HIGH RESOLUTION CAVITY RING DOWN SPECTROSCOPY OF THE 4_0^3 BAND OF THE $\tilde{A}^2E''$ STATE OF NO_3 RADICAL.

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The NO_3 radical is expected to exhibit a Jahn-Teller effect in its degenerate $\tilde{A}^2E''$ 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 $\tilde{A}\,^2E''$ 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_0^n (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^n (n=1,2) bands.The possible sources of this splitting are being investigated.

[a] E. Hirota, T. Ishiwata, K. Kawaguchi, M. Fujitake, N. Ohashi, and I. Tanaka, *J. Chem. Phys.*, **107**, 2829, 1997.

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