NOVEL PATTERNS OF TORSION - INVERSION TUNNELING AND TORSION - ROTATION COUPLING IN THE 
$\nu_{11}$ CH - STRETCH REGION OF CH$_3$NH$_2$

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The high-resolution infrared spectrum of CH$_3$NH$_2$ has been recorded using slit-jet absorption spectroscopy in the $\nu_{11}$ asymmetric CH-stretch region (2965 to 3005 cm$^{-1}$) with resolution of 0.003 cm$^{-1}$. The 580 lines, assigned by ground state combination differences, represent 27 subbands with $|K'| \leq 2$ for the $A$, $B$, $E_1$ and $E_2$ symmetries. Several of the observed subbands are split by perturbations. The analysis of spectrum shows that the patterns of the torsion-inversion tunneling splittings are qualitatively different from the ground state. In addition, the low - $J$ splittings between $|K'| = +|K'|$ and $-|K'|$ are greatly reduced relative to the ground state in both the $E_1$ and the $E_2$ species, indicating that torsion-rotation coupling is suppressed in the $\nu_{11}$ CH-stretch excited state.

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