SUBMILLIMETER SPECTRUM OF METHYL CHLORIDE: ANALYSIS OF THE ν_3=1 EXCITED STATE

ALISSA P. FISHER, *Auburn University*; DANE J. PHILLIPS, *Kratos Defense and Security Solutions Digital Fusion, 4904 Research Dr., Huntsville, Al, 35805*; DENNIS G. WILSON, *Massachusetts Institute of Technology*; ELIZABETH RHODES, *University of Alabama Tuscaloosa*; HENRY O. EVERITT, *Army Aviation and Missile RD&E Center, Weapon Sciences Directorate, Redstone Arsenal, AL, 35898*.

A significant source of chlorine in the atmosphere is found in the form of the halogenated species methyl chloride. Atmospheric as well as chemical sensing research of this molecule requires a detailed knowledge of its line position frequencies. The ground vibrational state, as well as the ν_6=1 vibrational state have been well studied using both microwave and infrared spectroscopy. The effort described here is the examination of less completely analyzed ν_3=1vibrational state by means of a frequency tunable microwave source with Schottky diode multipliers and heterodyne detection in the submillimeter region. Doppler limited spectra was obtained for $J \leq 25$, $K \leq 9$ for the ν_3=1 rotational states for both Cl isotopomers. The center frequencies of the hyperfine-split lines where obtained through a non-linear least squares fitting of the measured frequency modulated spectra with the derived lineshapes. These centers were combined with previously measured line frequencies to calculate new hyperfine and sextic rotational constants for the ν_3=1 state.