MEASUREMENTS OF LINE POSITIONS AND INTENSITIES OF $^{14}NH_3$ IN THE 1.5 μm REGION

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In the atmosphere of outer planets, low mass brown dwarfs, and possibly extrasolar planets, ammonia (NH_3) is one of the major opacity sources particularly in the 1.5 μm region (the *H*-band). However, the spectroscopic information of NH_3 in the region is completely missing in the HITRAN database. NH_3 has four infrared active fundamental modes, with the well-known inversion doubling for ν_2 band, in addition to the usual vibrational degeneracies. Its strong bands, ν_1, ν_3 and $2\nu_4$, dominate the spectrum at 3 μm, while their corresponding overtone and combination bands (e.g., $2\nu_1$, $2\nu_3$, ν_1+ν_3, ν_1+$2\nu_4$ and ν_3+$2\nu_4$) are prominent in the 1.5 μm region. As part of an effort to provide a complete set of NH_3 spectroscopic information in the 1.5 μm region, we are analyzing the laboratory spectra recorded at various temperatures (200 - 299 K) with the McMath-Pierce Fourier transform spectrometer (FTS) on Kitt Peak Observatory in Arizona. Line positions and strengths have been measured from the laboratory spectra, from which lower state energies and quantum assignments are being determined by adopting intensity ratios at two different temperatures and combination differnces. A theoretical IR linelist [a] built upon the recent HSL-2 potential energy surface (nonadiabatic corrections included) is complementarily used for the quantum assignments. Preliminary results are presented for ν_1+ν_3, $2\nu_3$, ν_1+$2\nu_4$ and ν_3+$2\nu_4$ bands and compared with those from early work available.[b]

[a] X. Huang, D.W. Schwenke, and T.J. Lee *J. Chem. Phys.* **134**, (2011) 044320/044321

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