

STIMULATED EMISSION PUMPING SPECTROSCOPY OF THE FIRST EXCITED SINGLET STATE OF GERMYLIDENE ( $\text{H}_2\text{C}=\text{Ge}$ )

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The  $\tilde{A}^1A_2$  states of  $\text{H}_2\text{CGe}$  and  $\text{D}_2\text{CGe}$  have been explored for the first time by  $\tilde{A} - \tilde{X}$  laser-induced fluorescence (LIF) spectroscopy of the orbitally forbidden  $S_1 - S_0$  transition and stimulated emission pumping (SEP) and wavelength resolved fluorescence studies of the allowed  $\tilde{B} - \tilde{A}$  electronic transition. Medium-resolution SEP studies gave the excited  $\tilde{A}$  state  $\nu_2$ ,  $\nu_3$ ,  $\nu_4$ , and  $\nu_6$  vibrational frequencies for  $\text{H}_2\text{C}^{74}\text{Ge}$  and  $\text{D}_2\text{C}^{74}\text{Ge}$ . The  $4^1$  and  $6^1$  levels and higher combination and overtone states are strongly Coriolis coupled, which perturbs the rotational subband structure, limiting the accuracy of the determination of the vibrational frequencies. High-resolution SEP studies of the  $\tilde{B} - \tilde{A} 0_0^0$  band have allowed us to determine the rotational constants of the  $\tilde{A}$  state of  $\text{H}_2\text{C}^{74}\text{Ge}$ , from which we were able to calculate an approximate  $r_0$  structure with the CH bond length constrained to the ground state value. The zero-point level of  $\text{D}_2\text{C}^{74}\text{Ge}$  is substantially perturbed, most plausibly by interaction with an excited vibrational level of the nearby triplet ( $\tilde{a}^3A_2$ ) state.