Monday Morning January 6 2020

**Plenary Session** Olga Kocharovskaya, Chair

<table>
<thead>
<tr>
<th>Laser/PQE History</th>
<th>Ultrafast Technology and Applications</th>
<th>Optical Control and Entanglement of Quantum Systems</th>
<th>Modern Problems in Quantum Electrodynamics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marlan Scully, Chair</td>
<td>Donna Strickland, Chair</td>
<td>Chris Monroe, Chair</td>
<td>Hakan Türeci, Chair</td>
</tr>
</tbody>
</table>

**7:00**
Continental breakfast

**7:30**
Marlan Scully, *Texas A&M University*, “A Brief History of Quantum Laser Theory”

**8:00**
Donna Strickland, *University of Waterloo*, “From Nonlinear Optics to High-Intensity Laser Physics”

**8:30**
Chris Monroe, *Institute for Quantum Information and Computer Science and University of Maryland*, “Quantum Control of Atomic-Like Systems with Light”

**9:10**
Murray Sargent III, Microsoft, “Growing up with Laser Theory”

**9:30**

**9:50**
Anatoly Svidzinsky, *Texas A&M University*, “Master equation analysis of fluctuations in an interacting Bose gas”

**10:10**
Frank Wise, *Cornell University*, “Spatiotemporal Mode-Locking”

**10:50**
Naomi Halas, *Rice University*, “Nanomaterials and Light for Sustainability and Societal Impact”

**11:20**
Olga Kocharovskaya, *Texas A&M University*, “Quantum Optics with X-rays: Dynamical Control of Resonant Interaction”

**12:00**
Steve Cronin, *University of Southern California*, “Ultrafast Dynamics of Hot Electrons in Photocatalytic Nanostructures: Distinguishing the Influence on Interband and Plasmon Resonances”

**12:20**
Jiming Bao, *University of Houston*, “Production of long-chain hydrocarbons through CO$_2$ photothermal reduction using cobalt nanocrystals”

**12:40**
Emiliano Cortés, *Ludwig-Maximilians-Universität*, “Plasmonic chemical hotspots”

**6:00PM**
Sunday, Jan. 5, Evening Reception in honor of 2020 PQE heroes at Golden Cliff Room
Monday Evening January 6 2020

Plenary Session Alexey Belyanin, Chair

19:00 Vladimir Shalaev, Purdue University, “Plasmonic Metamaterials Meet Quantum”
19:30 Da-Wei Wang, Zhejiang University, “Topological phases of quantized light”
20:00 Gennady Shvets, Cornell University, “Time–Varying Metamaterials: A New Paradigm in Nonlinear and Active Photonics”

Flat Optics

Vladimir Shalaev, Chair

19:00 Vladimir Shalaev, Purdue University, “Plasmonic Metamaterials Meet Quantum”

20:00 Gennady Shvets, Cornell University, “Time–Varying Metamaterials: A New Paradigm in Nonlinear and Active Photonics”

Topological Quantum Optics

Da-Wei Wang, Chair

19:30 Da-Wei Wang, Zhejiang University, “Topological phases of quantized light”

21:10 Bob Boyd, University of Ottawa, “Functionalized metasurfaces on an epsilon-near-zero platform”

21:30 Noah Rubin, Harvard University, “Matrix Fourier optics and compact full-Stokes polarization imaging with metasurfaces”

Designer Metamaterials and Metasurfaces for Nonlinear Optics

Gennady Shvets, Chair

20:50 Jelena Vuckovic, Stanford University, “Inverse Design of large-scale practical photonic circuits”

21:00 Oded Zilberberg, ETH Zurich, “Dimensional reduction, topological pumps, and topological quasicrystals”

21:30 Han Cai, Zhejiang University, “Manipulate the Localization Length of Flatband in Thermal Vapor”

21:50 Pierre Berini, University of Ottawa, “Plasmonic heptamer-arranged nano-hole arrays”

Plasmon-Enhanced Processes

Naomi Halas, Chair

22:00 Ritesh Agarwal, TBA, “TBA”

22:10 Prineha Narang, Harvard University, “Cavity Control of Transformations in Quantum Matter”

22:10 Shunping Zhang, Wuhan University, “Nonlinear Nanophotonics based on Surface Plasmon Polaritons”

22:20 Alessandro Alabastri, Rice University, “Nanoscale heating for macroscale challenges: light harvesting for water desalination”

22:30 Augustine Urbas, Air Force Research Laboratory, “Controlling nonlinear generation via multipolar interference”

22:45 Teri Odom, Northwestern University, “Conformal Quantum Emitters Coupled to Plasmonic Lattices”

23:00 Natalie Lichinitser, TBA, “TBA”

23:10 Hongxing Xu, Wuhan University, “Ultrasensing optical spectroscopy of plasmonic nanocavity”

23:20 Patrice Genevet, Université Côte d’Azur, “Applications and integration of semiconductor-based Metasurfaces”

23:30 Zheng-Wei Zhou, University of Science and Technology of China, “Simulating and manipulating topological physics in photonics synthetic dimensions”

23:45 Gediminas Juzeliunas, Viliaus University, “Geometric phases and spin-orbit coupling for periodically driven systems”

23:55 Hayk Harutyunyan, Emory University, “Nonlinear Chiral Response of Plasmonic Hybrid Metasurfaces”
Tuesday Morning January 7 2020

Plenary Session Weng Chow, Chair

7:00    Continental breakfast

7:30    Peter Nordlander, Rice University, “Plasmon-induced hot carrier generation, relaxation, and applications”
8:00    Amnon Yariv, TBA, “TBA”
8:30    Ernst Rasel, TBA, “TBA”

Active Nanophotonics
Peter Nordlander, Chair

9:10    Arseniy Kuznetsov, Institute of Materials Research and Engineering in Singapore, “Active and tunable dielectric metagratings”
9:30    Koray Aydin, Northwestern University, “Emerging Anisotropic 2D Layered Materials for Photonics, Plasmonics and Polaritonics”
9:50    Jason Valentine, Vanderbilt University, “Compound Metaoptics For Image Processing”
10:10   Alejandro Manjavacas, University of New Mexico, “Analysis of the near and far field produced by plasmonic arrays”
10:30   — Break —
10:50   Peter Zoller, University of Innsbruck and Austrian Academy of Sciences, “Cross–Platform Verification of Intermediate Scale Quantum Devices”
11:20   Warwick Bowen, University of Queensland, “Superfluid thin-film optomechanics: Coherent vortex dynamics, cooling and Brillouin lasing”

Programmable Quantum Simulators and Quantum Sensors
Peter Zoller, Chair

12:00   Adam Kaufman, JILA, “Atom arrays of ultracold strontium: new tools for many-body physics and metrology”
12:40   Mark Saffman, University of Wisconsin–Madison, “Quantum computing in 2D atomic arrays”

Applied Laser Physics
Peter Reithmaier, Chair

10:10   Johann Peter Reithmaier, University of Kassel, “Ultra-Narrow Linewidth of Quantum Dot Distributed Feedback Lasers”
10:30   Gadi Eisenstein, Russel Berrie Nanotechnology Institute, “Resonant and nonresonant tunneling injection in quantum dot gain media”
10:50   John Bowers, University of California Santa Barbara, “Narrow Linewidth Widely Tunable Semiconductor Lasers on Si”
11:10   Kent Choquette, University of Illinois, “Control of Complex Coupling in Microcavity Laser Arrays”
11:30   Jeffrey Lee, Naval Postgraduate School, “Progress toward a magnetically sensitive atom interferometer”
11:50   — Break —
12:10   Jason Valentine, Vanderbilt University, “Compound Metaoptics For Image Processing”
12:30   Albert Nieder, EPFL, “Active and tunable dielectric metagratings”
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Atom Optics and Interferometry I
Ernst Rasel, Chair

10:10   Arnaud Landragin, Universite PSL and Sorbonne Universite, “Accurate rotation rate measurements with cold atom Interferometer”
10:30   Johann Peter Reithmaier, University of Kassel, “Ultra-Narrow Linewidth of Quantum Dot Distributed Feedback Lasers”
10:50   Gadi Eisenstein, Russel Berrie Nanotechnology Institute, “Resonant and nonresonant tunneling injection in quantum dot gain media”
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13:30   Mark Saffman, University of Wisconsin–Madison, “Quantum computing in 2D atomic arrays”

Epsilon-Zero Optics
Howard Lee, Chair

10:10   Eric Mazur, Harvard University, “Extreme optics with zero index metamaterials”
10:30   Andrea Di Falco, University of St. Andrews, “Conformable and nonlinear epsilon near zero metamaterials”
10:50   Yuamnu Yang, Tsinghua University, “Nonlinear Up- and Down-Conversion Using Epsilon-near-zero Materials”
11:20   Zubin Jacob, Purdue University, “Spin-1 Maxwellian Phases of Matter”
11:40   Hong Tang, Yale University, “Integrated photon sources and detectors on \( \chi(2) \) waveguide platform”
11:50   — Break —
12:10   Andrew Weiner, Purdue University, “Frequency Bin Photonic Entanglement: Characterization and Control”
12:30   Zubin Jacob, Purdue University, “Spin-1 Maxwellian Phases of Matter”
12:50   Hong Tang, Yale University, “Integrated photon sources and detectors on \( \chi(2) \) waveguide platform”
Tuesday Evening January 7 2020

Plenary Session Ron Folman, Chair

19:00 Ralf Röhlberger, BESY, “When X-rays go Quantum: From Cavity QED to Quantum Imaging”
19:30 Nikolay Zheludev, University of Southampton and Nanyang Technological University, “Optical super-resolution beyond $\lambda/100$ through artificial intelligence”
20:00 Dana Anderson, ColdQuanta, Inc. and University of Colorado, “Coherent Matterwave Emission from an Atomtronic Transistor Oscillator”

X-ray and Nuclear Quantum Optics
Ralf Röhlberger, Chair

20:50 Jörg Evers, Max Planck Institute for Nuclear Physics, “Towards fast adaptive resonant X-ray optics”

21:10 Lars Bocklage, DESY, “X-ray quantum phase control with transient magnons”


21:50 Joachim von Zanthier, University of Erlangen, “Quantum imaging with incoherently scattered light from Free-Electron Lasers”


Artificial Intelligence and Nanophotonics
Nikolay Zheludev, Chair

Alexandra Boltasseva, Purdue University, “Advancing Photonic Device Design with Machine Learning”

Daniel Brunner, CNRS and FEMTO-ST, “Towards scalable Photonic Neural Networks”

Claudio Conti, National Research Council and University Sapienza, “Wave complexity and computation”

Junsuk Rho, Pohang University of Science and Technology, “Nanophotonics and deep-learning”

Nader Engheta, University of Pennsylvania, “Photonic Mathematics with Metasstructures and Mach-Zehnder Interferometers (MZIs)”

20:00 Dana Anderson/Barry Garraway, Chair

20:50 Mark Edwards, Georgia Southern University, “Mechanism for smooth flow production in atom circuits by stirring”

Malcolm Boshier, Los Alamos National Laboratory, “Atomtronic Rotation Sensors”

Ron Folman, Ben-Gurion University of the Negev, “A T$^3$ Stern-Gerlach matter-wave interferometer on the atom chip”

Barry Garraway, University of Sussex, “Dressing ultra-cold atoms for circuits, shells and lattices”

Jennifer Dionne, TBA, “TBA”

Quantum Photonics
Peter Nordlander, Chair

20:50 Tigran Shahbazyan, Jackson State University, “Transition to strong coupling regime for quantum emitters coupled to a plasmonic resonator”


Javier Aizpurua, San Sebastian (CSIC-UPV/EHU) and DIPC, “Sub-femtosecond Electron Transport in a Nanoscale Gap”

Henry Everitt, U.S. Army Combat Capabilities Development Command Aviation and Missile Center and Duke University, “Widely tunable compact terahertz gas lasers”
### Wednesday Morning January 8 2020

#### Plenary Session George Welch, Chair

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<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>7:00</td>
<td>Continental breakfast</td>
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<tr>
<td>7:30</td>
<td><strong>William Unruh, University of BC and Texas A&amp;M University</strong>, “Time Gravity and Quantum Mechanics”</td>
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<tr>
<td>8:00</td>
<td><strong>Alexei Sokolov, Texas A&amp;M University</strong>, “Applications of molecular coherence — from stand-off detection to nano-sensing — from ultrafast physics to biophotonics”</td>
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<tr>
<td>8:30</td>
<td><strong>Yoshinisa Yamamoto, NTT Research</strong>, “Quantum Neural Network — connecting Quantum and Brain with Optics”</td>
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#### Molecular Coherence Phenomena

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>9:10</td>
<td><strong>Masayuki Katsuragawa, University of Electro-Communications</strong>, “Designing nonlinear optical processes: Attractive route to high resolution laser spectroscopy in the vacuum ultraviolet region”</td>
</tr>
<tr>
<td>9:30</td>
<td><strong>Benjamin Strycker, BRIC and Texas A&amp;M University</strong>, “Stimulated Raman Backscattering Amplification in Plasmas and Gases”</td>
</tr>
<tr>
<td>9:50</td>
<td><strong>Fetah Benabd, Université de Limoges</strong>, “In-fiber gas-phase nanostructuring and dispersion control for non-classical light sources”</td>
</tr>
<tr>
<td>10:10</td>
<td><strong>Volker Deckert, Leibniz Institute of Photonic Technology</strong>, “Plasmon Enhanced Probe Spectroscopies Structural Investigation of Nanoscale Objects”</td>
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<td>10:30</td>
<td><strong>Deniz Yavuz, Chair</strong></td>
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#### 2-D Materials

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<tr>
<td>9:10</td>
<td><strong>Susanne Yelin, University of Connecticut and Harvard</strong>, “Quantum-level applications of 2D dipole arrays”</td>
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<tr>
<td>9:30</td>
<td><strong>Alexey Belyanin, Texas A&amp;M University</strong>, “Optical Hall effect and extreme anisotropy of surface polaritons in Weyl semimetals”</td>
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<td>9:50</td>
<td><strong>Dimitri Voronine, University of South Florida</strong>, “Quantum Biosensing with 2D Materials”</td>
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<td>10:10</td>
<td><strong>Jha Pankaj, California Institute of Technology</strong>, “Building a Quantum Hardware with Color Centers in Atomically Thin Crystals”</td>
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<td>10:30</td>
<td><strong>Frank Narducci, Chair</strong></td>
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#### Architectures and Materials for Photonic Networks

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<tr>
<td>9:10</td>
<td><strong>Helmut Katzgraber, Microsoft</strong>, “Quantum-driven classical optimization”</td>
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<td>9:30</td>
<td><strong>Ryan Hammerly, MIT</strong>, “Towards Large-Scale Photonic Accelerators for Deep Learning”</td>
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<td>9:50</td>
<td><strong>Marty Fejer, Stanford University</strong>, “Ultrabroadband Nonlinear Optics in Nanophotonic Periodically Poled Lithium Niobate Waveguides”</td>
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<td>10:10</td>
<td><strong>Matthew Pelton, University of Maryland</strong>, “Coupled Quantum-Dot/Plasmonic Nanoparticle Assemblies for Low-Power Optical Nonlinearities”</td>
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<td>10:30</td>
<td><strong>Mark Havey, Old Dominion University</strong>, “Raman Scattering and Atom Counting in Cold Rubidium Gas”</td>
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#### Atom Optics and Interferometry II

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<tbody>
<tr>
<td>9:10</td>
<td><strong>Frank Narducci, Naval Postgraduate School</strong>, “Asymmetry and coherence in continuous-beam atom interferometers”</td>
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<td>9:30</td>
<td><strong>Zhifan Zhou, Ben-Gurion University of the Negev</strong>, “An experimental test of the geodesic rule proposition for the non-cyclic geometric phase”</td>
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<tr>
<td>9:50</td>
<td><strong>Michael Maniccia, Naval Postgraduate School</strong>, “Dual continuous cold atom beam accelerometer/gyroscope”</td>
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#### Quantum Physics

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<tr>
<td>12:00</td>
<td><strong>Mikhail Lukin, Harvard University</strong>, “New frontier of quantum science and engineering”</td>
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<td>12:20</td>
<td><strong>Luiz Davidovich, Federal University of Rio de Janeiro</strong>, “Quantum Metrology of Open Systems: Exact solutions”</td>
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<td>12:40</td>
<td><strong>János Bergou, Hunter College of the City University of New York</strong>, “90 years after the Bohr-Einstein debate: Complementarity revisited”</td>
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<td>12:50</td>
<td><strong>Giacomo Torlai, TBA</strong>, “Enhancing quantum simulators with neural networks”</td>
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#### Quantum Optics with X-rays III

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<tr>
<td>12:00</td>
<td><strong>David Reis, Chair</strong></td>
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<tr>
<td>12:20</td>
<td><strong>Barry Walker, University of Delaware</strong>, “Ultrafast K-shell Hole Creation from Strong and Ultrafast Laser REsattering: optimized Wavelength and Intensity Yields for Lithium to Uranium”</td>
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<tr>
<td>12:40</td>
<td><strong>Wen-Te Liao, National Central University</strong>, “Control and production of nuclear excitations, from free space to a cladding x-ray waveguide”</td>
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<td>12:50</td>
<td><strong>Uwe Thumm, Kansas State University</strong>, “Ro-vibrational dynamics and stabilization of laser-excited O₂⁺”</td>
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#### Nonlinear optics and optical frequency combs in microresonators

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<tr>
<td>12:00</td>
<td><strong>Tobias Kippenberg, EPFL</strong>, “Photonic-chip based soliton microcombs”</td>
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<td>12:20</td>
<td><strong>Xinhao Li, Massachusetts Institute of Technology</strong>, “Modeling Colloidal-Quantum-Dot Plasmonic Laser as Excitable Spike Neuron”</td>
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<td>12:40</td>
<td><strong>Zhenrong Zhang, Baylor University</strong>, “Nano-focusing of light with optical fiber-plasmonic hybrid probe”</td>
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#### Novel Optics

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<td>12:00</td>
<td><strong>Jian Zi, Fudan University</strong>, “Bound states in-the-continuum in periodic photonic systems: observations and polarization-state manipulations”</td>
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<tr>
<td>12:20</td>
<td><strong>Zhenguo Zheng, Nanjing University</strong>, “Bound states in the continuum in periodic photonic systems: observations and polarization-state manipulations”</td>
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<td>12:40</td>
<td><strong>Eugeniy Mikhailov, William &amp; Mary University</strong>, “Tuning laser frequency response from low to high with dispersion”</td>
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Wednesday Evening January 8 2020

Plenary Session Václav Špička, Chair

19:00 Mercedeh Khajavikhan, TBA, “TBA”
19:30 Hui Cao, Yale University, “Physics and Application of Complex Lasers”
20:00 Jorge Rocca, Colorado State University, “Relativistic nanophotonics: creating extreme plasma conditions and fields with ultrafast lasers”

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<tr>
<td>20:50</td>
<td>Markus Lindemann</td>
<td>Rhur-University Bochum</td>
<td>“Ultrafast Spin-Lasers”</td>
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<tr>
<td>21:10</td>
<td>Hui Deng</td>
<td>University of Michigan</td>
<td>“Coherent Light-Matter Interactions in 2D Semiconductors”</td>
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<tr>
<td>21:30</td>
<td>Alejandro Yacomotti</td>
<td>Université Paris</td>
<td>“Towards few photon bifurcations in coupled nanolasers”</td>
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<tr>
<td>21:50</td>
<td>Stephan Reitzenstein</td>
<td>Technische Universität Berlin</td>
<td>“Micropillar Lasers with Site-controlled Quantum Dots as Active Medium”</td>
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<td>22:10</td>
<td>Weng Chow</td>
<td>Sandia National Laboratories</td>
<td>“Mode locking in a single-section semiconductor laser: theory and experiment”</td>
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Physics of Semiconductor Nanolasers
Mercedeh Khajavikhan, Chair

Physics and Applications of Complex Lasers
Hui Cao, Chair

Ultra-Intense Laser/Matter Int + X-ray Lasers
Jorge Rocca, Chair

Harris Fest: Current Research by Steve’s Former Students
Alexei Sokolov, Chair

20:50 Ortwin Hess, Imperial College London and Trinity College Dublin, “Spatio-Temporal Near-Field and Multi-Mode Dynamics of Large-Area and Disordered Semiconductor Lasers”

21:10 Marc Sciamanna, CentraleSupélec, “Collective dynamics of semiconductor laser modes”

21:30 Fan-Yi Lin, National Tsing Hua University, “Generations of chaos-modulated pulses for 3D pulsed chaos lidars”

21:50 Delphine Woltersberger, Centrale-Supélec, “Emerging applications from photorefractive nonlinear photonics”

22:10 Simon Mahler, Weizmann Institute of Science, “Solving combinatorial problems with coupled lasers”

Carmen Menoni, Colorado State University, “Optical interference coatings for high performance peta-watt class lasers”

Cameron Geddes, Lawrence Berkeley National Laboratory, “Compact ultrafast accelerators and photon sources using laser-plasma acceleration”


21:50 Matthias Fuchs, University of Nebraska–Lincoln, “Enhanced performance and controllability of compact laser-driven high-brightness X-ray sources”

22:10 Hui Deng, University of Michigan, “Coherent Light-Matter Interactions in 2D Semiconductors”

22:10 Weng Chow, Sandia National Laboratories, “Mode locking in a single-section semiconductor laser: theory and experiment”
Thursday Morning January 9 2020

7:00 Continental breakfast

Plenary Session Frank Narducci, Chair

7:30 Gershon Kurizki, Weizmann Institute of Science, “Machines Powered by Heat and Information: Is Quantumness an Advantage?”

8:00 Federico Capasso, Harvard University, “Multifunctional Flat Optics: High Performance Components to Cameras”

8:30 Wolfgang Schleich, Universität Ulm, “Hawking radiation and the logarithmic phase singularity”

Quantum Thermodynamic Machines
Gershon Kurizki, Chair

9:10 Özgür Müstecaplıoğlu, Koç University, “Quantum Fules for Quantum Machines”

9:30 Nir Bar-Gill, Hebrew University, “Enhanced polarization transfer and many-body dynamics in spin ensembles in diamond”

9:50 Fred Jendrzejewski, Universität Heidelberg, “Quantized refrigerator for an atomic cloud”

10:10 Eilon Poem, Weizmann Institute of Science, “Experimental demonstration of quantum effects in the operation of microscopic heat engines”

10:50 Mark Raizen, University of Texas, “Zooming in on Brownian Motion with Einstein’s Speed Demon”

11:20 Chao-Yang Lu, University of Science and Technology of China, “Scalable photonic quantum technologies”

Measurement of Physical Forces on the Nanoscale
Mark Raizen, Chair

12:00 Paulo Maia Neto, Universidade Federal do Rio de Janeiro, “Probing the screening of the Casimir interaction with optical tweezers”

12:20 Giorgio Gratta, Stanford University, “Measuring gravity at short distances and other fun tricks with levitated microspheres”

12:40 Jeremy Munday, University of California, “Casimir forces and torques”

Photonic Quantum Computing
Chao-Yang Lu, Chair

12:00 Richard Warburton, TBA, “TBA”

12:20 Glenn Solomon, TBA, “TBA”

12:40 Li-Ping Yang, Purdue University, “Single-Photon Detection Using Quantum Phase Transitions”

Open Systems

Yuri Rostovtsev, Chair

12:00 Václav Špicka, Academy of Sciences of the Czech Republic, “Dynamics of open systems and quantum transport theory”

12:20 Peter Keefe, University of Detroit Mercy, “Thermodynamics of Mesoscopic Superconductors”

12:40 Roland Allen, Texas A&M University, “An ideal dark matter scenario and the experimental evidence supporting it”

Optical Resonators: Physics and Applications

12:00 Frank Vollmer, University of Exeter, “Single-Molecule Sensing: Light waves meet molecular machines”

12:20 Tal Carmon, TBA, “TBA”

12:40 Lan Yang, Washington University, “Explore Chiral Modes at Exceptional Points in Whispering-Gallery-Mode Resonators”

MetaQuantum
Federico Capasso, Chair

9:10 Mark Brongersma, TBA, “TBA”

9:30 Xingjie Ni, Pennsylvania State University, “Nonreciprocal Light Propagation with a Time-Varying Metasurface”

9:50 Marko Lončar, Harvard University, “Photonic and Phononic Interfaces for Diamond Spin Qubits”

10:10 Andrea Alu, TBA, “TBA”

10:50 Mark Raizen, Chair

12:00 Richard Warburton, TBA, “TBA”

12:20 Glenn Solomon, TBA, “TBA”

12:40 Li-Ping Yang, Purdue University, “Single-Photon Detection Using Quantum Phase Transitions”

Quantum Thermodynamic Machines
Gershon Kurizki, Chair

10:10 Xingjie Ni, Pennsylvania State University, “Nonreciprocal Light Propagation with a Time-Varying Metasurface”

10:30 Fred Jendrzejewski, Universität Heidelberg, “Quantized refrigerator for an atomic cloud”

10:50 Andrea Alu, TBA, “TBA”

11:20 Chao-Yang Lu, University of Science and Technology of China, “Scalable photonic quantum technologies”

Atom Optics and Interferometry III
Wolfgang Schleich, Chair

10:10 Nacer Gaaloul, Leibniz University of Hanover, “Atom optics experiments in space with the Cold Atom Laboratory facility”

10:30 Matthias Meister, Ulm University, “The Space Atom Laser: An isotropic source for ultracold atoms aboard the International Space Station”

10:50 Robin Côté, University of Massachusetts Boston, “Rydberg electrons as a sensitive probe”

11:20 Peter Keefe, University of Detroit Mercy, “Thermodynamics of Mesoscopic Superconductors”

12:00 Frank Vollmer, University of Exeter, “Single-Molecule Sensing: Light waves meet molecular machines”

12:20 Tal Carmon, TBA, “TBA”

12:40 Lan Yang, Washington University, “Explore Chiral Modes at Exceptional Points in Whispering-Gallery-Mode Resonators”

Rydberg Physics with Applications to Quantum Information Science
Svetlana Malinovskaya, Chair

10:10 Ozgur Mустецаплиоѓу, Koç University, “Quantum Fules for Quantum Machines”

10:30 Nir Bar-Gill, Hebrew University, “Enhanced polarization transfer and many-body dynamics in spin ensembles in diamond”

10:50 Fred Jendrzejewski, Universität Heidelberg, “Quantized refrigerator for an atomic cloud”

11:20 Chao-Yang Lu, University of Science and Technology of China, “Scalable photonic quantum technologies”

12:00 Paulo Maia Neto, Universidade Federal do Rio de Janeiro, “Probing the screening of the Casimir interaction with optical tweezers”

12:20 Giorgio Gratta, Stanford University, “Measuring gravity at short distances and other fun tricks with levitated microspheres”

12:40 Jeremy Munday, University of California, “Casimir forces and torques”

10:30 — Break —

Plenary Session Luiz Davidovich, Chair

10:50 Mark Raizen, Chair

11:20 Chao-Yang Lu, University of Science and Technology of China, “Scalable photonic quantum technologies”

Measurement of Physical Forces on the Nanoscale
Mark Raizen, Chair

12:00 Richard Warburton, TBA, “TBA”

12:20 Glenn Solomon, TBA, “TBA”

12:40 Li-Ping Yang, Purdue University, “Single-Photon Detection Using Quantum Phase Transitions”

Open Systems

12:00 Yuri Rostovtsev, Chair

12:20 Václav Špicka, Academy of Sciences of the Czech Republic, “Dynamics of open systems and quantum transport theory”

12:40 Peter Keefe, University of Detroit Mercy, “Thermodynamics of Mesoscopic Superconductors”

Optical Resonators: Physics and Applications

12:00 Frank Vollmer, University of Exeter, “Single-Molecule Sensing: Light waves meet molecular machines”

12:20 Tal Carmon, TBA, “TBA”

12:40 Lan Yang, Washington University, “Explore Chiral Modes at Exceptional Points in Whispering-Gallery-Mode Resonators”
Thursday Evening January 9 2020

Plenary Session Vanderlei Bagnato, Chair

19:00 Mete Atature, TBA, “TBA”
19:30 Ren-Bao Liu, The Chinese University of Hong-Kong, “Quantum Sensing, sensing quantum”
20:00 Ron Folman, Ben-Gurion University of the Negev, “TBA”

20:50 Janik Wolters, German Aerospace Center, “Vapor Cell memories for single photons”
21:10 Florian Katsch, Technische Universität Berlin, “Theory of ultrafast excitonic dynamics in TMDCs: Exciton scattering induced dephasing and pump-probe spectroscopy”
21:30 Marcelo Davanco, NIST, “Heterogeneous integrated silicon photonic circuits with deterministically fabricated single quantum dot single-photon sources”
21:50 Frank Jahnke, University of Bremen, “Quantum-dot-like states and excited-carrier effects in atomically thin transition metal dichalcogenide semiconductors”
22:10 Yue Luo, Harvard University, “Plasmonic cavity enhanced single photon emission from low-dimensional materials”

Semiconductor Quantum Optics
Mete Atature, Chair

Diamond Quantum Sensing
Quan Li, The Chinese University of Hong Kong, “Measuring soft matters using nanodiamond based orientation sensing”
Peter Maurer, The University of Chicago, “Diamond quantum nanosensors for probing complex biological processes”
Jean-François Roch, TBA, “TBA”
Philip Hemmer, Texas A&M University, “Color-center engineering in diamond”
David Simpson, University of Melbourne, “Bio-Sensing and imaging with diamond quantum probes”

Quantum Informatics
Ron Folman, Chair

Peter Drummond, Swinburne University of Technology, “Dynamics of cat-states and quantum tunneling in quantum circuits”
Vanderlei Bagnato, University of São Paulo, “Turbulent BEC: Demonstration of Nonthermal States and Universal Scaling Properties”
Vladimir Malinovsky, US Army Research Laboratory, “Universal pulse shapes of beam splitter and mirror for arbitrary large area atom interferometer”
Alexey Akimov, Texas A&M University, “Toward quantum simulation with Thulium atom”
Barnabas Kim, Texas A&M University, “Correlation inside Canonical Ensemble through the investigation on Ideal Bose Gas”

Atom Optics and Interferometry IV
Wolfgang Schleich, Chair

Lisa Wörner, University of Bremen, “Quantum Gases Aboard the ISS-the BECCAL Project”
Denys Bondar, Tulane University, “When is it easier for a quantum particle to tunnel through than to fly above a barrier?”
Gary Rozenman, Tel-Aviv University, “Black Hole Physics, Kennard Phase and Surface Gravity Water Waves”
Paulo Nussenzveig, Universidade de São Paulo, “Challenging conventional wisdom with Optical Parametric Oscillators”
Philippe Bouyer, CNRS–IOGS, “Atom interferometry for advanced geodesy and gravitational wave observation”
Friday Morning January 10 2020

Plenary Session Peter Keefe, Chair

7:00 Continental breakfast

7:30 Paul Corkum, University of Ottawa, “Combining vector beams and coherent control to generate large THz magnetic field transients”

8:00 Leonid Butov, University of California at San Diego, “Condensation of indirect excitons”

8:30 Franco Nori, RIKEN and University of Michigan, “Quantum Nonlinear Optics without Photons, how to excite two or more atoms simultaneously with a single photon, and other unusual properties of ultra-strongly-coupled QED systems.”

Controlling Light to Control Materials
Paul Corkum, Chair

9:10 Peter Hommelhoff, Universität Erlangen, “Ultrafast physics in graphene and across graphene-SiC interface”

9:30 Shima Mirzaeimoghader, University of Central Florida, “Symmetry and High Harmonic Generation from Crystalline Solids”

9:50 Giulio Vampa, SLAC National Accelerator Laboratory, “Beating absorption in solid-state high harmonics”

10:10 Ravi Bhardwaj, University of Ottawa, “Spatially controlled nanostructuring of silicon with light”

10:30 — Break —

10:50 Girish Agarwal, Texas A&M University, “Magnons: New Platform for Quantum Optics and Quantum Information Science”

11:20 Harry Atwater, California Institute of Technology, “Laser Lightsails”

Macroscopic Magnon Systems
Girish Agarwal, Chair

Can-Ming Hu, University of Manitoba, “Unidirectional Invisibility in Cav-ity Magnonics”

12:00

Yasunobu Nakamura, University of Tokyo and RIKEN Center for Emergent Matter Science, “Quantum magnonics in a millimeter-scale ferromagnetic sphere”

12:20

Michael E. Tobar, University of Western Australia, “Implementations of Cavity-Magnon Polariton Systems: from Ultra Strong Coupling to Applications in Precision Measurement and Fundamental Physics”

12:40

Mikhail Kats, University of Wisconsin-Madison, “Engineering of optical forces and thermoregulation of laser sails for light spacecraft”

Radiation Pressure Manipulation and Propulsion
Harry Atwater, Chair

Grover Swartzlander, Rochester Institute of Technology, “Radiation Pressure and Beam Riding with a Space Variant Grating”

Kevin Webb, Purdue University, “Enhanced Optical Force with Nanostructured Material”

12:00

Yuri Rostovtsev, University of North Texas, “A novel resonant single frequency molecular detection with high sensitivity and selectivity for gas mixtures”

Narangerel Altangerel, Texas A&M University, “Applied Raman spectroscopy: Analyzing animal characteristics by their feces”

Zhong Zhang, Texas A&M University, “Quantum cooperativity in Living Matter”

Novel Detection Systems
Fu-Li Li, Chair

Yuri Rostovtsev, University of North Texas, “A novel resonant single frequency molecular detection with high sensitivity and selectivity for gas mixtures”

Narangerel Altangerel, Texas A&M University, “Applied Raman spectroscopy: Analyzing animal characteristics by their feces”

Zhong Zhang, Texas A&M University, “Quantum cooperativity in Living Matter”

Quantum Sensors for Fundamental Physics
Kater Murch, Chair

Shimon Kolkowitz, University of Wisconsin – Madison, “Searching for new physics with differential optical lattice clock comparisons”

Igor Pikovski, Stockholm University and Stevens Institute of Technology, “Quantum optics in the presence of time dilation”

Andrew Jayich, UC Santa Barbara, “Radium: a platform for precision measurement”
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<tr>
<th>Time</th>
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<td>University of S˜ao Paulo</td>
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**Quantum mechanics in curved and living platforms**

- William Unruh, Chair
- Jonathan Ben-Benjamin, Texas A&M University, “The Unruh and Moore effects, and equivalence between accelerating frames”
- Arash Azizi, Texas A&M University, “TBA”
- Tuguldur Begzjav, Texas A&M University, “TBA”
- TBA, TBA, “TBA”
- TBA, TBA, “TBA”

**Non-Classical Biophysics and Imaging**

- Leonid Krivitsky, Institute of Materials Research and Engineering, “Infrared metrology with visible light”
- Konstantin Dorfman, East China Normal University, “Four-wave mixing spectroscopy with squeezed light”
- Joel Bixler, TBA, “TBA”
- Wolfgang Losert, TBA, “TBA”

**Quantum Molecular Physics**

- Shaul Mukamel, Chair
- Christian Bressler, European XFEL, “Femtosecond X-Ray Experiments at European XFEL”
- Wei Xiong, UC San Diego, “Ultrafast Nonlinear Dynamics and Coupling between Molecular Polaritons in Different Cavities”
- Pavel Polynkin, The University of Arizona, “Spectral interference in short-wave and mid-wave infrared laser filaments in gases”
- Luca Argenti, University of Florida, “Circular Holographic Ionization-Phase Meter”

**Coherent and Enhanced AMO**

- Anatoly Svidzinsky, Chair
- Zhenhuan Yi, Texas A&M University, “Enhancing Coherent Anti-Stokes scattering with IR”
- Yogesh Patil, TBA, “Measuring the Topological Structure Around a Triple Exceptional Point”
- Zhe He, Texas A&M University, “Tip enhanced chemical mapping of DNA/RNA at single-molecule resolution”
- Maria Shutova, Texas A&M University, “Nanoantennas for chiral single-molecule spectroscopy”
- Kai Wang, Texas A&M University, “Studies of Atomic Hydrogen Superfluorescence in Flames Using Femtosecond Pump-Probe Spectroscopy”