TEMPERATURE DEPENDENCES OF MECHANISMS RESPONSIBLE FOR THE WATER VAPOR CONTINUUM

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The water-vapor continuum plays an important role in the radiation balance in the Earth's atmosphere. While this absorption has been known for a long time, the physical mechanism responsible is still an open problem. We have recently calculated theoretically both the magnitude and temperature dependence for the three mechanism that have been suggested: the far-wings of allowed lines, collision-induced absorption, and water dimers[a,b]. All three mechanisms depend quadratically on the number density of H_2O for the self-continuum, and on the product of the densities for the foreign-continuum. However, these three mechanisms have quite differences on the temperature as we will discuss. This analysis may provide us with a method to assess their relative importance in ambient atmospheric measurements.

[a] Q. Ma, R. H. Tipping, and C. Leforestier, J. Chem. Phys. **128**, 124313 (2008).
[b] C. Leforestier, R. H. Tipping, and Q. Ma, to be submitted for publication.