NEW DEVELOPMENTS IN PULSED 2D IR SPECTROSCOPY AND ITS APPLICATIONS TO BIOMOLECULAR SYSTEMS

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Recent advances in ultrafast infrared laser technology have paved the way for novel multidimensional infrared spectroscopies that are proving to be powerful probes of the structures and dynamics of molecules. In this presentation, spectra collected with new $3^{rd}-$ and $5^{th}-$ order infrared pulse sequence will be presented that are designed for more precise measurement of the combination band and overtone frequencies used to calculate vibrational couplings and monitor structure.[a] Applications of 2D IR spectroscopy will also be presented, with an emphasis on understanding the vibratonal couplings and frequency fluctuations of condensed phase biomolecules like DNA and membrane peptides.[b]

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[a] E. C. Fulmer, F. Ding, P. Mukherjee, and M. T. Zanni, "Vibrational dynamics of ions in glass from fifth order two-dimensional infrared spectroscopy," Phys. Rev. Lett., **94**, 067402 (2005)

[b] A. T. Krummel, P. Mukherjee, and M. T. Zanni, "Inter- and intra-strand vibrational coupling studied with heterodyned 2D-IR spectroscopy," J. Phys. Chem. B, **107**, 9165 (2003)