HIGH RESOLUTION CAVITY RING DOWN SPECTROSCOPY OF THE $4_{0}^{3}$ BAND OF THE $\tilde{A}^{2}E''$ STATE OF NO$_3$ RADICAL.

MOURAD, ROUDJANE, TERRANCE J. CODD and TERRY A. MILLER, Laser Spectroscopy Facility, The Ohio State University, Columbus, Ohio 43210.

The NO$_3$ radical is expected to exhibit a Jahn-Teller effect in its degenerate $\tilde{A}^{2}E''$ electronic state.$^a$ A more comprehensive understanding of its structure can be achieved using high resolution rotationally resolved absorption spectroscopy of its different vibronic bands. The high resolution absorption spectra of $4_{0}^{3}$ vibronic band of the $\tilde{A}^{2}E''$ excited state of NO$_3$ have been successfully recorded for the first time using our jet cooled cavity ring down apparatus. The parallel $4_{0}^{3}$ band is a vibronically allowed transition and shows the same contour as the one observed previously for $4_{n}^{0}$ ($n=1,2$).$^b$ The oblate symmetric top model Hamiltonian including both centrifugal distortion and spin rotation terms is used to analyze the spectrum. The rotational analysis of this band, supported by combination differences, demonstrate the existence of doubled lines as were observed for $4_{0}^{0}$ ($n=1,2$) bands. The possible sources of this splitting are being investigated.


$^b$Chen, M.W. et al. 66$^{th}$ OSU International Symposium on Molecular Spectroscopy, The Ohio State University, Columbus, Ohio, 2011, talk WJ-04.