LINE MIXING EFFECTS IN IR Q BRANCHES OF CO_2. A DATABASE FOR ATMOSPHERIC SPECTRA COMPUTATIONS

J-M HARTMANN, D. PIERONI, *Laboratoire de Physique Moléculaire et Applications Université Paris-Sud, 91405 Orsay Cedex, FRANCE.*

Line mixing effects in CO_2 infrared Q branches are studied both experimentally and theoretically. The model used is based on the Energy Corrected Sudden (ECS) Approximation. Its parameters for CO_2-O_2 and CO_2-N_2 mixtures have been determined, in the 200-300 K temperature range, from fits of absorption in the $(\nu_1\text{-}\nu_2)_I$ Q branch. The quality of the theoretical approach is demonstrated by comparisons with many (about 200) laboratory spectra: these include 8 Q branches of various symmetries as well as absorption by minor isotopomers. The model is then used to generate a set of numerical data for the computation of line-mixing effects in atmospheric CO_2 Q-branches. This database, which includes all bands of significant absorption in the atmosphere for the 8 more abundant isotopomers, is available by ftp. Its validity is tested by comparisons with numerous stratospheric spectra recorded by balloon borne instruments. Bands of various symmetries and isotopomers are used, demonstrating the quality of the model and data.