TUE2A • Control of Molecular Processes

Auditorium
10:45–12:30
TUE2A • Control of Molecular Processes
Chair: Regina de Vivie-Riedle, Department Chemie und Biochemie, LMU München, München, Germany

TUE2A.1 • 10:45
Femtosecond pulse shaping for measurements at the nano-scale, •*Fernando D. Stefani*[1], *Daan Brinks*[1], and *Niek F. van Hulst*[1,2]; [1]*ICFO, Mediterranean Technology Park, 08860 Castelldefels (Barcelona), Spain,* [2]*ICREA - Inst. Catalana de Recerca i Estudis Avancats, 08015, Barcelona, Spain.*
With the aim of applying shaped optical pulses to the investigation of individual nano-systems and molecules, the implications of spatio-temporal distortions induced by different shaping techniques are investigated.

TUE2A.2 • 11:00
Coherent Control of Retinal Isomerization in Bacteriorhodopsin in the High Intensity Regime, *Andrei C. Florean*[1], *David Cardoza*[2], *James L. White*[2], *Janos K. Lanyi*[3], •*Roseanne J. Sension*[1], and *Philip H. Bucksbaum*[2,4]; [1]*Department of Physics, University of Michigan, Ann Arbor, MI 48109, USA,* [2]*Department of Physics, Stanford University, Stanford, CA 94305, USA,* [3]*School of Medicine, University of California, Irvine, CA 92697, USA,* [4]*PULSE Center, SLAC, Menlo Park, CA 94025, USA.*
We use a learning algorithm to optimize retinal isomerization in bacteriorhodopsin. The yield increases linearly beyond the saturation of the first excited state. The results are modeled including the influence of one-photon and multiphoton transitions.

TUE2A.3 • 11:15
Quantum Control of the Photoinduced Wolff Rearrangement of Diazonaphthoquinone in the Condensed Phase using Mid-Infrared Spectroscopy, *Daniel Wolpert*[1], *Marco Schade*[2], *Gustav Gerber*[1], and •*Tobias Brixner*[1,2]; [1]*Physikalisches Institut, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany,* [2]*Institut für Physikalische Chemie, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany*.
A shaped ultraviolet pump - mid-infrared probe setup is employed for spectroscopy and quantum control of the photoinduced Wolff rearrangement of diazonaphthoquinone in the condensed phase.

TUE2A.4 • 11:30
Coherent Control of Matter Waves Passing Through a Conical Intersection in β-Carotene, •*Jürgen Hauer*[1], *Tiago Buckup*[1], *Judith Voll*[2], *Regina de Vivie-Riedle*[2], and *Marcus Motzkus*[1]; [1]*Physikalische Chemie, Philipps Universität Marburg, D-35043 Marburg, Germany,* [2]*Department Chemie, Ludwig-Maximilians-Universität, Butenandt-Str. 11, D-81377 München, Germany*.
The interplay between structural and electronic dynamics near a conical intersection in β-carotene is disclosed by coherent control. A low-frequency coupling mode is found to determine the ultrafast relaxation rate between the involved electronic states.

TUE2A.5 • 11:45
Mode selective single-beam coherent anti-Stokes Raman scattering, •*Paul Wrzesinski*[1], *Haowen Li*[2], *D. Ahmasi Harris*[1], *Bingwei Xu*[1], *Vadim Lozovoy*[1], and *Marcos Dantus*[1]; [1]*Department of Chemistry, Michigan State University, East Lansing MI 48824,* [2]*BioPhotonic Solutions Inc. Okemos MI 48864*.
We report the detection of chemicals using a single-beam coherent anti-Stokes Raman scattering (CARS) technique. Characteristic Raman lines for several chemicals were successfully obtained from a 12 m standoff distance.

TUE2A.6 • 12:00
Early Time Vibrationally hot Ground-State Dynamics in β-Carotene Investigated with Pump-Degenerate Four Wave Mixing (Pump-DFWM), •*Tiago Buckup, Jürgen Hauer, Jens Möhring,* and *Marcus Motzkus*; *Physikalische Chemie, Philipps Universität Marburg, D-35043 Marburg, Germany.*.
Pump-DFWM is used to study the early events in structural and electronic population dynamics of the S_2, S_1 and hot-S_0 states of β-carotene. New evidence to the existence of a long-lived hot-S_0 is discussed.

TUE2A.7 • 12:15
Surface Femtochemistry: Investigation and Optimization of Bond-Forming Chemical Reactions, *Patrick Nuernberger*[1,2], *Daniel Wolpert*[1], *Horst Weiss*[3], and •*Gustav Gerber*[1]; [1]*Physikalisches Institut, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany,* [2]*Institut für Physikalische Chemie, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany,* [3]*BASF AG, Polymer Research Division, 67056 Ludwigshafen, Germany*.
We investigate femtosecond laser-induced surface reactions by varying the properties of the surface, the reactant gases, and the laser. In optimal control experiments, we selectively manipulate the bond-forming catalytic reactions.