ABSORPTION OSCILLATOR STRENGTHS FOR RYDBERG BANDS IN CO BETWEEN 956 AND 1076 Å

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CO is the second most abundant interstellar molecule. Interpretation of its spectra in terms of column density, temperature, and turbulent line width requires laboratory data on rotational line wavelengths, oscillator strengths, and predissociation line widths. Chemical models describing the CO abundance and the relative amounts of its isotopomers also need oscillator strengths for bands below 1100 Å, because absorption in these bands leads to photodissociation. Oscillator strengths for 6 strong bands involving high Rydberg states, namely $E - X$ (1-0) at 1051 Å, $B - X$ (7-0) at 1002 Å, $K - X$ (0-0) at 970 Å, $L' - X$ (1-0) at 968 Å, $L - X$ (0-0) at 967 Å, and $W - X$ (0-0) and (1-0) at 972 and 956 Å, were measured using as a background source the SU5 high resolution (R $\approx$ 30,000) beam line at the SuperACO Synchrotron (Orsay, France). An absorption cell of 54 mm in length was isolated from the monochromator and the electron storage ring by differential pumping, while the pressure was held constant in the cell. Absorption spectra were analyzed via simulation fitting techniques 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 spectrum in a non-linear least-squares fitting procedure with the band oscillator strength, the rotational excitation temperature of the ground state, 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. Due to the use of a differentially pumped cell, the measured CO pressure had to be corrected to determine the CO column density. This procedure was validated by using as a standard the $E - X$ (0-0) band oscillator strength recently measured by Federman et al. (2001) in a closed cell. For overlapping bands, such as the $K/L'/L$ group, the fit is limited, first to the non-overlapping P branch of the $K - X$ (0-0) band, then to the R and Q branches for the $L - X$ (0-0) band and finally to the P and Q branches for the $L' - X$ (1-0) band. Results obtained to date, with comparison to earlier work, will be presented.

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