THE ROTATIONAL SPECTRUM OF $^{13}CH_3NH_2$ UP TO 1 THz

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Methylamine (CH_3NH_2) is a molecule of astrophysical importance detected in interstellar medium for the first time in 1974[a]. Also it has been discovered in the atmosphere of Jupiter[b]. It is suggested that methylamine can be a precursor of the simplest amino acid glycine. In this context we present a new study of rotational spectrum of the ground vibrational state of ^{13}C isotopologue of methylamine in the frequency range up to 1 THz. The spectrum of $^{13}CH_3NH_2$ was recorded and analyzed for the first time. All the spectra were obtained using the Lille spectrometer based on the solid state sources.

The analysis of the rotational spectrum of methylamine is complicated by two large-amplitude motions: CH_3 torsion and NH_2 wagging. The Hamiltonian used in the present study is based on the group-theoretical high-barrier tunneling formalism developed by Ohashi and Hougen[c]. This model proved to be efficient in the previous studies of the parent species of methylamine[d] since it allowed fitting within experimental accuracy all the rotational transitions of the ground vibrational state with $J \leq 30$. In view of extended frequency range of the present study the fitting program will be modified in order to take into account the rotational transitions with $J > 30$. For the parent isotopic species, measurements and analysis using the same approach are in progress. The latest results will be discussed.

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