

**Manipulating Molecular Electronic
Properties by Vibrational Excitations:
Novel Spectroscopies and
Microscopies**

838. WE-Heraeus-Seminar

17 – 21 August 2025

at the Physikzentrum Bad Honnef, Germany

**WILHELM UND ELSE
HERAEUS-STIFTUNG**



Program

Sunday, 17 August 2025

16:00 – 21:00 Registration

18:30 *BUFFET SUPPER and informal get together*

20:30 – 20:45 Scientific Organizers **Welcome and Introduction**

Session chairs: Jens Bredenbeck / Wei Xiong

20:45 – 21:30 Andrei Tokmakoff **Enabling single molecule infrared spectroscopy through fluorescence detection**

Monday, 18 August 2025

08:00 *BREAKFAST*

Session chair: Wei Xiong

09:00 – 09:45 Jens Bredenbeck **Subensemble selective dynamics through IR pre-excitation**

09:45 – 10:30 Julia Weinstein **IR-control of photoinduced electron transfer in solution**

10:30 – 11:00 *COFFEE BREAK*

11:00 – 11:45 Fabrizio Santoro **Computing Vibronic Spectra after vibrational pre-excitation with FCclasses code**

11:45 – 12:30 Irene Burghardt **Signatures of vibronic couplings in VIPER spectroscopy and VIPER mediated photocontrol**

12:30 – 12:40 **Conference Photo (in front of the main entrance)**

Program

Monday, 18 August 2025

12:40 – 14:00 *LUNCH*

Session chair: Lu Wei

14:00 – 15:30 **Contributed Talks 1 - 3**

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|-------------------------------|---|
| Hugo Levy Falk | Hybrid Interfaces for Sensing and Control in Fluorescent Organic Molecules |
| Beier Hu | Unveiling the Impact of High-Frequency Vibrations on Electronic Properties in Soft Optoelectronic Materials |
| Srijan Chatterjee (ONLINE) | Mapping Vibronic Couplings in Mixed-Frequency Regimes Using Coherent Multidimensional Vibrational-Electronic Spectroscopy |

15:30 – 16:00 *COFFEE BREAK*

16:00 – 16:10 **Video WE Heraeus Foundation**

Session chair: Ricardo Fernández-Terán

16:10 – 18:10 **Hot Topic Talks**

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| Patrick Friebe | THz vibrational dynamics of Liquid Crystals: from molecular origin to bulk response |
| Timo Stern | Simultaneous detection of FEIR and 2D-IR spectra and site-specific application to biomolecules |
| Stefan Piontek | Innovation in Ultrashort Broadband Mid-Infrared Pulses for Nonlinear Spectroscopy |
| Luuk van Wilderen | Vibronic couplings in a photoreceptor protein |

Program

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| Bin Yang | Ultrafast Optical Gating of Single Photon Emission via Pump-Ionization-Probe Spectroscopy in CdSe/ZnS Quantum Dots |
| Ryan McDonnell | Comparing one and two-photon transitions in vibronic coupling schemes |
| William Jeffries | Decoding nanocrystal surface heterogeneity: insights from ligand vibrations and vibronic coherences |

19:00

DINNER

Program

Tuesday, 19 August 2025

08:00 *BREAKFAST*

Session chair: Jens Bredenbeck

09:00 – 09:45 Jeremy Baumberg **Exploiting Extreme Plasmonic Nano-cavities to drive Collective Molecular Vibrations**

09:45 – 10:30 Christophe Galland **Optical and electrical investigations of molecules in plasmonic nanojunctions**

10:30 – 11:00 *COFFEE BREAK*

11:00 – 12:30 **Contributed Talks 4 - 6**

Carsten Fallnich **A route to chip-based ultrafast light sources for coherent Raman imaging**

Ricardo Fernández-Terán **Towards Controlling Excited State Reactivity in Organic and Organometallic Systems: A Perspective Through Ultrafast Multidimensional Spectroscopies**

Hanqing Xiong **Recent progress in time-domain stimulated Raman excited fluorescence spectroscopy**

12:30 – 14:00 *LUNCH*

Session chair: Christophe Galland

14:00 – 14:45 Nicholas Chilton **Vibronic coupling probed by single-crystal FIRMS**

14:45 – 15:30 **Poster Flash Talks**

15:30 – 16:00 *COFFEE BREAK*

16:00 – 18:00 **Poster Session**

19:00 *DINNER*

Program

Wednesday, 20 August 2025

08:00 *BREAKFAST*

Session chair: Tim Zuehlsdorff

09:00 – 09:45 Jiri Vanicek **Vibrationally resolved electronic spectra from Hagedorn wavepacket dynamics**

09:45 – 10:30 Wei Xiong **Nonlinear IR-visible interactions: From Multiplexing Imaging to Ultrafast Quantum Emitters**

10:30 – 11:00 *COFFEE BREAK*

11:00 – 11:45 Lu Wei **Functional bond-selective microscopy toward the single-molecule, super-resolution regime**

11:45 – 12:30 Renee Frontiera (ONLINE) **Distinguishing spectator from driving vibrational modes in excited state photochemistry**

12:30 – 14:00 *LUNCH*

14:00 **Excursion**

19:00 *HERAEUS DINNER*
(social event with cold & warm buffet with complimentary drinks)

Program

Thursday, 21 August 2024

08:00 *BREAKFAST*

Session chair: Hanqing Xiong

09:00 – 09:45 Christopher Elles **Manipulating reaction dynamics
through vibronic coupling in higher-
lying electronic states**

09:45 – 10:30 Tim Zuehlsdorff **Modeling nonlinear optical
spectroscopy signals in molecules
beyond the Condon approximation**

10:30 – 11:00 *COFFEE BREAK*

11:00 – 11:45 Junrong Zheng **Mechanism of aggregation-induced
emission and control of excited state
dynamics**

11:45 – 12:30 **Discussion and Closing Remarks**

12:30 *LUNCH*

End of the seminar and departure