CH_3OH SUB-DOPPLER SPECTROSCOPY

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The methanol torsion-rotation spectrum in the first three torsional states has been measured and analysed for a search of m_e/m_p variations from comparison of radio astronomical and laboratory frequencies and for studies of systematic velocity motions in star-forming regions. The investigation is based on Lamb-dip measurements with sub-Doppler spectrometer developed at IAP RAS. CH_3OH-A and -E frequencies have been obtained with an accuracy of $\sim$1 kHz at 48$-$510 GHz for more than 500 transitions in $v_t = 0$, more than 200 transitions in $v_t = 1$ and 100 transitions in $v_t = 2$. For many b-type transitions the removed degeneracy of the CH_3OH levels due to different nuclear spin statistics was measured in a form of doublets with unresolved hf structure. Some a-type transitions show resolved spin-rotational splitting.