MO 25: Poster: Quantum control

Time: Thursday 16:00–18:00 Location: P2

MO 25.1 Thu 16:00 P2

Broadband visible polarization pulse shaping and pulse characterization by dual-channel and dual-quadrature spectral interferometry — •Tatjana Quast, Patrick Nürnberger, and Tobias Brixner — Institut für Physikalische und Theoretische Chemie, Universität Würzburg, Am Hubland, 97074 Würzburg

Polarization pulse shaping is achieved by a two-layer liquid-crystal spatial light modulator in a zero-dispersion-compressor geometry. The pulses are characterized by dual-channel spectral interferometry (SI). Results of polarization-shaped pulses and the measured Jones matrix of the setup are presented.

As an additional pulse characterization technique, dual-quadrature spectral interferometry is introduced. A circularly polarized reference pulse is used to generate the spectral interference pattern with the shaped pulse. By polarization multiplexing, one can extract the in-phase and quadrature fraction of the SI pattern and use them to reconstruct the phase of the shaped pulse. First examples of phase-shaped pulses are shown and an extension to measure polarization-shaped pulses by dual-quadrature SI is presented.

MO 25.2 Thu 16:00 P2

UV Quantum control spectroscopy approach on $BP(OH)_2$ — •Jens Möhring[1,2], Tiago Buckup[1], and Marcus Motzkus[1] — [1]Physikalisch-Chemisches Institut, Ruprecht-Karls-Universität Heidelberg, D-69120 Heidelberg, Germany — [2]Physikalische Chemie, Philipps-Universität Marburg, D-35032 Marburg, Germany

Shaped femtosecond pulses are a versatile spectroscopic tool to gain additional insight into ultrafast dynamics of molecular systems. Such an approach, generally called Quantum Control Spectroscopy (QCS), has been successfully used with visible and infrared pulses. Just recently, QCS turn out to be valuable with UV absorbing systems due to direct UV pulse shaping technology. Here we investigate the dynamics of the excited state proton transfer (ESIPT) molecule [2,2'-bipyridyl]-3,3'-diol ($BP(OH)_2$). Directly modulated, sub 30 fs, UV pulses generated by a MEMS-based shaper [1] are applied as QCS pump pulses. BP(OH)2 exhibits two ESIPT transfers and shows steady state fluorescence from the double ESIPT product. Possible mechanisms suggest either parallel double and single ultrafast ESIPT processes [2] or a sequential model, since the possibility of two different reaction pathways in the molecule offers a promising leverage for a control approach. The absence of any population control effect in $BP(OH)_2$ over a multitude of control fields clearly favors a model with only a single initial reaction channel. **Ref.:**[1] J. Möhring, T. Buckup, C. Lehmann, and M. Motzkus, Journal of the Optical Society of America B 26, 1538-1544 (2009). [2] K. Stock, C. Schriever, S. Lochbrunner, and E. Riedle, Chemical Physics 349, 197-203 (2008).