HIGH RESOLUTION JET COOLED CAVITY RINGDOWN SPECTROSCOPY OF THE $\tilde{A}$ STATE 3_0^1 BAND OF THE NO_3 RADICAL

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The $^2E''\tilde{A}$ state of NO_3 is doubly degenerate and is therefore subject to Jahn-Teller (JT) distortion. In the $\tilde{A}$ state there are two JT active modes, ν_3 and ν_4 (e' stretch and in plane bend respectively). Theoretical work has predicted that the JT effect in the $\tilde{A}$ state should be quite strong and approach the static case (D$\geq$1) where the molecule is permanently distorted to a lower symmetry geometry.[abc] A moderate resolution spectrum of the $\tilde{A}$ state showed a feature that we tentatively assigned as the 3_0^1 band based on position and band contour.[d] Using high resolution cavity ringdown spectroscopy we have now obtained a rotationally resolved spectrum of this band. The analysis of this band has been commenced using an oblate symmetric top Hamiltonian with spin-rotation terms. This analysis supports the assignment of this band to the a_1'' vibronic component of the 3_0^1 band. So far, the spectrum shows no evidence of a large geometric distortion of the molecule. Some lines appear to be split, as was previously observed in the 4_0^1 and 4_0^2 bands,[e] and the possible sources of this splitting are being investigated.

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[c] S. Faraji, H. Köppel, W. Eisfeld, S. Mahapatra, J. Chem. Phys. 347, 110 (2008)

[d] T.J. Codd, M.W. Chen, T.A. Miller, 66^{th} OSU International Symposium on Molecular Spectroscopy, The Ohio State University, Columbus Ohio, 2011, TD-06

[e] M.W. Chen, T.J. Codd, G. Just, T.A. Miller, OSU International Symposium on Molecular Spectroscopy, The Ohio State University, Columbus Ohio, 2011, TD-07