

6th International Conference on Coherent Multidimensional Spectroscopy (CMDS 2012) – Scientific Program

Monday, July 16, 2012		Tuesday, July 17, 2012		Wednesday, July 18, 2012	
8:30 Conference Opening					
A: New Methods		E: Electronic and Vibrational Coherences		H: Many-Body Effects	
8:40 A1	T. Brixner (invited)	8:30 E1	D. Turner	8:30 H1	S. Cundiff (invited)
9:10 A2	I. Mercer (invited)	8:50 E2	D. Zigmantas	9:00 H2	J. C. Wright
9:40 A3	I. Pugliesi (invited)	9:10 E3	D. Jonas	9:20 H3	T. Pullerits
10:10 A4	G. Auböck	9:30 E4	T. Mančal	9:40 H4	M. Berg
		9:50 E5	C. Steiner	10:00 H5	J. Davis (invited)
		10:10 E6	J. Hauer		
10:30 Break		Break		Break	
B: Hydrogen Bond and Proton Dynamics		F: Vibrational Dynamics and Relaxation		J: Nonlinear Terahertz Spectroscopy	
10:50 B1	R. Hochstrasser (invited)	10:50 F1	M. Khalil (invited)	10:50 J1	P. Hamm (invited)
11:20 B2	H. J. Bakker	11:20 F2	J. Bredenbeck (invited)	11:20 J2	K. Reimann
11:40 B3	P. Vöhringer	11:50 F3	J. Zheng	11:40 J3	B. Mayer
12:00 B4	N. Hunt	12:10 F4	K. Tominaga		
12:30 Lunch		Lunch		Lunch	
C: Vibrational Probes of Structure		G: Electron Transfer & Charge Separation		K: Surfaces and Interfaces	
14:00 C1	T. L. C. Jansen (invited)	14:00 G1	Y. Tanimura (invited)	14:00 K1	M. Zanni (invited)
14:30 C2	D. Klug (invited)	14:30 G2	J. Ogilvie (invited)	14:30 K2	S. Nihonyanagi
15:00 C3	K. Kubarych (invited)	15:00 G3	V. Prokhorenko	14:50 K3	E. Backus
15:30 C4	C. Baiz	15:20 G4	E. Romero	15:10 K4	P. Petersen
		15:40 G5	M. Pshenichnikov		
15:50 Break		16:00 Break		15:30 End of Meeting	
	D: Structural Dynamics				
16:10 D1	A. Marcus (invited)				
16:40 D2	S. Woutersen (invited)				
19:00	P: Poster Session	19:30	Conference Dinner		

Scientific Program

Monday, July 16, 2012

8:30 Conference Opening

Session A: New Methods

Chair: Thomas Elsaesser

8:40 **Coherent 2D spectroscopy of nanostructures (invited paper)**

A1 T. Brixner¹, M. Aeschlimann², W. Pfeiffer³

¹Institut für Physikalische und Theoretische Chemie, Universität Würzburg, 97074 Würzburg, ²Fachbereich Physik and Research Center OPTIMAS, TU Kaiserslautern, 67663 Kaiserslautern, ³Fakultät für Physik, Universität Bielefeld, 33615 Bielefeld, Germany

9:10 **Superposition state evolution – do photons add up ?**
A2 **(invited paper)**

I. Mercer

University College Dublin, Ireland

9:40 **Ultrabroad 2D-UV spectroscopy with cross-peaks: photophysical**
A3 **and photochemical dynamics in the UV (invited paper)**

I. Pugliesi, N. Krebs, C. E. Eckert, E. Riedle

Lehrstuhl für BioMolekulare Optik, Ludwig-Maximilians-Universität München, 80538 München, Germany

10:10 **UV Two-Dimensional Spectroscopy for Biological Systems**

A4 G. Auböck, C. Consani, F. van Mourik, M. Chergui

Ecole Polytechnique Fédérale de Lausanne, Laboratory of Ultrafast Spectroscopy, Lausanne, Switzerland

10:30 Coffee Break

Session B: Hydrogen Bond and Proton Dynamics

Chair: Peter Hamm

10:50 **Dynamics of nitriles probed by 2D IR in highly symmetric struc-**
B1 **tures^{a)} and their structural dynamics as the non-nucleoside inhibi-**
tor TMC278 bound to HIV-1 reverse transcriptase^{b)} (invited paper)

D. Kuroda^{1ab}, J. R. Challa^{1b*}, T. Troxler^{1b}, P. Singh^{1a}, J. D. Bauman^{2b},
D. Patel^{2,3b}, K. Das^{2b}, E. Arnold^{2b}, R. M. Hochstrasser^{1ab}

¹Dept. of Chemistry, University of Pennsylvania, PA 19067, USA,

²Center for Advanced Biotechnology and Medicine, and Dept. of Chemistry & Chemical Biology, Rutgers University,

³Dept. of Medicinal Chemistry, Rutgers University, Piscataway, NJ 08854,

*Present address: Dept. of Chemistry, University of Rochester, Rochester, NY 14627

- 11:20
B2 **2D-IR vibrational spectroscopy of proton fluxional defects in aqueous nanochannels**
H. J. Bakker, L. Liu
FOM-AMOLF, 1098 XG Amsterdam, Netherlands
- 11:40
B3 **2D-IR spectroscopy of hydrogen-bond flip-flop dynamics**
M. Olschewski, S. Knop, P. Vöhringer
Institute for Physical & Theoretical Chemistry, University of Bonn, 53177 Bonn, Germany
- 12:00
B4 **The role of bound water in the structural dynamics of the catalase enzyme**
M. Candelaresi¹, K. Adamczyk¹, A. Gumiero², K. Robb³, C. Bellota-Anton³, G. M. Greetham⁴, A. W. Parker⁴, P. A. Hoskisson³, M. A. Walsh², N. P. Tucker³, N. T. Hunt¹
¹*Dept. of Physics, University of Strathclyde, SUPA, Glasgow,*
²*Diamond Light Source, Harwell Science and Innovation Campus, Didcot,*
³*Strathclyde Institute of Pharmacy and Biomedical Science, University of Strathclyde, Glasgow,*
⁴*Research Complex at Harwell, STFC Rutherford Appleton Laboratory, Didcot, UK*
- 12:30
Lunch
- Session C: Vibrational Probes of Structure**
Chair: Martin Zanni
- 14:00
C1 **Progress in computational multidimensional spectroscopy (invited paper)**
T. L. C. Jansen
Zernike Institute for Advanced Materials, University of Groningen, 9747 AG Groningen, Netherlands
- 14:30
C2 **Progress in deconvolving structural elements in a small protein using EVV 2D-IR (invited paper)**
D. R. Klug¹, R. Guo¹, M. Miele¹, E. Gardner¹, S. Mukamel², K. R. Willison¹
¹*Dept. of Chemistry and Institute of Chemical Biology, Imperial College London, UK*
²*University of California Irvine, USA*
- 15:00
C3 **2D-IR vibrational probes of complex environments: nanocavities, glasses and proteins (invited paper)**
J. T. King, M. R. Ross, D. G. Osborne, E. J. Arthur, K. J. Kubarych
Dept. of Chemistry, University of Michigan, Ann Arbor, MI, USA
- 15:30
C4 **Temperature-jump amide-I 2D-IR spectroscopy: a toolkit to study protein dynamics and folding**
C. R. Baiz, C. S. Peng, M. E. Reppert, K. C. Jones, A. Tokmakoff
Dept. of Chemistry, Massachusetts Institute of Technology, Cambridge, MA, USA
- 15:50
Coffee Break

Session D: Structural Dynamics

Chair: Keitsuke Tominaga

16:10
D1

Temperature-dependent conformation of self-assembled porphyrin dimers in phospholipid membranes by 2D fluorescence spectroscopy (invited paper)

A. H. Marcus¹, J. R. Widom¹, A. Perdomo-Ortiz², G. A. Lott¹, A. Aspuru-Guzik²

¹*Dept. of Chemistry, Oregon Center for Optics, Institute of Molecular Biology, University of Oregon, Eugene, OR 97403,*

²*Dept. of Chemistry and Chemical Biology, Harvard University, Cambridge, MA 02138, USA*

16:40
D2

Time-resolved two-dimensional infrared spectroscopy of an operating molecular machine (invited paper)

M.R. Panman¹, C.N. van Dijk¹, A. Huerta Viga¹, B.H. Bakker¹, E.R. Kay², D.A. Leigh², W.J. Buma¹, A.M. Brouwer¹, S. Woutersen¹

¹*Van 't Hoff Institute for Molecular Sciences, University of Amsterdam, Netherlands,*

²*School of Chemistry, University of Edinburgh, UK*

19:00
P1-P69

Poster Session

Posters P1-P69 are listed after the oral sessions.

Tuesday, July 17, 2012

Session E: Electronic and Vibrational Coherences

Chair: Majed Chergui

- 8:30
E1 **Electronic and vibrational coherences in algal light-harvesting proteins**
D. B. Turner, G. D. Scholes
Dept. of Chemistry and Centre for Quantum Information and Quantum Control, University of Toronto, Toronto, Ontario M5S 3H6, Canada
- 8:50
E2 **The nature of coherence beatings in various biological complexes**
J. Dostál, D. Paleček, R. Augulis, J. Alster, D. Zigmantas
Dept. of Chemical Physics, Lund University, SE-22100 Lund, Sweden
- 9:10
E3 **Non-adiabatic dynamics of anti-correlated intramolecular vibrations promote electronic energy transfer in photosynthesis**
V. Tiwari, W. K. Peters, D. M. Jonas
Dept. of Chemistry and Biochemistry, University of Colorado, Boulder, CO, USA
- 9:30
E4 **Vibronic excitons and long lived coherences in photosynthetic complexes**
N. Christensson¹, H. F. Kauffmann¹, T. Pullerits², T. Mančal³
¹*Faculty of Physics, University of Vienna, A-1090 Vienna, Austria,*
²*Dept. of Chemical Physics, Lund University, SE-22100 Lund, Sweden,*
³*Institute of Physics, Faculty of Mathematics and Physics, Charles University, Prague 121 16, Czech Republic*
- 9:50
E5 **Investigating excitonic coupling in tubular J-aggregates via two-dimensional electronic spectroscopy**
C. Steiner¹, D. Arias¹, D. Eisele¹, X. Fu², D. Nicastro², M. Bawendi¹, K. Nelson¹
¹*Dept. of Chemistry, Center for Excitonics, MIT, Cambridge, USA*
²*Dept. of Biology, Brandeis University, Waltham, USA*
- 10:10
E6 **Long lived coherence dynamics in 2D electronic spectra of a molecular aggregate**
N. Christensson¹, M. Maiuri², F. Milota¹, H. F. Kauffmann¹, J. Hauer¹
¹*Faculty of Physics, University of Vienna, 1090 Vienna, Austria,* ²*Dipartimento di Fisica, Politecnico di Milano, 20133 Milano, Italy*
- 10:30 Coffee Break

Session F: Vibrational Dynamics and Relaxation

Chair: Huib Bakker

10:50
F1 **Using multidimensional spectroscopies to probe non-equilibrium vibrational dynamics (invited paper)**

M. S. Lynch, K. M. Slenkamp, J. F. Brookes, M. Cheng, M. Khalil
Dept. of Chemistry, University of Washington, Seattle, WA 98115, USA

11:20
F2 **2D-IR EXSY at 100 × T1 – how to outwit vibrational relaxation (invited paper)**

J. Bredenbeck, L. J. G. W. van Wilderen, A. T. Messmer
Institut für Biophysik, Goethe-Universität, 60438 Frankfurt/M., Germany

11:50
F3 **Vibrational energy transfer as a molecular ruler**

J. Zheng
Dept. of Chemistry, Rice University, Houston, TX 77251-1892, USA

12:10
F4 **Vibrational dynamics of [RuCl₅(NO)]²⁻ in aqueous solution studied by nonlinear infrared spectroscopy**

K. Aikawa¹, J. Tayama², M. Banno², K. Ohta², K. Tominaga^{1,2}
¹*Graduate School of Science, Kobe University,*
²*Molecular Photoscience Research Center, Kobe University, Japan*

12:30
Lunch

Session G: Electron Transfer and Charge Separation

Chair: Tonu Pullerits

14:00
G1 **Exploring electron transfer processes by means of 2D-ES (invited paper)**

Y. Tanimura
Dept. of Chemistry, Kyoto University, Kyoto, Japan

14:30
G2 **Two dimensional electronic spectroscopy of the photosystem II reaction center (invited paper)**

F. D. Fuller, K. L. M. Lewis, D. E. Wilcox, J. P. Ogilvie
Dept. of Physics and Biophysics, University of Michigan, Ann Arbor, MI 48109, USA

15:00
G3 **Three-dimensional electronic spectroscopy of the photosystem II subunits**

V. I. Prokhorenko¹, R. Croce², R. J. D. Miller¹
¹*Max-Planck Research Dept. for Structural Dynamics, Dept. of Physics, University of Hamburg, Center for Free Electron Laser Science, DESY, Hamburg, Germany,*
²*Vrije Universiteit Amsterdam, Dept. of Biophysics, Amsterdam, Netherlands*

15:20
G4

Quantum-coherent charge separation in the photosystem II reaction center

E. Romero¹, R. Augulis², V. I. Novoderezhkin³, M. Ferretti¹, J. Thieme¹, D. Zigmantas², R. van Grondelle¹

¹VU University Amsterdam, Netherlands, ²Lund University, Sweden, ³Moscow State University, Russia

15:40
G5

Towards 2D-IR spectroscopy of organic photoconversion systems

M. S. Pshenichnikov¹, A. A. Bakulin^{2,4}, A. Rao², R. H. Friend², V. G. Pavelyev¹, P. H.M. van Loosdrecht¹, D. Niedzialek³, J. Cornil³, D. Beljonne³

¹Zernike Institute for Advanced Materials, University of Groningen, Netherlands, ²Cavendish Laboratory, University of Cambridge, UK, ³Laboratory for Chemistry of Novel Materials, University of Mons, Belgium, ⁴AMOLF, Amsterdam, Netherlands

16:00

Coffee Break

19:30

Conference Dinner at the Museum für Naturkunde

Wednesday, July 18, 2012

Session H: Many-Body Effects

Chair: Maxim Pshenichnikov

- 8:30
H1 **Multidimensional Fourier transform spectroscopy of an atomic vapor (invited paper)**
S. T. Cundiff
¹JILA, National Institute of Standards and Technology and University of Colorado, Boulder, CO 80309-0440, USA
- 9:00
H2 **Multiresonant CMDS of semiconductor nanostructures**
J. C. Wright, S. B. Block, L. A. Yurs, A. V. Pakoulev, R. S. Selinsky, S. Jin, J. Wright
Dept. of Chemistry, University of Wisconsin, Madison, USA
- 9:20
H3 **3D spectroscopy of coherences in colloidal quantum dots**
M. Mukhopadhyay¹, R. Augulis^{1,2}, N. Lenngren¹, K. Zidek¹, D. Zigmantas¹, T. Pullerits¹
¹Chemical Physics, Lund University, 22100 Lund, Sweden, ²Current address: Centre of Physical Sciences and Technology, Vilnius, Lithuania
- 9:40
H4 **MUPPETS in excitonic systems: exciton and biexciton dynamics in CdSe nanoparticles**
M. A. Berg, K. Sahu, H. Wu
Dept. of Chemistry and Biochemistry, University of South Carolina, Columbia, SC 29208, USA
- 10:00
H5 **Three-dimensional electronic spectroscopy of excitons in asymmetric double quantum wells (invited paper)**
C. R. Hall¹, L.V. Dao¹, K. A. Nugent², H. M. Quiney², H. H. Tan³, C. Jagadish³, J.A. Davis¹
¹Centre for Atom Optics and Ultrafast Spectroscopy, Swinburne University of Technology, Victoria 3122, ²School of Physics, University of Melbourne, Victoria 3010, ³Dept. of Electronic Materials Engineering, Research School of Physics and Engineering, Australian National University, Canberra 0200, Australia
- 10:30
Coffee Break

Session J: Nonlinear Terahertz Spectroscopy

Chair: Peter Vöhringer

- 10:50
J1 **Two-dimensional Raman-THz spectroscopy of water (invited paper)**
J. Savolainen, S. Ahmed, P. Hamm
Institute of Physical Chemistry, University of Zurich, Zurich, Switzerland

11:20
J2 **Two-dimensional THz spectroscopy on graphene in the non-perturbative regime**
P. Bowlan, E. Martinez Moreno, K. Reimann, M. Woerner, T. Elsaesser
Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie, 12489 Berlin, Germany

11:40
J3 **Non-perturbative response in bulk InSb driven by intense off-resonant multi-THz pulses**
B. Mayer¹, F. Junginger¹, C. Schmidt¹, O. Schubert^{1,2}, S. Mährlein¹, R. Huber^{1,2}, A. Leitenstorfer¹, A. Pashkin¹
¹Department of Physics and Center for Applied Photonics, University of Konstanz, 78464 Konstanz, Germany, ²Current address: Dept. of Physics, University of Regensburg, 93053 Regensburg, Germany

12:30 Lunch

Session K: Surfaces and Interfaces

Chair: John Wright

14:00
K1 **Designing pulses sequences for 2D SFG spectroscopy (invited paper)**
M. T. Zanni
Dept. of Chemistry, University of Wisconsin-Madison, Madison WI 53706, USA

14:30
K2 **2D heterodyne-detected VSFG spectroscopy of water molecules at charged interfaces**
S. Nihonyanagi, P. C. Singh, S. Yamaguchi, T. Tahara
Molecular Spectroscopy Laboratory, RIKEN, 2-1 Hirosawa, Wako, Saitama 351-0198, Japan

14:50
K3 **Structure and ultrafast dynamics of water interfaces studied using femtosecond 2D surface spectroscopy**
E. H. G. Backus¹, Z. Zhang¹, C.-S. Hsieh¹, Y. Tong¹, L. Piatkowski², H.J. Bakker², M. Bonn
*¹Max Planck Institute for Polymer Research, 55128 Mainz, Germany
²FOM-Institute AMOLF, 1098 XG Amsterdam, Netherlands*

15:10
K4 **Towards coherent surface-specific 2D-IR spectroscopy**
C. Calabrese, A. Barrett, A. M. Stingel, M. L. McDermott, P. B. Petersen
Dept. of Chemistry and Chemical Biology, Cornell University, Ithaca, NY 14853, USA

15:30 End of meeting

Poster Papers

- P1 **Generation of pulsed broadband mid-infrared light for two-dimensional vibrational spectroscopy**
L. De Marco, K. Ramasesha, A. Mandal, A. Tokmakoff
Dept. of Chemistry, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA
- P2 **Simplified and economical 2D IR spectrometer design using a dual Ge acousto-optic modulator**
D. R. Skoff, M. T. Zanni
University of Wisconsin, Madison, USA
- P3 **Overtone 2D IR spectroscopy of neat liquid**
J. Wang, D. Li, F. Yang, C. Han
Beijing National Laboratory for Molecular Sciences, State Key Laboratory of Molecular Reaction Dynamics, Institute of Chemistry, Chinese Academy of Sciences, Beijing, 100190, PR China
- P4 **IR-induced visible absorption – applications in two-dimensional infrared spectroscopy**
L. J. G. W. van Wilderen¹, A.T. Messmer¹, S. Bauer², R. Berger², J. Bredenbeck¹
¹*Institut für Biophysik, Goethe-Universität, 60438 Frankfurt/M.,*
²*Clemens-Schöpf-Institut, Technische Universität Darmstadt, 64287 Darmstadt, Germany*
- P5 **Controlling quantum interferences in IR vibrational excitations in metal carbonyls**
J. Tayama, K. Enomoto, S. Ashihara
Dept. of Applied Physics, Tokyo Univ. of Agriculture and Technology, 2-24-16, Nakacho, Koganei, Tokyo 184-8588, Japan
- P6 **Two-dimensional short-wave IR electronic spectroscopy**
T. L. Courtney, S. D. Park, R. J. Hill, D. M. Jonas
Dept. of Chemistry and Biochemistry, University of Colorado, Boulder, CO, USA
- P7 **Multidimensional electronic spectroscopy with non-collinear four-wave mixing set-up fully based on pulse shaping**
A. Cannizzo, F. Frei, T. Feuerer
Institute of Applied Physics, University of Bern, 5 CH-3012 Bern, Switzerland
- P8 **Experimental implementation and theory of phase-cycling schemes for pump-probe beam geometry two-dimensional electronic spectroscopy**
Z. Zhang, K. L. Wells, H.-S. Tan
Division of Chemistry and Biological Chemistry, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore

- P9 **Data evaluation and modeling in coherent 2D nanoscopy**
C. Kramer¹, M. Aeschlimann², T. Brixner¹, A. Fischer², P. Melchior²,
W. Pfeiffer³, C. Schneider², C. Strüber³, P. Tuchscherer¹, D. V.
Voronine⁴
*¹Institut für Physikalische und Theoretische Chemie, Universität Würzburg, 97074
Würzburg, ²Fachbereich Physik and Research Center OPTIMAS, Technische
Universität Kaiserslautern, 67663 Kaiserslautern, ³Fakultät für Physik, Universität
Bielefeld, 33615 Bielefeld, Germany
⁴Institute for Quantum Science and Engineering, Texas A&M University, College
Station, TX 77840, USA*
- P10 **Automation of multiphoton pathways construction with
applications in two-dimensional spectroscopy**
K. K. Liang^{1,2}, A. A. Villaeys^{1,3}
*¹Research Center for Applied Sciences, Academia Sinica, Taipei, Taiwan,
²Department of Biochemical Science and Technology, National Taiwan University,
Taipei, Taiwan, ³Université de Strasbourg et Institut de Physique et Chimie des
Matériaux de Strasbourg, Strasbourg, France*
- P11 **Pulse propagation effects in 2D-FT spectroscopy**
H. Li¹, A. Kortyna^{1,2}, G. Moody^{1,3}, S. T. Cundiff^{1,3}
*¹JILA, University of Colorado & National Institute of Standards and Technology,
Boulder, CO 80309, USA, ²Dept. of Physics, Lafayette College, Easton PA 18042,
USA, ³Dept. of Physics, University of Colorado, Boulder, CO 80309*
- P12 **Ultraviolet 2D spectroscopy: an experimental realization with
sub-16 fs UV pulses and a super continuum probe**
N. Krebs, C. E. Eckert, I. Pugliesi, E. Riedle
*Lehrstuhl für BioMolekulare Optik, Ludwig-Maximilians-Universität München, 80538
München, Germany*
- P13 **Calculation of third order optical signals in the Schrödinger
wave-function picture**
J. Krčmář, M. F. Gelin, W. Domcke
Dept. of Chemistry, Technische Universität München, Garching, D-85747, Germany
- P14 **Surface hopping modeling of two-dimensional spectra**
R. Tempelaar, T. L. C. Jansen, J. Knoester
Zernike Institute for Advanced Materials, University of Groningen, Netherlands
- P15 **Simulating 2D-spectra with the mixed quantum-classical
Ehrenfest method**
C. P. van der Vegte, T. L. C. Jansen, J. Knoester
Zernike Institute for Advanced Materials, University of Groningen, Netherlands
- P16 **Multi-point and multi-time density correlations for probing
dynamic heterogeneities in glasses: On the analogy of multi-
dimensional spectroscopies**
K. Kim, S. Saito
Institute for Molecular Science, Okazaki 444-8585, Japan

- P17 **THz-induced multiple rotational coherences in polar gas phase molecules**
S. Fleischer, R. W. Field, K. A. Nelson
Dept. of Chemistry, Massachusetts Institute of Technology, Cambridge, MA 02139, USA
- P18 **Picosecond rotational conformation exchange studied by two-dimensional infrared spectroscopy**
H. Maekawa, N.-H. Ge
Dept. of Chemistry, University of California at Irvine, Irvine, California 92697-2025, USA
- P19 **Intermolecular torsional motion of a π -aggregated dimer probed by two-dimensional electronic spectroscopy**
J. Seibt¹, A. Eisfeld^{1,2}
¹Max Planck Institute for the Physics of Complex Systems, 01187 Dresden, Germany, ²Dept. of Chemistry and Chemical Biology, Harvard University, Cambridge, Massachusetts 02138, USA
- P20 **Theoretical study on frequency fluctuation of HOH bend in liquid water**
S. Imoto¹, S. Saito^{1,2}
*¹Graduate University for Advanced Studies, Okazaki, Japan
²Institute for Molecular Science, Okazaki, Japan*
- P21 **Multidimensional IR spectroscopy of ice Ih**
F. Perakis, P. Hamm
Institute of Physical Chemistry, University of Zurich, Switzerland
- P22 **2D-IR spectroscopy of water confined inside phospholipid reverse micelles**
R. Costard¹, C. Greve¹, I. A. Heisler¹, N. E. Levinger², E. T. J. Nibbering¹, T. Elsaesser¹
¹Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie, D-12489 Berlin, Germany, ²Dept. of Chemistry, Colorado State University, Fort Collins, Colorado 80523-1872, USA
- P23 **Probing hydration shell dynamics via degenerate vibrational modes. Polarization-enhanced 2D-IR of NO_3^- in water**
J. Réhault¹, J. Thøgersen², S. R. Keiding², J. Helbing¹
¹Physikalisch-chemisches Institut, Universität Zürich, CH-8057 Zürich, Switzerland, ²Dept. of Chemistry, Aarhus University, DK-8000 Aarhus, Denmark
- P24 **Structural fluctuation in hydrogen bonding liquids with amino acid derivatives probed by two-dimensional infrared spectroscopy**
M. Okuda¹, K. Ohta², and K. Tominaga^{1,2}
¹Graduate School of Science and ²Molecular Photoscience Research Center, Kobe University, Nada, Kobe, Japan

- P25 **Azide-water intermolecular coupling measured by 2-color 2D-IR spectroscopy**
J. A. Borek, F. Perakis, P. Hamm
University of Zurich, Institute of Physical Chemistry, Zurich, CH-8057 Switzerland
- P26 **Ultrafast dynamics at the protein-water interface studied with 2D-IR spectroscopy**
J. T. King, K. J. Kubarych
Dept. of Chemistry, University of Michigan, Ann Arbor, MI 48109, USA
- P27 **Surfactin-lipid interactions probed using two-dimensional infrared spectroscopy**
A. T. Krummel, J. Nite, J. Cyran, J. Blaser
Colorado State University, Dept. of Chemistry, Fort Collins, USA
- P28 **Proton transfer dynamics in aqueous hydroxide solutions probed using ultrafast nonlinear infrared spectroscopy**
A. Mandal, K. Ramasesha, L. De Marco, A. Tokmakoff
Dept. of Chemistry and G. R. Harrison Spectroscopy Laboratory, Massachusetts Institute of Technology, Cambridge, MA 02139, USA
- P29 **Aqueous proton transfer dynamics probed with ultrafast broadband infrared pulses**
K. Ramasesha, L. De Marco, A. Mandal, A. Tokmakoff
Dept. of Chemistry and George R. Harrison Spectroscopy Laboratory, Massachusetts Institute of Technology, Cambridge, MA 02143, USA
- P30 **Dynamics of N-H stretching excitations of guanosine-cytidine base pairs in solution**
M. Yang¹, H. Fidler¹, Ł. Szyc¹, K. Röttger², E. T. J. Nibbering¹, T. Elsaesser¹, F. Temps²
¹Max Born Institut für Nichtlineare Optik und Kurzzeitspektroskopie, D-12489 Berlin, ²Institut für Physikalische Chemie, Christian-Albrechts-Universität zu Kiel, D-24098 Kiel, Germany
- P31 **Ultrafast 2D infrared photon echo and pump-probe spectroscopy of adenosine and thymidine monomers and base pairs**
C. Greve¹, N. Pekretes², R. Costard¹, B. Koeppe¹, H. Fidler¹, E. T. J. Nibbering¹, F. Temps³, S. Mukamel², T. Elsaesser¹
¹Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie, D-12489 Berlin, Germany, ²Dept. of Chemistry, University of California, Irvine, California 92697-2025, USA, ³Institut für Physikalische Chemie, Christian-Albrechts-Universität zu Kiel, 40, D-24098 Kiel, Germany
- P32 **2D-IR spectroscopy of nucleic acid bases and DNA aptamers**
C. S. Peng, K. C. Jones, C. Baiz, M. E. Reppert, A. Tokmakoff
Dept. of Chemistry, Massachusetts Institute of Technology, Cambridge, MA 02139, USA

- P33 **IR spectroscopic signatures of correlated dynamics of the double hydrogen bonds in solution**
Y. Yan, T. Zentel, S. D. Ivanov, O. Kühn
Institute of Physics, University of Rostock, 18051 Rostock, Germany
- P34 **3D molecular conformations mapped with multiple-mode multiple-dimensional vibrational spectroscopy**
J. Zheng
Dept. of Chemistry, Rice University, Houston, USA
- P35 **Broadband two dimensional infrared spectra of 2-pyrrolidinone**
K. S. Maiti¹, T. Steinel²
¹*Dept. of Chemistry, The Lundberg Laboratory, University of Gothenburg, Sweden,*
²*Institut für Physikalische Chemie, TU München, D-85748 Garching, Germany*
- P36 **Structure determination of reactive catalyst-substrate-complexes by two-dimensional infrared spectroscopy**
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- P37 **Resolving the geometry of salt bridges in solution using 2D-IR spectroscopy**
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- P38 **2D-IR measurements of bound and unbound peptide using the azidohomoalaine label**
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- P39 **Artificial amino acids as site-specific probes for ultrafast dynamics in proteins**
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- P40 **Two-dimensional infrared spectroscopy of disordered systems: application to elastin-like peptides**
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- P41 **Ultrafast 2D-IR spectroscopy of an anti tuberculosis drug**
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- P42 **Vibrational dynamics of the CO stretching of 9-fluorenone studied by visible-pump and IR-probe spectroscopy**
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- P43 **Excited state characterization of trans- β -apo-8'-carotenal with T-2D-IR spectroscopy**
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- P44 **Simulation of transient infrared spectra of photoswitchable peptides**
G. Stock
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- P45 **Exploring excited states of a molecular switch by coherent triggered-exchange electronic 2D spectroscopy**
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- P46 **Dynamical molecular axial chirality can be monitored by 2D photon echo experiment**
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- P47 **Mixed potential energy surfaces of the ultrafast isomerization of retinal in bacteriorhodopsin**
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- P48 **Two dimensional ultraviolet spectroscopy of proteins**
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- P49 **Effect of the time scale of the environment on exciton dynamics**
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- P50 **Signatures of molecular vibrations in two-dimensional electronic spectroscopy**
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- P51 **Coherences in 2D-electronic spectroscopy: molecules and aggregates**
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- P52 **Excitonic dynamics in the Soret band of a porphyrin dimer**
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- P53 **2D electronic photon echo spectroscopy of excitons in a molecular dimer**
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- P54 **Line narrowing of excited state transitions in nonlinear polarization spectroscopy**
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- P55 **2D electronic spectroscopy on the B820 subunit of the bacterial core light-harvesting complex 1**
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- P56 **Polarization electronic 2D spectroscopy distinguishes electronic and vibrational coherences**
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- P57 **Monitoring the charge separation pathways in reaction centers by pulse polarized 2D electronic photon echo spectroscopy**
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- P58 **Coherent picosecond exciton dynamics in a photosynthetic reaction centre**
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- P59 **Two-dimensional electronic spectroscopy of photosystem I: supercomplex of cyanobacteria *A. marina* and *T. elongatus***
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- P60 **Vibronic effects in 2D electronic spectra continued: dimers and conical intersections**
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- P61 **Presence and absence of coherent exciton coupling in a disordered semiconductor quantum well**
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- P62 **Exciton-trion correlations in a CdTe/CdMgTe quantum well**
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- P63 **Field-resolved observation of a THz-induced Franz-Keldysh effect**
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- P64 **Collinear two-dimensional THz spectroscopy on semiconductor nanostructures**
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- P65 **Two-dimensional spectroscopy of ultrafast carrier dynamics in graphite studied with multi-THz pulses**
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- P66 **Host-guest interaction in cryogenic solids probed by infrared stimulated photon echoes**
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- P67 **Monitoring excitonic entanglement in carbon nanotubes via optical 2D photon-echo spectroscopy**
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- P68 **Excitons, biexcitons, and trions in an InAs QD ensemble**
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- P69 **Surface enhanced 2D-IR spectroscopy of gold nanoparticle capping layers**
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