LINE INTENSITIES MEASUREMENTS IN $^{13}$C$^{16}$O$_2$ AND THEIR TREATMENT USING THE EFFECTIVE OPERATORS APPROACH

V. I. PEREVALOV, S. A. TASHKUN, Institute of Atmospheric Optics, Russian Academy of Sciences, Siberian Branch, 1 Akademicheskii Avenue, 634055 Tomsk, Russia; C. CLAVEAU, J-L. TEFFO, Laboratoire de Physique Moléculaire pour l’Atmosphère et l’Astrophysique, CNRS UMR 7092, case 76, Université Pierre et Marie Curie, 4 Place Jussieu, F-75252 Paris Cedex 05, France; J. VANDER AUWERA, Service de Chimie Quantique et Photophysique C.P. 160/09, Université Libre de Bruxelles, 50 Avenue F. D. Roosevelt, B–1050 Brussels, Belgium.

This work deals with the modeling of line intensities of cold and hot bands of $^{13}$C$^{16}$O$_2$ corresponding to $\Delta P = 5$ transitions ($P = 2V_1 + V_2 + 3V_3$), using the effective operators approach. In Brussels, 5 unapodized absorption spectra of $^{13}$C$^{16}$O$_2$ (98% purity, $P \times \ell = 7.43 - 538$ mbar \times m, room temperature) were recorded at a resolution of 0.0035 cm$^{-1}$ (MOPD = 257.1 cm) using a Bruker IFS120HR.

382 absolute line intensities were measured in 9 bands observed between 3090 and 3920 cm$^{-1}$. In Paris, 2 apodized absorption spectra of an $^{18}$O–enriched CO$_2$ sample (297.0 K, $\ell = 8.07(2)$ and 36.07(4) m, $P = 1.685(8)$ torr) containing 0.5% of $^{13}$C$^{16}$O$_2$ were recorded at a resolution of 0.0043 cm$^{-1}$ using a home–made FTS. 90 absolute line intensities were measured for 5 bands observed from 3400 to 3700 cm$^{-1}$. A least squares fit of 479 observed line intensities, including those measured in this work and published for the 21102-00001 band, allowed determination of 12 effective dipole moment parameters corresponding to the $\Delta P = 5$ series of transitions (weighted standard deviation $\chi = 0.855$, RMS deviation = 4.69%). The new set of effective dipole moment parameters will soon be used to update the Carbon Dioxide Spectroscopic Databank (CDSD–1000). Results will be presented and discussed.

---

