



## **A statistical study of of CO<sub>2</sub> non-LTE emission at 4.3 $\mu$ m in the atmosphere of Mars with PFS limb observations**

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We present PFS-MEX limb observations of the high altitude non-local thermodynamic equilibrium (non-LTE) CO<sub>2</sub> emission in the atmosphere of Mars collected in more than one martian year. We find that the spectral shape changes with the altitude, giving indication of the different contribution of the CO<sub>2</sub> isotopes and ro-vibrational bands to the non-LTE emission. We analyse how solar zenith angle (SZA) and altitude affect the intensity of the observed radiance. There is evidence for a clear dependence of the non-LTE peak emission from the SZA, showing a cosine-like relation. Moreover, the altitude of the maximum emission lowers as the SZA increases, ranging from 150 km (SZA  $\sim$  20°) to 50 km (SZA  $\sim$  80°). We discuss how such observations can be interpreted in terms of the non-LTE theory.