NEW EXPERIMENTAL DATA OF THE WATER VAPOR ABOVE $\sim 25000\,\mathrm{cm}^{-1}$ BY CW-CRLAS

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The Cavity RingDown Laser Absorption Spectroscopy (CRLAS or CRDS) technique is a unique tool for probing weakly absorbing molecular species. High resolution (Doppler-limited broadening) is achievable in the blue-UV energy region by intracavity frequency doubling a CW laser source (here a Ti:Sa laser) externally. Moreover, absolute intensity and energy calibrations are available.
The H_2O molecule in vapor phase exhibits a weak absorption spectrum in the visible-UV energy range. Fourier transform spectra are available up to $\sim 25000\,\mathrm{cm}^{-1}$; our experimental setup allows us to probe the UV energy range potentially up to $\sim 27000\,\mathrm{cm}^{-1}$ (i.e. the energy region of the polyad $8\nu, 8\nu + \delta$) with Doppler-limited linewidth and a sensitivity of $\sim 4\,\mathrm{ppb/cm}/\sqrt{\mathrm{Hz}}$. The modelling of high vibrational energy levels is now available as part of the ab initio investigation of floppy molecules. The new experimental data show poor agreement compared to the available ab initio predictions.