TWO-DIMENSIONAL CHIRPED-PULSE FOURIER TRANSFORM MICROWAVE SPECTROSCOPY: MODELING COHERENCE TRANSFER

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Two-dimensional broadband techniques have been introduced into the microwave regime using chirped-pulse Fourier transform spectroscopy. Theoretical considerations of expanding the prototypical three-level model to an N-level system are presented. Representative Hamiltonian and density matrices were used to solve the Liouville-von Neumann equations of motion in order to describe the evolution of coherently prepared states. Several selective excitation pulse sequences were performed on 1-chloro-1-fluoroethylene and 3,3,3-trifluoropropyne to test the validity of the theory. Through modeling one-dimensional slices of a traditional 2D plot, peaks in the indirectly measured frequency dimension were identified and classified and phenomenological selection rules were obtained.