion rates occur in the upper atmosphere and therefore the understanding of the energetics, chemistry and dynamics of the Martian upper atmosphere is crucial to constrain the contribution of the different escape channels to the Martian atmospheric erosion.

The atomic oxygen, produced by photodissociation of the atmospheric carbon dioxid, becomes the main neutral species in the upper thermosphere and low exosphere of Mars. This species is a key species for several processes in the Martian upper atmosphere. For example, the collisions between atomic oxygen and carbon dioxid can effectively excite the $\nu 2$ vibrational state of CO_2 leading to an increase of the 15 μm emission which in turn leads to an increase of the thermospheric cooling rate and therefore controls the Martian temperature at the exobase. The Martian ionosphere is mainly composed by O_2+, CO_2+, O+ whose abundances are chemically controlled by the amount of atomic oxygen in the thermosphere. According to recent GCM simulations, cold atomic oxygen is very sensitive to the thermospheric circulation and its expected diurnal variations could be used to constrain the dynamics of the Martian upper atmosphere. Finally, thermal exospheric oxygen can be ionized and picked up by the solar wind contributing to the erosion of the Martian atmosphere.

The caracterization of the atomic oxygen in the Martian upper atmosphere can be derived from its UV emission at 130.4 nm mainly produced by resonant scattering of the solar flux. The UV spectrometer IUVS aboard the MAVEN mission routinely observes this emission at Mars. In this presentation we will present the first observations of the 130.4 nm resonant line performed by IUVS at different altitudes and solar zenith angles, we will compare these observations to past observations performed by previous missions and discuss these first results.