ANALYSIS OF ACETYLENE $\tilde{X}$ STATE DYNAMICS UTILIZING SPECTROSCOPIC PATTERN RECOGNITION TECHNIQUES.

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Recently we have developed a novel spectroscopic pattern recognition technique entitled Extended Cross Correlation (XCC) that is capable of identifying patterns of spectroscopic lines that are repeated in multiple spectra. Here we apply the XCC technique to the identification of polyads in multiple acetylene $\tilde{A}$-$\tilde{X}$ dispersed fluorescence spectra. The ability to disentangle the polyads from each other in a numerically rigorous yet model-free fashion vastly simplifies the analysis of the acetylene dispersed fluorescence spectra and provides immediate insight into the dynamical information encoded in the spectra. Energies and Franck-Condon factors of the zero-order bright states can be determined with high precision, and an effective Hamiltonian model can be employed to provide deeper insight into the implications of the data for acetylene $\tilde{X}$ state dynamics. The disentangled experimental data will also be compared to theoretical calculations on acetylene $\tilde{X}$ state dynamics performed in our laboratory.