OSCILLATOR STRENGTHS FOR RYDBERG TRANSITIONS IN CO BETWEEN 925 AND 956 Å[a]

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CO is used as a probe of astronomical environments ranging from planetary atmospheres and comets to interstellar clouds and the envelopes surrounding stars near the end of their lives. One of the processes controlling the CO abundance and the ratio of its isotopomers is photodissociation. Accurate oscillator strengths for Rydberg transitions are needed for modeling this process. Here we focus on recent analyses of absorption from the $W - X$ (ν'-0) bands with $\nu' = 0$ to 3 acquired at the high resolution (R $\approx$ 30,000) SU5 beam line at the SuperACO Synchrotron (Orsay, France). Spectra were obtained for the $^{12}C^{16}O$, $^{13}C^{16}O$, and $^{13}C^{18}O$ isotopomers. Absorption bands were analyzed by synthesizing the profiles with codes developed independently in Meudon and Toledo. The synthetic spectra were based on tabulated spectroscopic data. Each synthetic spectrum was adjusted to match the experimental one in a non-linear least-squares fitting procedure with the band oscillator strength, the line width (instrumental, thermal, and predissociation), and the wavelength offset as free parameters. In order to perform the synthesis, the CO column density was required. Because a differentially pumped cell was used, the measured CO pressure had to be corrected to determine the CO column density. This was accomplished by fitting absorption obtained at the same pressure from the $E - X$ (0-0) band, whose oscillator strength is well known. Our results on the $W - X$ bands will be compared with earlier determinations.

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