

The synthetic spectrum of Venus in the 8-micron region

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The thermal emission of Venus in the 1220-1380 cm⁻¹ range, observable from the ground, probes the upper atmosphere, above the H₂SO₄ clouds. Depending upon the altitude of the upper clouds, the brightness temperature of the continuum, as measured by the Venera probes, is expected to range between about 220 and 240 K. A calculation of the synthetic spectrum of Venus at high resolution ($R > 50000$) shows that transitions of CO₂, HDO and SO₂ are expected to be detectable. Mapping the disk of Venus from the ground in the 8-micron region, both on the night side and on the day side, at the time of quadrature, should give information upon the variations of SO₂ as a function of latitude which are presently a matter of debate. In addition, day-night variations of H₂O could also be studied.

Such observations could be performed using the TEXES high-resolution imaging spectrometer at IRTF or, in the future, with the EXES instrument aboard the SOFIA spacecraft. This program would fully complement the VIRTIS/VEx observations which probe HDO and SO₂ in the lower atmosphere of Venus in the 2-4 micron region.