A STATUS REPORT ON THE COLOGNE DATABASE FOR MOLECULAR SPECTROSCOPY, CDMS

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The CDMS[a] was founded more than 20 years ago to provide in its catalog section line lists of mostly molecular species which were or may be detected in space by radio astronomical means.[b] The line lists are generated by fitting critically evaluated experimental data, mostly from laboratory spectroscopy, to established Hamiltonian models. The assessment of the experimental data and of the Hamiltonian model is very important[c] and will be discussed in some detail. There are 998 entries in the CDMS catalog as of Feb. 01 2020.

A large fraction of the contribution will deal with recent entries and with potential laboratory needs which are often linked to Atacama Large Millimeter/submillimeter Array projects such as (R)EMoCA[d], PILS[e], and ATOMIUM.[f] These include numerous diatomics, frequently containing metals, with highly excited states and isotopic species for several molecules already detected in space for the last project and excited states or isotopic species of known interstellar organic molecules, but also several new ones for the other projects.

Other sections of the classical CDMS include a page on Molecules in Space and a help page for users of Pickett's SPFIT/SPCAT programs. There is also a VAMDC compatible incarnation of the CDMS which is linked to a plethora of other spectroscopic, collisional, and kinetic databases via the Vitual Atomic and Molecular Data Centre portal.[g]

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[a] Shortcut: cdms.de; web address: https://cdms.astro.uni-koeln.de/. The CDMS is supported by the Verbundforschung Physik of the BMBF (German Ministry of Science and Education), project ID 05A17PK1.

[b] H. S. P. Müller et al., Astron. Astrophys. 370 (2001) L49.

[c] e.g., C. P. Endres et al., J. Mol. Spectrosc. 327 (2016) 95.

[d] (Re-) Exploring Molecular Complexity with ALMA, A. Belloche et al., Astron. Astrophys. 587 (2016) A91 & 628 (2019) A10.

[e] The ALMA Protostellar Interferometric Line Survey, J. K. Jørgensen et al., Astron. Astrophys. 595 (2016) A117.

[f] ALMA Tracing the Origins of Molecules forming dust In oxygen-rich M-type stars, L. Decin et al. (2020) submitted.

[g] http://www.vamdc.org/