Microwave spectrum of CD_3OD in the $\nu_t = 0, 1, 2$ torsional states and a search of CD_3OD toward IRAS 16293−2422.

V. Ilyushin[1,2], R. Porohovoi[1], E. Alekseev[1,2], O. Dorovskaya[1], H. S. P. Müller[3], F. Lewen[3], S. Schlemmer[3], C. Maul[4], R.M. Lees[5], J. K. Jørgensen[6]

[1] Institute of Radio Astronomy of NASU, Mystetstv 4, 61002 Kharkiv, Ukraine; [2] Quantum Radiophysics Department, V. N. Karazin Kharkiv National University, Kharkiv, Ukraine; [3] I. Physikalisches Institut, Universität zu Köln, 50937 Köln, Germany; [4] Institut für Physikalische und Theoretische Chemie, Technische Universität Braunschweig, Gaußstr. 17, 38106 Braunschweig, Germany; [5] Department of Physics, University of New Brunswick, Saint John, NB E2L 4L5, Canada; [6] Niels Bohr Institute, University of Copenhagen, Øster Voldgade 5−7, 1350 Copenhagen K, Denmark

We present[a] the results of our new study of the torsion-rotation spectrum of the fully deuterated isotopologue of methanol CD_3OD. The new microwave measurements were carried out from the millimeter wave range (starting at 34.5 GHz) to the THz range (up to 1.1 THz) using spectrometers in Kharkiv and Köln. The analysis is done using the rho axis method and the RAM36 program code. As it was the case[1] for CD_3OH our preliminary fits for CD_3OD show that the $\nu_t = 2$ torsional state is affected by perturbations propagating down through intertorsional interactions from non-torsional vibrational modes. Taking into account the astrophysical significance of methanol and its isotopologs we decided at the current stage of spectrum analysis to concentrate our fitting attempts at the ground and first excited torsional states of CD_3OD. With this limitation a fit within experimental error has been achieved (weighted rms ~ 0.78). In the poster the details of this new study will be discussed. By the time of the conference we also hope to present the first results of our search of interstellar CD_3OD toward IRAS 16293−2422 (PILS survey).

References

[1] V. V. Ilyushin, H. S. P. Müller, J. K. Jørgensen, et al.; A&A 658, A127 (2022).

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