

ACCURACY and COMPLETENESS of MOLECULAR LINE LISTS

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We review recent progress in the calculation of the global, high-temperature and accurate room-temperature linelists of various molecules relevant for the analysis of both Earth and exoplanet atmospheres and cool stars. These global line lists can be constructed based on progress in calculation of energy levels up to dissociation and the fitting of the molecular PESs to the experimental data close to dissociation. Sub-percent accuracy in the intensity of calculated absorption lines is achieved thanks to progress in *ab initio* electronic structure calculations which is aided by the possibility of characterizing their accuracy by the comparison with experimental intensities measured with sub-percent accuracy for some molecular lines. The advantage of variational calculations over experiment though is the ability to produce billions of lines covering all the isotopologues, which is clearly impossible for the experimental observations. Atmospherically and astrophysically important molecules such as H_2O , CO_2 , CO and H_3^+ will be considered together with some examples of the other molecules.