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Study of Optically Excited Nitrobenzene through Nonlinear Ultrafast Polarization Spectroscopy[1] RICHARD THURSTON, MATTHEW BRISTER, Chemical Sciences Division, Lawrence Berkeley National Laboratory, LIANG TAN, Molecular Foundary, Lawrence Berkeley National Laboratory, NIRANJAN SHIVARAM, Purdue University, DANIEL SLAUGHTER, Chemical Sciences Division, Lawrence Berkeley National Laboratory — A Kerr gating pulse induces a third order non-linear polarization response in a media of interest. This response can then sampled by a probing pulse resulting in a change in polarization of the probe that can be measured using the technique of optical Kerr effect spectroscopy. Such techniques have been used in the past to study dynamics in solid, liquid and gas phase systems on picosecond and femtosecond time scales. With the addition of a third excitation pulse, the non-linear response of the system due to the gating pulse is modified. Here, we present measurements and electronic structure calculations of optically excited liquid nitrobenzene and discuss potential origins of the ultrafast polarization response of the system. We then discuss the extension of this method to study ultrafast dynamics in polyatomic gas phase systems.

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