OODR SPECTROSCOPY OF $\tilde{c}\,^1A_1$ CH_2

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Optical-Optical Double Resonance spectroscopy has been used to search for rovibrational levels in the $\tilde{c}\,^1A_1$ state of CH_2 which are lifetime broadened due to predissociation. In the scheme used, an assigned rovibronic transition in the $\tilde{b}\,^1B_1 - \tilde{a}\,^1A_1$ system was monitored using frequency-modulated laser transient absorption, while a pulsed ns OPO laser was scanned through visible wavelengths. The electric field of the pulsed laser caused transient shifts and broadening, due to the ac Stark effect in the upper level of the probed transition, when it was tuned to be resonant with an allowed upward transition connecting to the probed level. The sum of the two optical frequencies was chosen to match the approximately known bond dissociation energy of $\tilde{a}\,^1A_1$ CH_2. However, nearly all of the double resonance transitions detected involved a different mechanism: transient depletion of population in the lower level of the probed transition. These give information on previously undetected, J-selected, levels in the $\tilde{b}$-state. Analysis of the data provides energies for higher rovibronic levels in the $\tilde{b}$-state. Reasons for the non-observation of ac Stark resonances will also be discussed.

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