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The spectrum of 15NH3 in the 66-2000 cm-1 region

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Ammonia is indeed an ubiquitous molecule, it can be found in various astrophysical objects such as planetary atmospheres, comets and interstellar medium, and its presence in exoplanets and in the atmosphere of cold stars must be taken in serious consideration. The 15N isotopic variety could be very important since it allows the knowledge of the 14N/15N ratio in the universe. Although lists of precise molecular transitions obtained from ab-initio calculations at various temperature up to 1500 K are available in the literature for both 14NH3 and 15NH3 the very accurate and precise measurements obtained in this work may support the spectroscopic observations of SOFIA, Herschel and of the ground based ALMA.
Here we report on the observation and the analysis of all vibrational transitions falling below 2000 cm-1, namely n2 ← GS, n4 ← GS and 2n2 ← GS and the hot bands 2n2 ← n2, n4 ← n2 and 2n2 ← n4. Transitions up to J = 15, have been identified and fitted, together with the rotation-inversion transition in all the excited states, using of a computer program based on an effective Hamiltonian which takes into account all symmetry allowed interactions between and within the excited states. About 6300 transitions have been observed, 5700 of these have been so far retained in the fit.

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