ANALYSIS OF THE CAVITY RINGDOWN SPECTRA OF THE SMALLEST JET-COOLED ALKYL PEROXY RADICALS USING A EVOLUTIONARY ALGORITHM

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Alkyl peroxy radicals long have been well known to be key intermediates in atmospheric chemistry as well as in low temperature combustion. For the last several years, our group has generated a data set for these radicals using room temperature cavity ringdown spectroscopy. We have recently extended our investigations of these radicals to obtain a similar data set of spectra under jet cooled conditions using a quasi-Fourier-transform-limited laser source, a supersonic slit jet expansion, and a discharge. We were able to observe partially rotationally resolved spectra of isomers and conformers of several peroxy radicals such as methyl peroxy, CH_3O_2/CD_3O_2, ethyl peroxy, $C_2H_5O_2$ and $C_2D_5O_2$, propyl peroxy, $C_3H_7O_2$, and phenyl peroxy, $C_6H_5O_2$. To analyze our results we employed a new approach by using the evolutionary algorithm method, whereby we can effectively use both the frequency and the intensity information contained in the experimental spectra. This presentation will focus on the results from our fitted spectra which were obtained using this semi-automated method and will demonstrate the power of our technique .