

THE ROTATIONAL SPECTRA OF THE HCCCNH⁺, NCCNH⁺, AND CH₃CNH⁺ IONS

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The rotational spectra of the HCCCNH⁺, NCCNH⁺, and CH₃CNH⁺ ions have been observed for the first time in a supersonic molecular beam by Fourier transform microwave (FTM) spectroscopy. Precise values of the rotational and centrifugal distortion constants were determined for all three ions, and quadrupole hyperfine structure was observed in HCCCNH⁺ and NCCNH⁺. It was found that eQq for the inner nitrogen atom in HCCCNH⁺ and NCCNH⁺ is an order of magnitude smaller than that of the terminal nitrogen atom in most polyatomic molecules of this size. The narrow-line FTM spectra reveal that the ions move with essentially the same velocity as the neutral buffer gas in the supersonic beam; there is no evidence for excess broadening of the rotational lines of the ions with respect to those of the neutrals. The abundances of the ions here are sufficiently high to be detectable by present laser techniques.