# A DISPERSED FLUORESCENCE DATA SET FOR THE $\tilde{X}$ STATE OF ACETYLENE: AN APPROACH TOWARD MULTIDIMENSIONAL VIBRATIONAL SPECTROSCOPY

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We have recorded several series of dispersed fluorescence (DF) spectra of acetylene $\tilde{A}$-$\tilde{X}$ emission. These spectra were recorded using an Intensified Charge Coupled Device (ICCD) in conjunction with a one meter monochromator with a 1200 groove/mm grating, and procedures were developed to ensure rigorous calibration of both frequencies and intensities. Dispersed fluorescence spectra have been recorded from seven different vibrational bands of the $\tilde{A}$ state of acetylene; the resolutions of these spectra range from 18 $\mathrm{cm}^{-1}$to 5 $\mathrm{cm}^{-1}$. As will be described in detail in the following talk, the existence of DF spectra recorded from multiple $\tilde{A}$ state intermediate vibrational levels permits the use of spectroscopic pattern recognition techniques developed in our laboratory to pull the DF spectra apart into polyads even when the polyads partially overlap. We believe that these dispersed fluorescence spectra represent a definitive data set for the investigation of acetylene $\tilde{X}$ state dynamics, and thus will provide a critical test for theoretical calculations on acetylene $\tilde{X}$ state dynamics, as well as play a crucial role in the refinement of the acetylene $\tilde{X}$ state potential surface.