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Reference data for optical spectroscopy of small molecules

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In our laboratory, we study the interaction of light with small molecules (such as ammonia or NOx radicals). These particles often play a key role in everyday physical and chemical processes on both terrestrial and cosmic scales. One example is the characterization of exoplanets based on the detection of such molecules in their atmospheres.
Effective analysis of absorption signals requires a very good understanding of the structure of these molecules and their mutual interactions. The most reliable way to obtain such data is through sensitive laboratory measurements, where reference data can be collected under well-defined experimental conditions (unlike in studied astronomical objects, where these parameters must be inferred from observations).
Our work focuses both on the development of new optical detectors (e.g., CEAS and CRDS) and on the processing of spectroscopic data and creation of reference datasets. Most of this year was dedicated to the finalisation of the ammonia dataset for the HITRAN 2024 edition.

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Authors: CERMAK, Peter (KEF FMFI UK, Bratislava); PASTIEROVIC, Filip (Department of Experimental Physics Faculty of Mathematics, Physics and Informatics Comenius University, Bratislava, Slovakia)

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