

COLLISIONAL ORIENTATION TRANSFER FACILITATED POLARIZATION SPECTROSCOPY^a

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Collisional orientation transfer facilitated V-type double-resonance polarization spectroscopy technique was applied to study the A-b complex of Rb₂^a and Cs₂^b. Since spectral congestion makes it difficult to find isolated pump transitions for heavy molecules such as Rb₂ and Cs₂, this technique significantly enlarges the range of rotational levels that can be observed per vibrational level. Collisional satellite lines with ΔJ up to 58 were observed in the Rb₂ polarization experiment. In the Cs₂ experiment, due to weaker Franck-Condon factors, collisional satellite lines with ΔJ_{max} equals to 12 were observed.

Collisional orientation transfer in polarization spectroscopy was first observed with buffer gas pressure of several hundred Torr^c. The high pressure led to loss of spectral resolution from collisional broadening. Only 1 to 3 Torr of argon buffer gas pressure was used in our experiments to obtain spectra with much higher resolution. Among the six types of possible probe signals^d, we assigned and analyzed the signals from the V type excitation scheme. The data was used in the global deperturbation analysis of the A-b complex of both Rb₂ and Cs₂.

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