

NOVEL PATTERNS OF TORSION - INVERSION TUNNELING AND TORSION - ROTATION COUPLING IN THE ν_{11} CH - STRETCH REGION OF CH₃NH₂

MAHESH B DAWADI, SYLVESTRE TWAGIRAYEZU, C. MICHAEL LINDSAY,^a AND DAVID S. PERRY,
*Department of Chemistry, The University of Akron, OH 44325-3601; LI-HONG XU, Department of Physics,
Centre for Laser, Atomic and Molecular Studies (CLAMS) University of New Brunswick, Saint John, New
Brunswick, Canada E2L 4L5.*

The high-resolution infrared spectrum of CH₃NH₂ has been recorded using slit-jet absorption spectroscopy in the ν_{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 ν_{11} CH-stretch excited state.

^aPresent address: U.S. Air Force Research Laboratory, 2306 Perimeter Rd, Eglin AFB, FL 32542-5910