

# The Cologne Database for Molecular Spectroscopy, CDMS: A Tool for Astrochemists and Astrophysicists

Holger S. P. Müller<sup>1,2</sup>, F. Schlöder<sup>1</sup>, J. Stutzki<sup>1</sup>,  
S. Schlemmer<sup>1</sup>, T. Giesen<sup>1</sup>, and P. Schilke<sup>2</sup>

<sup>1</sup>1. Physikalisches Institut, Universität zu Köln, Zùlpicher Str. 37, 50937 Cologne, Germany  
email: hspm@ph1.uni-koeln.de

<sup>2</sup>Max-Planck-Institut für Radioastronomie, Postfach 2024, 5310 Bonn, Germany

**Abstract.** The computer-accessible Cologne Database for Molecular Spectroscopy (CDMS) contains a catalog of rotational transition frequencies of molecular species that have been or may be identified in the interstellar medium, circumstellar envelopes, or in planetary atmospheres (Müller et al. 2001, Müller et al. 2005). Particular emphasis has been put on supplying data in the submillimeter and terahertz frequency ranges as well as data with increased accuracy. The entries are created by fitting critically evaluated experimental data to established Hamiltonian models to ensure entries that are as reliable as possible. Separate entries are provided for minor isotopic species or for excited vibrational states (except for diatomics) as far as appropriate.

The catalog is updated continuously. More than 300 entries are available as of April 2005. Examples of recently included light hydride species, deuterated compounds, vibrationally excited species, and complex molecules will be listed, and the need for additional data shall be discussed. Several output options have been implemented, and examples will be demonstrated. Future plans will be discussed, e. g. using resources other than the CDMS catalog in the search and conversion routines and creating more entries involving rovibrational transitions.

Transition frequencies are available not only for species detected in space but also for compounds that may be detected in the future. Therefore, the catalog is an ideal tool for analyzing line surveys and for searching for new molecules in space.

In addition, the CDMS contains a web page that lists molecules detected in astronomical sources, a help page for fitting rotationally resolved spectra, as well as information on recent changes in the CDMS.

The CDMS is available online free of charge via the alias <http://www.cdms.de/> and via a link on the KOSMA web page <http://www.ph1.uni-koeln.de/>.

**Keywords.** catalogs, molecular data, ISM: lines and bands, ISM: molecules, radio lines: ISM

---

## Acknowledgements

The CDMS is supported by the Deutsche Forschungsgemeinschaft (DFG) via grant SFB 494. Additional support by the Ministry of Science and Technology of the Land Nordrhein-Westfalen (NRW) is acknowledged.

## References

- Müller, H. S. P., Thorwirth, S., Roth, D. A. & Winnewisser, G. 2001, *A&A* 370, L49  
Müller, H. S. P., Schlöder, F., Stutzki, J., & Winnewisser, G. 2005, *J. Mol. Struct.* 742, 215