HIGH RESOLUTION BROADBAND RATIONAL SPECTROSCOPY: GROUND STATE SPECTRUM OF 1-CHLORO-1-FLUOROETHYLENE

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A high resolution ground state rotational spectrum of 1-chloro-1-fluoroethylene was observed by using Chirped Pulse Fourier Transform Microwave Spectroscopy (CP-FTMW). This free-jet, broadband (11 GHz) technique has substantially faster acquisition times compared to the Balle Flygare cavity method allowing the rotational spectrum of 1-chloro-1-fluoroethylene (7.5-18.5 GHz) to be recorded in approximately 30 minutes at 65 kHz resolution. In this spectrum, over two hundred thirty lines were fit using Pickett SPFIT for the main chlorine isotopes. In addition, the ^{13}C peaks associated with each chlorine isotope were also observed and assigned. The high signal-to-noise ratio across the entire 11 GHz bandwidth facilitated the assignment of the ^{13}C species in natural abundance. The rotational constants and distortion terms for all assigned isotopes were calculated using various *ab initio* methods and are compared to the measured values. Structural analysis of the molecule will be discussed.