

STUDIES OF THE PREDISSOCIATED, QUASILINEAR  $B^1A'$  STATE OF  $CH^{35}Cl$  AND  $CD^{35}Cl$  BY OPTICAL-OPTICAL DOUBLE RESONANCE SPECTROSCOPY

C. TAO, C. MUKARAKATE AND S. A. REID, *Department of Chemistry, Marquette University, Milwaukee, WI 53233*.

Last year at this meeting, we reported studies of the predissociated, quasilinear  $B^1A'$  state of fluorocarbene (CHF and CDF) using a fluorescence dip detected optical-optical double resonance technique via the  $A^1A''$  state.<sup>a</sup> Recently, we have extended these observations to chlorocarbene, measuring OODR spectra of both  $CH^{35}Cl$  and  $CD^{35}Cl$ . By recording OODR spectra of both isotopomers, we are able to pinpoint the origin of the  $B^1A'$  state, while lies near  $22\,400\text{ cm}^{-1}$ . In contrast to CHF, the  $B^1A'$  origin in chlorocarbene lies below the energetic threshold of the lowest dissociation channel,  $C(^3P) + HCl$ . However, at higher energies several channels open up, including C-H and C-Cl bond fission, and the OODR spectra show significant lifetime broadening. Trends in the measured linewidths with energy will be discussed.

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<sup>a</sup>C. Tao, S. A. Reid, T. W. Schmidt, and S. H. Kable, *J. Chem. Phys.* 125, 051105 (2007).