SPECTROSCOPY OF THE GROUND, FIRST AND SECOND EXCITED TORSIONAL STATES OF ACETALDEHYDE FROM 0.05 TO 1.6 THz.

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A new global study of the acetaldehyde (CH_3CHO) spectrum is reported. The new measurements cover the frequency range from 49 GHz to 1.6 THz and have been carried out using three different spectrometers in IRA NASU (Ukraine), PhLAM Lille (France), and JPL (USA). The rotational transitions belonging to the three lowest torsional states, as well as previously published data on the FIR torsional bands, of the molecule have been analyzed using the rho-axis-method. The dataset consisting of more than 19700 line frequencies and including rotational transitions with J up to 66 and K_a up to 22 was fit using a model consisting of 117 parameters and weighted root-mean-square deviation of 0.71 has been achieved. Details of this new study and problems encountered in analysis of the second torsional state will be discussed.

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