GLOBAL ANALYSIS OF HIGH-RESOLUTION DATA PERTAINING TO WATER UP TO THE SECOND TRIAD

O. PIRALI, M. VERVLOET, L. H. COUDERT, *Laboratoire de Photophysique Moléculaire, C.N.R.S., Bât. 350, Université Paris-Sud, 91405 Orsay Cedex, France*; R. LANQUETIN, AND C. CAMY-PEYRET, *Laboratoire de Physique Moléculaire et Applications, Unité mixte du C.N.R.S. et de l'Université Pierre et Marie Curie, Tour 13, Boîte 76, 4 Place Jussieu, 75252 Paris Cedex 05, France*.

Using the bending-rotation theoretical approach,[a] line position and line intensity analyses of a large body of high-resolution data have been carried out for the water molecule up to the second triad.

For the line position analysis, the first part of the data set involves experimental energies. For the five first vibrational states, that is the ground, (010), and the three first triad states (020), (100), and (001), the energies reported in the literature[b] were taken. For the next three vibrational states, that is the second triad states (030), (110), and (011), the experimental energies were either determined in the present work or taken from the literature. The second part of the line position data set consists of microwave and high resolution infrared lines involving the vibrational states just mentioned. The latter lines involve newly measured FIR transitions recorded using emission spectroscopy with a high-temperature cell heated by a radio frequency discharge at 13.5 MHz. The wavenumbers of these transitions range from 70 to 475 cm^{-1} and they mainly involve the (010), (020), (100), and (001) vibrational states.

For the line intensity analysis, the data set involves a large body of data and includes intensities for transitions belonging to the $\nu_1 + \nu_2$, $3\nu_2$, and $\nu_3 + \nu_2$ bands.[c]

In the paper the results of both analyses will be presented and comparisons with similar investigations will be carried out.

[a] Coudert, *J. Molec. Spectrosc.* **181,** 246 (1997) and Lanquetin, Coudert, and Camy-Peyret, *J. Molec. Spectrosc.* **195,** 54 (1999).

[b] Lanquetin, Coudert, and Camy-Peyret, *J. Molec. Spectrosc.* **206,** 83 (2001).

[c] Toth, *Applied Optics* **33,** 4851 (1994).