THE ROTATION-VIBRATION SPECTRUM OF $ClONO_2$

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Chlorine nitrate ($ClONO_2$) is one of a class of molecules whose size and mass are such that their infrared spectra are only partially resolved in the Doppler limit. As such it serves as an interesting example in which the interaction of microwave and infrared data for the calculation of rotational-vibrational spectra and energy levels can be considered. We
have used a FASSST spectrometer to record the millimeter and submillimeter spectrum of chlorine nitrate and have assigned over 10,000 lines in 20 different vibrational states for the ^{35}Cl and ^{37}Cl isotopomer. Many of these states form interacting dyads and triads because of systematic energy differences among the vibrational states. These states have complex perturbations, which we will discuss modeling to microwave accuracy. We will present analyses of a number of these states, discuss the limits set by spectral congestion due to the overlap of the rotational structure of different vibrational bands in the submillimeter wave region, and show the calculation of the rotational structure of the corresponding infrared bands.