HIGH RESOLUTION ANALYSIS OF THE $3\nu_3$ AND $2\nu_1 + \nu_3$ BANDS OF NITROGEN DIOXIDE BY FOURIER TRANSFORM SPECTROSCOPY

T. M. STEPHEN, *Department of Physics, University of Denver, Denver CO80208, USA*; A. PERRIN, *Laboratoire de Photophysique Moléculaire, CNRS, Université Paris Sud, Campus d'Orsay, Bat 210, 91405 Orsay Cedex, France*; A. GOLDMAN, *Department of Physics, University of Denver, Denver CO80208, USA*; C. P.RINSLAND, *Atmospheric Science Division, NASA Langley Research Center, Hampton, VA 23682-0001, USA*; J.-M. FLAUD, and F. KELLER, *Laboratoire de Photophysique Moléculaire, CNRS, Université Paris Sud, Campus d'Orsay, Bat 210, 91405 Orsay Cedex, France*.

Long-path high resolution Fourier transform spectra of nitrogen dioxide has been measured in the 2μm region at the University of Denver. This has faciltated a new, extensive study of the $3\nu_3$ and $2\nu_1 + \nu_3$ bands. The energy levels of this molecule have been analysed using a least squares fitting procedure that accounts for both the vibrational -rotational resonances and for the spin rotation interactions. This work was motivated by the analysis of Kerridge and Remsberg [a] of the results from the Limb Infrared Monitor of the Stratosphere (LIMS) instrument. They suggested that Non Local Thermodymical Equilibrium (NLTE) may result in emission due to hot bands of NO_2. It is surmised that in the analysis of higher spectral resolution data of future remote sensing instruments, such as MIPAS, the NLTE emission of such hot bands may be of significance in the interpretation of the resulting data. Part of the spectroscopic objectives of the present work is also to generate the required high-resolution parameters for the $(n+1)\nu_3 - n\nu_3$ series of hot bands. This work will complement the existing $2\nu_3 - \nu_3$ linelist [b], to allow for a more accurate description of the NLTE effects.

[a] B.J.Kerridge, E.E.Remsberg, J. Geophys. D94, 16323 (1989).

[b] A.Perrin, J.-M.Flaud, C.Camy-Peyret, D.Hurtmans, and M.Herman, J. Mol. Spectrosc. 177, 58, (1996)