

**Quantum frontiers in molecular science**  
**June 26-29, 2018**  
**Telluride Science Research Center**

Telluride Intermediate School  
725 West Colorado Ave Telluride, CO 81435

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**Schedule - updated June 19, 2018**

<b>Monday</b>		25-Jun
6:00-8:00 PM	Informal gathering at "Phoenix Bean" 221 W. Colorado Ave Main Street	
<b>Tuesday</b>		26-Jun
9:20-9:35 AM	Opening Remarks	
	<b>Cavities I</b>	
9:35-10:10	Vahid Sandoghdar (Max Planck Institute for the Science of Light, Germany) <i>Organic molecules coming of age for quantum optics</i>	
10:10-10:45	Jonathan Keeling (St. Andrews, UK) <i>Oriental alignment in Cavity Quantum Electrodynamics</i>	
10:45-11:05	COFFEE BREAK	
11:05-11:40	Heiko Appel (Max Planck Institute for the Structure and Dynamics of Matter, Germany) <i>Time-dependent density-functional theory for QED: an ab initio framework for modeling light-matter interactions</i>	
11:40-12:15 PM	Frank Huo (U. Rochester, USA) <i>Theoretical investigations of New Chemical Reactivity Enabled by Intrinsically Quantum Mechanical Behavior</i>	
12:15-2:00	LUNCH BREAK	
	<b>Quantum Dynamics and Spectroscopy I</b>	
2:00-2:35	Ralph Ernstorfer (Fritz Haber Institute, Germany) <i>Beyond the molecular movie: ultrafast dynamics of bands, bonds and excitons investigated with trARPES</i>	
2:35-3:10	Marcus Kowalewski (Stockholm U., Sweden) <i>Coherent Signatures of Conical Intersections in Ultrafast X-Ray Spectroscopy</i>	
3:10-3:45	Sophya Garashchuk (U. South Carolina, USA)	

*Quantum trajectory dynamics: theme and variations*

- 3:45-4:20 COFFEE BREAK
- 4:20-4:55 Eberhard Gross (Max Planck Institute of Microstructure Physics, Germany)  
*Nuclear-velocity perturbation theory: A systematic approach to electron-nuclear correlation beyond Born-Oppenheimer*
- 4:55-5:30 Eric Bittner (U. Houston, USA)  
*Excitonic quantum logic gates*
- 6:30-7:15 **Town Talk - 2018 R. Stephen Berry Lecture**  
Sir Fraser Stoddart – 2016 Nobel Laureate, Northwestern University  
Telluride Conference Center in Mountain Village  
Free Admission, Cash Bar starts at 6:00PM.

**Wednesday**

27-Jun

**Control and Strong Field Dynamics I**

- 9:00-9:35 AM Albert Stolow (U. Ottawa, Canada)  
*Non-perturbative quantum control and strong field ionization of molecules*
- 9:35-10:10 Regina de Vivie-Riedle (Ludwig-Maximilians-Universität, Germany)  
*Photostability of uracil affected by cellular environment and controlled with shaped light fields*
- 10:10-10:45 Ignacio Franco (U. Rochester, USA)  
*Stark Control of Electrons*

10:45-11:05 COFFEE BREAK

**Quantum Dynamics and Spectroscopy II**

- 11:05-11:40 Andy Marcus (U. Oregon USA)  
*Broadband entangled photon pairs for nonlinear molecular spectroscopy*
- 11:40-12:15 PM Mike Reppert (U. Toronto, Canada)  
*Quantum or Classical?: The case of 2D Vibrational Spectroscopy*

12:15-2:00 LUNCH BREAK

**Transport/Open Systems**

- 2:00-2:35 Jianshu Cao (MIT, USA)  
*Engineering exciton and charge transport: From photosynthesis to molecular electronics*
- 2:35-3:10 Ivan Kassal (U. Sydney, Australia)  
*Quantum coherence in light-harvesting systems and organic semiconductors*
- 3:10-3:45 Semion Saikin (Harvard, USA)  
*Molecular aggregates -- a testbed for topological excitonics*

- 3:45-4:20 COFFEE BREAK
- 4:20-4:55 Ulrich Kleinekathofer (Jacobs U. Bremen, Germany)  
*Charge and energy transfer in molecular systems: A time-dependent view*
- Special Seminar**
- 4:55-5:30 Evi Goldfield (NSF, USA)  
*Enabling Quantum Leap: an NSF Big Idea. What it means for chemistry*
- 6:00-8:00 Picnic@TSRC Tent  
Telluride Intermediate School, 725 W Colorado Avenue.

**Thursday** 28-Jun

**Cavities II**

- 9:00-9:35 AM Stephane Kena-Cohen (Polytechnique Montreal, Canada)  
*Nonlinear phenomena and devices in the strong exciton-photon coupling regime*
- 9:35-10:10 Joel Yuen-Zhou (UC San Diego, USA)  
*Polariton assisted photochemistry and photophysics*
- 10:10-10:45 Felipe Herrera (U. Santiago de Chile, Chile)  
*Holstein-Tavis-Cummings theory of organic polaritons: Spectroscopy and chemistry*
- 10:45-11:05 COFFEE BREAK
- 11:05-11:40 Johannes Feist (U. Autónoma de Madrid, Spain)  
*Manipulating molecules by strong light-matter coupling in cavities*
- 11:40-12:15 PM David Masiello (U. Washington, USA)  
*Optimizing the Hybridization between Localized Surface Plasmons and Photonic Cavity Modes in a Photothermal Absorption Spectrometer*
- 12:15-2:00 LUNCH BREAK

**Control and Strong Field Dynamics II**

- 2:00-2:35 Alicia Palacios (U. Autónoma de Madrid, Spain)  
*Imaging ultrafast molecular dynamics using attosecond pulses. A theoretical outlook*
- 2:35-3:10 David Ayuso (Max Born Institute, Germany)  
*Chiral discrimination using high harmonic generation: a giant macroscopic electric dipole response*
- 3:10-3:45 Christian Heide (U. Erlangen, Germany)  
*Coherent light-field-driven electron dynamics in graphene*
- 3:45-4:20 COFFEE BREAK

### Quantum Dynamics and Spectroscopy III

- 4:20-4:55 Christiane Koch (U. Kassel, Germany)  
*Quantum effects in the dynamics of molecular systems*
- 4:55-5:30 Zlatko Bacic (NYU, USA)  
*Explaining the symmetry breaking observed in the solid endofullerenes  $M@C60$  ( $M = H_2, HF, H_2O$ ) and its spectroscopic manifestations*
- 6:00-8:00 Conference dinner. Location TBD

### Friday

29-Jun

#### Cavities III

- 9:00-9:35 AM Javier Aizpurúa (U. País Vasco, San Sebastián)  
*Quantum descriptions of plasmon-assisted molecular spectroscopy*
- 9:35-10:10 Prineha Narang (Harvard, USA)  
*Cavity correlated electron-nuclear dynamics*
- 10:10-10:30 COFFEE BREAK

#### Quantum Dynamics and Spectroscopy IV

- 10:30-11:05 Jeffrey Cina (U. Oregon, USA)  
*Wave-packet interferometry for electronic excitation transfer*
- 11:05-11:40 Jacob Krich (U. Ottawa, Canada)  
*Frequency domain wavepackets for nonlinear optical spectroscopies*
- 11:40-12:15 PM Thorsten Hansen (U. Copenhagen, Denmark)  
*Keldysh contour based approaches to coherent spectroscopy and electron dynamics*
- 12:15-12:30 Final Remarks
- Afternoon Scientific Discussions/ Hike

#### Notes:

- **All talks are 25 minutes plus 10 minutes for discussion.**
- Breakfast is included in the registration fee and will be served at the meeting site from 8:30am-9:00am.
- Lunch/dinner is not provided – a variety of restaurants are locally available.
- Each session will have a coffee break between sets of speakers.
- Any questions about the schedule should be directed to the workshop organizers: Ignacio Franco (ignacio.franco@rochester.edu) or Joel Yuen-Zhou (joelyuen@ucsd.edu).
- Any questions about logistics should be directed to TSRC Director Mark Kozak, (mark@telluridescience.org) 970-708-4426, or for lodging questions to Kristen Redd (kristen@telluridescience.org) 970-708-0827.