Monday Morning January 10 2022

7:00 **Continental breakfast** [Ballroom 1+2]

Plenary Session [Ballroom 1+2] Olga Kocharovskaya, Chair

7:30 **Marlan Scully**, *Texas A&M University*, "Unruh Acceleration and Hawking Black Hole Radiation from a Quantum Optics Perspective"

8:00 **Mikhail Lukin**, *Harvard University*, "Exploring New Scientific Frontiers Using Programmable Quantum Simulators"

8:30 **Dana Anderson**, *JILA/University of Colorado*, "Coherent Matterwaves and Resonant Matterwave Interferometry"

	Quantum Optics in Curved Space-Time Ballroom 1 Marlan Scully, Chair	*Quantum Simulators and Applications* Magpie A Mikhail Lukin, Chair	*Quantum Signal Processing with Atoms* Magpie B Dana Anderson, Chair	*Photonic Materials and Structures* Wasatch A Alexei Sokolov, Chair
9:10	**William Unruh**, *Texas A&M University/University of British Columbia*, "Toward the Measurement of the Acceleration Thermal Effect in a BEC"	**Shimon Kolkowitz**, *University of Wisconsin, Maddison*, "Precision Measurements with a Multiplexed Strontium Optical Lative Clock"	**Luigi Amico**, *Technology Innovation Institute, Abu Dhabi*, "Attracting Quantum Many-Body Systems in Atomtronic Ring Circuits"	**Philip Russell**, *Max-Planck Institute for the Science of Light, Erlangen, Germany*, "Optomechanical synchronization in harmonically mode-locked photonic crystal fibre lasers"
9:30	**Anatoly Svidzinksy**, *Texas A&M University*, "Unruh & Cherenkov Radiation from a Negative Frequency Perspective"	**Jeff Thompson**, *Princeton University*, "Towards quantum computing with ^{171}Yb arrays"	**Malcolm Boshier**, *Los Alamos National Laboratory*, "A Moving Waveguide Sagnac Atom Interferometer Gyro"	**Fetah Benabid**, *Universite de Limoges, Limoges, France*, "Inhibited-Coupling Guiding Hollow Core PCF Enabled PUlse Compression and Optical Waveform Synthesis"
9:50	**Janathan Ben-Benjamin**, *Texas A&M University*, "Wedge Entanglement from Rindler to Kruskal"	**Hannes Pichler**, *University of Innsbruck*, "Entanglement-Optimal Trajectories of Many-Body Quantum Markov Processes"	**Charles Clark**, *NIST/University of Maryland*, "Stirring, Shocking, Quantum and Thermal Fluctuations in Atom Circuits"	**Nanfang Yu**, *Columbia University*, "Wavelength-Selective, Nonlocal Metasurfaces for Active Wavefront Shaping"
10:10	**Arash Azizi**, *Texas A&M University*, "Unruh Radiation and Causality"	**Murray Holland**, *JILA, University of Colorado*, "Using Machine Learning for the Quantum Design of a Matter-Wave Interferometer"	**Shengwang Du**, *University of Texas, Dallas*, "All-Optical Neural Networks with Nonlinear Activation Functions"	**Howard Lee**, *UC Irvine*, "Active Zero-Index Photonics in Planner and Optical Fiber Platforms"

10:30 — Break —

Plenary Session [Ballroom 1+2] Anatoly Svidzinsky, Chair

10:50 **Hui Cao**, *Yale University*, "Tailoring Micro-Laser Dynamics for Parallel Ultrafast Random Bit Generation"

11:20 **Olga Kocharovskaya**, *Texas A&M University*, "Quantum Nucleonics: Quantum Optics with Ultra-Narrow Nuclear Resonances"

	In Memory of Richard Chang Ballroom 1 Hui Cao, Chair	*Quantum Nucleonics* Magpie A Olga Kocharovskaya, Chair	*Atomic Interferometry* Magpie B Svetlana Malinovskaya, Chair	*Novel Quantum Optics* Wasatch A Lan Yang, Chair
12:00	**Douglas Stone**, *Yale University*, "Chaotic Micro-Cavities and Micro-Lasers: an Overview After 25 Years"	**Peter Thirolf**, *Ludwig Maximilian University*, "Development of a $^{229\mathrm{m}}$Th Nuclear Clock: Status and Perspectives for a Unique Quantum Sensor"	**Ron Folman**, *Ben-Gurion University of the Negave*, "Matter-wave interferometers on the atom chip"	**Lan Yang**, *Washington University*, "Opportunities of High-Quality Photonic Resonators for Sensing Applications"
12:20	**Yongle Pan**, *Army Research Laboratory*, "Optical-Trap Laser Spectroscopic Technologies for Single-Particle Detection and Characterization"	**Dmitry Budker**, *Helmholtz Institute, Mainz*, "Physics opportunities with the Gamma Factory"	**Frank Narducci**, *Naval Postgraduate School*, "A T^3 atom interferometer"	**Weidong Zhou**, *University of Texas, Arlington*, "Complete 2π-Phase Control by Photonic Crystal Slabs"
12:40	**Andrew Poon**, *Hong Kong University of Science and Technology*, "Micro-Cavity Optics in Silicon Photonics"	**Sharon Shwartz**, *Bar-Ilan University*, "Chemical element mapping by x-ray ghost fluorescence"	**Vladminir Malinovsky**, *US Army Research Laboratory*, "Optical Control for Cold-Atom Quantum Metrology"	**Pavel Polynkin**, *University of Arizona*, "Mid-Wave and Long-Wave Infrared Ultrashort-Pulse Laser Filamentation in Gases"

Monday Evening January 10 2022

Plenary Session [Ballroom 1+2] Alexey Belyanin, Chair

19:00 **Yoshihisa Yamamoto**, *NTT Research Inc.*, "Recent Progress in Coherent Ising Machines (CIMs)"
19:30 **Naomi Halas**, *Rice University*, "Computational Chromatography"
20:00 **Alexei Sokolov**, *Texas A&M University*, "Coherent Vibrational Spectroscopy as a Tool for Biophotonics"

	Physics of Light-Matter Interactions Ballroom 1 Yoshihisa Yamamoto, Chair	*Frontiers in Nanophotonics I* Magpie A Naomi Halas, Chair	*Biophotonics* Magpie B Alexei Sokolov, Chair	*Quantum Nucleonics* Wasatch A Olga Kocharovskaya, Chair
20:50	**Edo Waks**, *University of Maryland*, "Generating Strong Interaction Between Photons and Spin Using Nano-Photonics"	**Jennifer Dionne**, *Stanford University*, "Driving Energetically Unfavorable Reactions with Bimetallic Plasmon Catalysis"	**Zhenhuan Yi**, *Texas A&M University*, "Towards Tip-enchanced Low Frequency Raman"	**Donald Umstadter**, *University of Nebraska, Lincoln*, "Nonlinear Scattering of Extreme Light"
21:10	**Kai-Mei Fu**, *University of Washington*, "ZnO Donors in Nano-Structures: Spin Relaxation, Coherence and the Isolation of Single Donors"	**Nicolas Large**, *University of Texas, San Antonio*, "Plasmon-Phonon Interaction and Acoustic Raman Scattering of Plasmonic Nanoparticles"	**Felipe Guzman**, *Texas A&M University*, "Optomechanical Inertial Sensors and Precision Measurements"	**Yuri Shvyd'ko**, *Argonne National Laboratory*, "X-ray cavities for cavity based x-ray free-electron lasers"
21:30	**Na Young Kim**, *Waterloo University*, "Where a Photon Meets an Exciton: Micro-Cavity Exciton-Polariton"	**Steve Cronin**, *University of Southern California*, "Hot Electron-Driven Catalysis via Local Plasma Discharge and Plasmon-Resonant Nanostructures"	**Dzmitry Kurouski**, *Texas A&M University*, "Plasmon-Driven Chemistry on Mono and Bimetallic Nanostructures"	**Kai Li**, *Argonne National Laboratory*, "Propagation Induced Pulse Reshaping for X-Rays"
21:50	**Peter McMahon**, *Cornell University*, "Photonic Neural Networks Using Linear and Nonlinear Optics"	**Teri Odom**, *Northwestern University*, "Symmetry Effects in Plasmonic Nanoparticle Superlattices"	**Sergey Polyakov**, *National Institute of Standards and Technology*, "Faint-Light Biophonics"	**David Reis**, *Stanford PULSE Institute*, "Ultrafast x rays reveal a novel photo-induced lattice instability"
22:10	**Mike Fraser**, *NTT Research & RIKEN*, "Optically Driving Exciton-Polariton Condensate Dynamics With Microwave Modulation"	**Jason Valentine**, *Vanderbilt University*, "Dynamic Electrochemically Actuated Metasurfaces"	**Volker Deckert**, *Leibniz-Institut für Photonishce Technologien and Freidrich-Schiller Universität Jena*, "Prospect of Individual Virus Identification Based on Optical and Non-Optical Scanning Probe Techniques"	**Wen-Te Liao**, *National Center University, Taiwan*, "Time-Delayed Magnetic Control and Narrowing of X-Ray Frequency Spectra in Two-Target Nuclear Forward Scattering"

Tuesday Morning January 11 2022

7:00 **Continental breakfast** [Ballroom 1+2]

Plenary Session [Ballroom 1+2] Joachim von Zanthier, Chair

7:30 **Ralf Rohlsberger**, *DESY, Hamburg*, "Incoherent Nuclear Diffractive Imaging"
8:00 **Marko Loncar**, *Harvard University*, "Lithium Niobate Quantum and Nonlinear Photonics"
8:30 **John Bowers**, *University of California, Santa Barbara*, "Milli-Hertz Lorentizan Linewidth Self Injection Locked DFB Lasers"

	X-Ray Quantum and Nonlinear Optics	*Meta-Quantum*	*Advanced Concepts in SC Nano-Structured Semiconductor Lasers*	*Flat-Optics Generation of Quantum Light*
	Ballroom 1 Ralf Rohlsberger, Chair	Magpie A Marko Loncar, Chair	Magpie B John Bowers, Chair	Wasatch A Maria Chekhova, Chair
9:10	**Joachim von Zanthier**, *University of Erlangen-Nuremberg*, "Super-Radiance in Free Space With X-Rays"	**Andrea Alu**, *CUNY*, "Quantum Metamaterials and Meta-surfaces"	**Johann Peter Reithmaier**, *Kassel University*, "InP-Based Quantum Dot Gain Material for Heterogenerous and Monolithic Integration in the 1.3–1.6 Micro-Meter Wavelength Range"	**Maria Chekhova**, *Max-Planck Institute for the Science of Light*, "Photon Pairs from Resonant Meta-Surfaces"
9:30	**Christina Boemer**, *DESY, Hamburg*, "Imaging the X-Ray Parametric Conversion Cone and Observing Indications of Light-Matter Hybridization"	**Mark Brongersma**, *Stanford University*, "Dynamic Quantum Meta-surfaces Based on van der Waals Materials"	**Gadi Eisenstein**, *Technion*, "Quantum Coherent Revival in Room Temperature Quantum Dot Ensembles"	**Pramey Upadhyaya**, *Purdue University*, "Quantum Spin-Magnon-Optics: A Hybrid Platform for Quantum Sensing/Information Processing With Color Centers"
9:50	**Jorg Evers**, *MPI for Nuclear Physics, Heidelberg*, "Inverse Design of Artifical Few-Level Systems With Mossbauer Nuclei in X-Ray Cavities"	**Andrei Faraon**, *Caltech*, "Quantum Photonic Devices Based on Rare Earth Ions"	**Jesper Mork**, *Danish Technical University*, "Narrow-Linewidth Fano Laser Exploiting a Bound State in the Continuum"	**Zhipei Sun**, *Aalto University, Finland*, "2D Materials Based Nonlinear Optics for Quantum Photonics"
10:10	**Lars Bocklage**, *DESY, Hamburg*, "Dynamic Magnetic Control of Nuclear Timed Dicke States"	**Valdimir Shalaev**, *Purdue University*, "Hybrid Quantum Photonics"	**Ken Choquette**, *University of Illinois*, "Exploiting Non-Hermitian Microcavity Laser Dynamics"	**Polina Vabishchevich**, *NIST*, "Semiconductor-Based Meta-Surfaces: Optical Nonlinearities and Emission Control"

10:30 — Break —

Plenary Session [Ballroom 1+2] Marco Loncar, Chair

10:50 **Harry Atwater**, *Caltech*, "Metastructures for Dynamic Wavefront Manipulation"
11:20 **Susanne Yelin**, *Harvard University*, "Quantum Optics and Applications with Cooperative 2D Arrays"

	Metastructures for Dynamic Wavefront Manipulation	*New Applications of Quantum Optical Systems*	*Quantum Dynamical Systems*	*Novel Quantum Optics*
	Ballroom 1 Harry Atwater, Chair	Magpie A Susanne Yelin, Chair	Magpie B Alexey Belyanin, Chair	Wasatch A Alexey Akimov, Chair
12:00	**Hossein Mosallaei**, *Northeastern University*, "Time Modulation of Metasurfaces"	**Matteo Mitrano**, *Harvard University*, "Ultrafast manipulation of electronic interactions in quantum materials"	**Alexey Belyanin**, *Texas A&M University*, "Quantum Dynamics of Open Strongly-Coupled Many-Qubit Systems in Dissipative Cavities"	**John Howell**, *Hebrew University of Jerusalem*, "Do We Really Understand the Gryoscope?"
12:20	**Arka Majumdar**, *University of Washington*, "Software-Define Optics"	**Mihir Bhaskar**, *Harvard University*, "Diamond nanophotonic quantum networks"	**Alejandro Rodriguez**, *Princeton University*, "Physical bounds on nanophotonic systems"	**Gerd Leuchs**, *Max Planck Institute, Erlangen*, "Concentrating light to the extreme"
12:40	**Lisa Poulikakos**, *University California, San Diego*, "Colorimetric Metasurfaces Shed Light on Fibrous Biological Tissue"	**Ephraim Shahmoon**, *Weizmann Institute*, "Multi-channel waveguide QED with atomic arrays in free space"	**Hakan Tureci**, *Princeton University*, "Reservoir Computing Using Finitely Sampled Quantum"	**Alexander Lvovsky**, *Oxford University*, "Superresolution linear optical imaging in the far field"

Tuesday Evening January 11 2022

Plenary Session [Ballroom 1+2] Alexei Sokolov, Chair

19:00 **Alejandro Manjavacas**, *University of New Mexico and Instituto de Optica-CSIC*, "Long-Range Dipole-Diple Coupling Mediated by Lattice Resonances in Nanoparticle Arrays"
19:30 **Eugene Demler**, *ETH, Zurich*, "Universality of optical responses of photoexcited solids"
20:00 **Zubin Jacob**, *Purdue University*, "Photon Wavefunctions in Matter: Atomistic Maxwell Hamiltonian"

	Frontiers in Nanophotonics II Ballroom 1 Alejandro Manjavacas, Chair	*Physics of Qubits* Magpie A Eugene Demler, Chair	*Topological Electrodynamics* Magpie B Zubin Jacob, Chair	*Imaging With Incoherent X-Ray* Wasatch A Joachim von Zanthier, Chair
20:50	**Henry Everitt**, *Rice University*, "Towards High Quantum Efficiency in Quantum Cascade Laser-Pumped Molecular Lasers"	**William D. Oliver**, *MIT*, "Giant Artificial Atoms and Waveguide QED"	**Hong Tang**, *Yale University*, "Superconducting Single Photon Detectors"	**Ichiro Inoue**, *RIKEN Hyogo, Japan*, "Intensity Correlation Techniques for Spatiotemporal Diagnostics of X-Ray Laser Pulses"
21:10	**Prineha Narang**, *Harvard University*, "Far-from-Equilibrium Excitations in Metals and Semimetals"	**Ike Chuang**, *MIT*, "From Spin Physics to Quantum Algorithms"	**Zongfu Yu**, *University of Wisconsin, Madison*, "Dipole-dipole Interactions Near Photonic Weyl Points"	**Phay Ho**, *Argonne National Laboratory*, "Fluorescence Intensity Correlation Imaging With X-Ray Pulses"
21:30	**Tigran Shahbazyan**, *Jackson State University*, "Non-Markovian Effects for Hybrid Plasmonic Systems in the Strong Coupling Regime"	**Jungsang Kim**, *Duke University and IonQ*, "Advances in Trapped Ion Quantum Computing"	**Tongcang Li**, *Purdue University*, "Non-Reciprocity in Vacuum Fluctuations"	**Leon Lohse**, *University Gottingen, Germany*, "Geometry and Statistics of Incoherent Diffractive Imaging"
21:50	**Peter Nordlander**, *Rice University*, "Plasmon-Induced Hot Carrier Generation and Applications"	**Thaddeus Ladd**, *HRL*, "Progress in Silicon Spin Qubit"	**Tigran Sedrkyan**, *University of Massachusetts, Amherst*, "Spin Liquids"	**Sebastian Karl**, *University Erlangen-Nurnberg, Germany*, "A Software Pipeline for Simulating and Evaluating Incoherent Diffraction Imaging"
22:10	**Jiming Bao**, *University Houston*, "Marangoni Convection-Driven Laser Fountains on Free Surfaces of Liquids"	**Shruti Puri**, *Yale University*, "Practical Quantum Computation With Bosonic Qubits"	**Matthew Pelton**, *University of Maryland*, "Room-Temperature Strong Coupling to Plasmonic Nanocavities"	**Petar Andrejic**, *University of Erlangen-Nurnberg, Germany*, "Collective Coupling of Spatial Structures in Resonant X-Ray Waveguides"

Wednesday Morning January 12 2022

7:00 **Continental breakfast** [Ballroom 1+2]

Plenary Session [Ballroom 1+2] Philip Hemmer, Chair

7:30 **Luiz Davidovich**, *Texas A&M University/Federal University of Rio de Janeiro*, "How Quantum Physics Can Help in Making Better Sensors"
8:00 **Arnab Banerjee**, *Purdue University*, "Novel Platforms for Emergent Quasiparticles in Quantum Spin Liquids"
8:30 **Christopher Monroe**, *University of Maryland*, "Quantum Computer Systems and Applications"

	Advances in Quantum Information	*Crossroads of Quantum and Machine-Learning*	*Towards Quantum Computers*	*Color Centers in Diamonds*
	Ballroom 1 Luiz Davidovich, Chair	Magpie A Arnab Banerjee, Chair	Magpie B Christopher Monroe, Chair	Wasatch A Philip Hemmer, Chair
9:10	**Andrew Jordan**, *Institute for Quantum Studies, Chapman University*, "Quantum metrology and shortcuts to adiabaticity"	**Shanhui Fan**, *Stanford University*, "Optical Computing in Wavevector and Synthetic Dimensions"	**Sonika Johri**, *IonQ*, "Applications with IonQ's Quantum Computers"	**Alexey Akimov**, *Texas A&M University*, "Photonic Crystal Cavities GeV & SnV Diamond"
9:30	**Christopher Fuchs**, *University of Massachusetts, Boston*, "Writing the Born Rule in Irreducible QBist Form"	**Alexandra Boltasseva**, *Purdue University*, "Advancing Nano and Quantum Photonics with Machine Learning"	**Alex Lukin**, *Qu ERA Computing*, "Cloud-accessible, programmable quantum simulator based on two-dimensional Rydberg arrays"	**Renbao Liu**, *Hong Kong University*, "Extracting High-Order Quantum Correlations via a Quantum Sensor"
9:50	**Rene Reimann**, *Quantum Research Center, TEchnology Innovation Institute, Abu Dhabi*, "**TBA**"	**Darko Zibar**, *Technical University of Denmark*, "Approaching Optimum Phase Measurement in the Presence of Amplifier Noise"	**Trent Graham**, *University of Wisconsin, Madison*, "Quantum Computing with a 2D Array of Cs Atom Qubits"	**Peter J. Pauzauskie**, *University of Washington*, "Solid-State Laser Refrigeration of Quantum Electronics Sensor"
10:10	**Sebastian Carrasco**, *U.S. Army Research Laboratory*, "Schrödinger-Cat State Generation and Generalized Ramsey Interferometry"	**Andrew Sornborger**, *LANL*, "**TBA**"	**Josh Nunn**, *ORCA*, "ORCA Computing: Manipulating Time-Bins in a Photonic Quantum Processor"	**Philip Hemmer**, *Texas A&M University*, "Challenges for Biosensing with Fluorescent Diamond and Phosphor Nanoparticles"

10:30 — Break —

Plenary Session [Ballroom 1+2] Virgil Sanders, Chair

10:50 **Marlan Scully**, *TAMU, Baylor, Princeton*, "Presentation of the 2022 Willis E. Lamb Award for Laser Science and Quantum Optics"
11:20 **Eden Figueroa**, *Brookhaven National Laborotry/Stony Brook University*, "Towards Quantum Astrometry using a Field-Developed Long-Distance Quantum Network"

	Quantum Enhanced Telescopy and Imaging	*Novel Quantum Optics*	*Metamaterials*	*Non-equilibrium Thermodynamics*
	Ballroom 1 Eden Figueroa, Chair	Magpie A Irina Novikova, Chair	Magpie B Andrei Afanasev, Chair	Wasatch A Barnabas Kim, Chair
12:00	**Mankei Tsang**, *National University of Singapore*, "Resolving Starlight: A Quantum Perspective"	**Irina Novikova**, *College of William & Mary*, "Vector atomic magnetometer based on EIT"	**Pankaj Jha**, *California Institute of Technology*, ''Quantum Defects in Flatland: Sensing and Metrology to Non-Classical Thermal Light"	**Barnabas Kim**, *Texas A&M University*, "Single atom in cavity as Heat Engine"
12:20	**Nicolas Treps**, *Laboratoire Kastler Brossel, Sorbonne University*, "Source Separation Estimation using Modal Decomposition: Reaching the Limit"	**Eugeniy Mikhailov**, *College of William & Mary*, "Is quantum noise always bad? Low-Light Shadow Imaging using Quantum-Noise Detection with a Camera"	**Ivan Burenkov**, *University of Maryland, College Park*, "Single-shot quantum measurement confidence for near-quantum-optimal state identification"	**Chun-Chia Chen**, *National Institute of Standards and Technology*, "Continuous Bose-Einstein Condensation"
12:40	**Michael Raymer**, *University of Oregon*, "Very Long Baseline Interferometric Imaging using Single-Photon States"	**Svetlana Malinovskaya**, *Stevens Institute of Technology*, "On the Role of Dressed State Picture in Designing Many-body quantum Superposition States"	**Andrei Afanasev**, *George Washington University*, "A "Superkick" in the Absorption of Twisted Photons"	**Denys Bondar**, *Tulane University, New Orleans*, "Asymmetric Tunneling of Bose-Einstein Condensates" 13:00 **Sam Patrick**, *University of British Columbia*, "Unexpected behavior of decaying vortices in BECs"

Wednesday Evening January 12 2022

Plenary Session [Ballroom 1+2] Denis Yavuz, Chair

19:00 **Zhenrong Zhang**, *Baylor University*, "Nano-focusing of light with plasmonic fiber probes"
19:30 **Roger Fu**, *Harvard University*, "An Expanded Role for NV magnetic Field Sensing in the Earth Sciences"
20:00 **Carmen Menoni**, *Colorado State University*, "Tailoring Medium Range Order in Amorphous Oxides for Coatings of Gravitational Wave Interferometers"

	New Optical Techniques in Sensing and Imaging Ballroom 1 Zhenrong Zhang, Chair	*Quantum Microscopy* Magpie A Roger Fu, Chair	*Internal Friction in Coatings for Gravitational Wave Interferometers* Magpie B Carmen Menoni, Chair	*Optical Sensing and Spectroscopy* Wasatch A Alexei Sokolov, Chair
20:50	**Siddharth Ramachandran**, *Boston University*, "Nonlinear Optics with Topologically Complex Light"	**Ron Walworth**, *University of Maryland*, "Applications of Quantum Diamond Microscopy in the Life & Physical Sciences"	**Hai Ping Cheng**, *University of Florida*, "Analysis of Two Level Systems: Potential Energy Functions and MD Simulations"	**Hebin Li**, *Florida International University*, "Optical 2D Coherent Spectroscopy of Many-Body Dipole-Dipole Interactions and Correlations in Atomic Ensembles"
21:10	**Alan Wang**, *Oregon State University*, "Epsilon-Near-Zero Photonics using Mobility Transparent Conductive Oxides"	**Warwick Bowen**, *University of Queensland*, "Absolute Quantum Advantage in Light Microscopy"	**Evan Hall**, *LIGO MIT*, "The Present and Future of Ground-Based Gravitational-Wave Observatories"	**Dmitry Voronin**, *University of South Florida*, "Nanoimaging of 2D Nanobubbles"
21:30	**Xingde Li**, *John Hopkins University*, "Microscopic Biophotonics in-vivo"	**Theodore Goodson**, *University Michigan*, "Fluorescence Microscopy at Extremely Low Excitation Intensity: The Power of Quantum Correlations"	**Gabriele Vajente**, *LIGO Caltech*, "Thermal Noise due to Dielectric Coating in Gravitational Wave Interferometric Detectors"	**Benjamin Stryker**, *Texas A&M University*, "Melanin: Applications and Characterization"
21:50	**Qichi Hu**, *Bruker Nano Surfaces & Metrology*, "Nanoscale Imaging of Surface Polaritons with s-SNOM and AFM-IR"	**Anna Paterova**, *ASTAR*, "Hyperspectral Infrared Microscopy With Visible Light"	**Frances Helman**, *University California Berkely*, "Searching for Ultra-Stable Glasses, Two Level Systems and Low Loss in Amorphous Thin Films"	**Aart Verhoef**, *Texas A&M University*, "Advanced Optical Imaging Techniques for Plant Science"
22:10	**Svetlana Lukishova**, *Rochester University*, "Photomodification of Silver Nanocubes for Patch Plasmonic Nanoantennas by Visible Laser Light"	**Girish Agarwal**, *Texas A&M Univeristy*, "Quantum Advantage of Seeded, Squeezed Light in Stimulated Brillouin Spectroscopy and Imaging"	**Stephen Penn**, *Hobart and William Smith Colleges*, "Advancing Gravitational Wave Astrophysics with Crystalline Coatings"	**Sahar Sharifzadeh**, *Boston University*, "Modeling of opto-mechanical response in low dimensional materials"

Thursday Morning January 13 2022

7:00 **Continental breakfast** [Ballroom 1+2]

Plenary Session [Ballroom 1+2] Edward Fry, Chair

7:30 **Nikolay Zheludev**, *University of Southampton/NTU Singapore*, "Picophotonics"

8:00 **Hui Deng**, *University of Michigan*, "Excitons and Polaritons in van der Waals Hetro-Bilayers"

8:30 **Saikat Guha**, *University of Arizona*, "Overview of the NSF Center for Quantum Networks"

	Light Structured in Space and Time	*Semiconductor Quantum Optics*	*Overview of NSF and DoE National Quantum Initiative (NQI) Centers of Excellence in Quantum Information Science & Engineering*	*Fundamentals of Quantum Mechanics*
	Ballroom 1 Nikitas Papasimakis, Chair	Magpie A Hui Deng, Chair	Magpie B Saikat Guha, Chair	Wasatch A Peter Keefe, Chair
9:10	**Ayman F. Abouraddy**, *CREOL University of Central Florida*, "Space-Time WavePackets: A New Frontier for Structured Light"	**David Gershoni**, *Israel Institute of Technology Haifa*, "Deterministic Source of Indistinguishable Photons in a Cluster State"	**Travis Humble**, *Oak Ridge National Laboratory*, "Overview of the DoE NQI Quantum Science Center"	**Peter Keefe**, *University of Detroit, Mercy*, "Magnetic Hysteresis in the First Order Adiabatic Phase Transition of Mesoscopic-Size Type 1 Superconductors: The Origin of Bardeen Hysteresis Explained"
9:30	**Nikitas Papasimakis**, *University of Southampton*, "Supertoroidal Pulses: Propagating Electromagnetic Skyrmions and Space-Time Supreoscillations"	**Frank Jahnke**, *University of Bremen, Germany*, "Quantum-Optics Properties of InP-Based Metallic Nanolasers"	**Rick Muller**, *Sandia National Laboratory*, "Overview of the DoE Center for Quantum Systems Accelerator"	**Vaclav Spicka**, *Institute of Physics ASCR, Prague*, "Relation Between Full NEGF, Non-Markovian and Markovian transport Equations"
9:50	**Natalia M. Litchinitser**, *Duke University*, "Exploring Light-Matter Interactions with Symmetry and Topology of Light"	**Weng Chow**, *Sandia National Laboratory*, "Line Narrowing in Semiconductor Lasers from 10^{12} Hz Nanolasers to Hz-Level Heterogeneous Integrated III-V/Si Lasers"	**Andrew Childs**, *University of Maryland*, "Overview of the NSF-QLCI Center for Robust Quantum Simulations"	**Roland Allen**, *Texas A&M University*, "Origin of Quantum Mechanics: From Dits to Quantum Fields"
10:10	**Alon Bahabad**, *Tel-Aviv University*, "Weakly Measuring Light Where or When It Is Not Expected"	**Stephan Reitzenstein**, *Technische Universität Berlin, Germany*, "Bright Electrically Controllable Quantum-dot-Molecule spin-Photon Interfaces Fabricated by In Situ Electron-Beam Lithography"	**Anna Grasselino**, *Fermi Laboratory*, "Overview of the DoE NQI Center on Superconducting Quantum Materials and Systems Center"	**Suzy Lidström**, *Texas A&M University*, "Consciousness as Coherent Excitation of a Hybrid Quantum Field"

10:30 — Break —

Plenary Session [Ballroom 1+2] Peter Keefe, Chair

10:50 **Gershon Kurizki**, *Weizmann Institute, Israel*, "Bridging the Gulf Between Thermodynamics and Quantum Mechanics in Heat Machines"

11:20 **János Bergou**, *Hunter College/City University/New York)*, "Complementarity beyond wave-particle duality: A historic perspective"

	Quantum Coherent Heat Machine	*Complementarity, Quantum Eraser, Related Questions*	[Same to previous Session]	*Novel Quantum Optics*
	Ballroom 1 Gershon Kurizki, Chair	Magpie A Janos Bergou, Chair	Magpie B Saikat Guha, Chair	Wasatch A Karl Berggren, Chair
12:00	**Amit Finkler**, *Weizmann Institute, Israel*, "Anti-Zeno Cooling of Spin Baths by Quantum Probe Measurements"	**Berge Englert**, *National University of Sinapoer*, "Complementarity and the Quantum Rotor"	**Peter Maurer**, *University of Chicago*, "Overview of the NSF QLCI Center on Quantum Sensing in Biophysics and Bioengineering"	**Karl Berggren**, *MIT*, "Superconducting Nanowire Single Photon Detectors"
12:20	**Tomas Opatrny**, *University of Olomouc, Czech Republic*, "Nonlinear Interferometer as a Finite Reservoir Heat Engine"	**Mark Hillery**, *Hunter College/City University/New York*, "Wave-Particle Duality Games"	**Inder Monga**, *Lawrence Berkeley National Laboratory*, "Overview of the DoE QUANT-NET Center"	**Reed Nessler**, *Texas A&M University*, "Quantum Model for Protein-Ligand Binding"
12:40	**Eilon Poem-Kalogerakis**, *Weizmann Institute, Israel*, "Experimental Proposal for Nonlinear, Coherent Heat Machines"	**Alexander Streltsov**, *University of Warsaw*, "Operational Resource Theory of Imaginarity"	**Andrew Houck**, *Brookhaven National Laboratory*, "Overview of the NSF QLCI Center for Present and Future Quantum Computing"	**Georgi Gary Rozenman**, *Tel-Aviv University*, "Emulating Black Holes Using Surface Gravity Waves"
13:00			**Dan Stamper-Kurn**, *University California, Berkeley*, "Overview of the NSF QLCI Center for Present and Future Quantum Computing"	

17:30 **Poster Session and Buffet Dinner — Ballrooms 2 & 3**

Thursday Evening January 13 2022

Plenary Session [Ballroom 1+2] Gennady Shvets, Chair

19:00 **Vladislav Yakovlev**, *Texas A&M University*, "The Dream is Still Alive: Physics of Quantum Elctronics in Biology and Medicine"
19:30 **Ryan Camacho**, *Brigham Young University*, "Towards a National Scale Infrastructure for Accelerating Quantum Technologies"
20:00 **Jorge Rocca**, *Colorado State University*, "**New Advances in the Technology and Science of High Power Lasers**"

	Quantum Inspired Biophysics Ballroom 1 Vladislav Yakovlev, Chair	*Quantum Photonics Foundries and Capabilities* Magpie A Ryan Camacho, Chair	*High Power Lasers and Ultrahigh Laser/Matter Interactions* Magpie B Jorge Rocca, Chair	*Quantum Optics* Wasatch A Denis Yavuz, Chair
20:50	**Gennady Shvets**, *Cornell University*, "Plasmonic Metasurfaces and Live Cells: Towards Novel Phenotypic Assays and Drug Screens"	**Ted Letavic**, *Global Foundries*, "Silicon Photonics: Quantum and Beyond"	**Franziska Treffert**, *SLAC*, "High Repetition Rate Laser-Driven Neutron Beam Sources Employing Micro-Scale Converging Liquid Jet Targets"	**Denis Yavuz**, *University of Wisconsin, Madison*, "Spatial Coherence of Light in Collective Spontaneous Emission"
21:10	**Jianshu Cao**, *MIT*, "Single Photon Statistics of light-harvesting energy transfer"	**David Harame**, *AIM Photonics*, "AIM Photonics Capabilities in Quantum Photonics"	**Howard Milchberg**, *University of Maryland*, "Multi-GeV Electron Bunches from an All-Optical Laser Wakefield Accelerator"	**Suhail Zubairy**, *Texas A&M University*, "Lasing in a Cavity with Atomic Mirrors"
21:30	**Yulia Pushkar**, *Purdue University*, "Electronic requirements for low barrier O-O bond formation in Natural and Artificial Photosynthesis"	**Ania Jayich**, *University California, Santa Barbara*, "UCSB Quantum Foundry"	**Brian Krause**, *Princeton Plasma Physics Laboratory*, "Plasma Dynamics and Transport in Short-Pulse Heated Solids via X-Ray Line Emission Spectroscopy"	**Franco Nori**, *RIKEN, Japan*, "Quantum Optics with Giant Atoms"
21:50	**A.A. Chabanov**, *University of Texas at San Antonio*, "A Wide-Aperture Optical Isolator"	**Matt Eichenfeld**, *Sandia National Laboratory*, "Photonics Capabilities at Sandia National Laboratories"	**Bedros Afeyan**, *Polymath Inc.*, "Femtosecond Plasma Phase Space Photonics: STUD Pulses Meet Machine Learning using HED Plasmas"	**Vitaly Kocharovsky**, *Texas A&M University*, "Quantum supremacy of the many-body fluctuations in the occupations of the excited particle states in a Bose-Einstein-condensed gas"
22:10	**Konstantin Dorfman**, *East China Normal University*, "Multidimensional spectroscopy with squeezed light"	**Luqi Yuan**, *Shanghai Jiao Tong University*, "Simulating Dynamic and Non-Equilibrium Systems with Synthetic Dimentions"	**Ronnie Shepherd**, *Lawrence Livermore National Laboratory*, "The Study of Ionization Dynamics and Electron-Ion Equilibration using Sub-Picosecond Time Resolved X-Ray Spectroscopy"	**Da-Wei Wang**, *Zhejiang University*, "Topological phases of quantized light"

Friday Morning January 14 2022

7:00 **Continental breakfast** [Ballroom 1+2]

Plenary Session [Ballroom 1+2] Reinhard Kineberger, Chair

7:30 **Leonid Butov**, *University of California, San Diego*, "Spatially Indirect Excitons"

8:00 **Luca Argenti**, *University of Central Florida*, "Control of Coherence in Attosecond Ionization Processes"

8:30 **Anil Patnaik**, *Air Force Institute of Technology, Dayton*, "Femtosecond Laser Induced Plasma and Applications"

	Excitons in Heterostructures	*Attosecond Physics*	*Intense Ultrashort-Pulse Laser-Matter Interactions and Applications*	*(Joint with SIPQNP) Industry Vision and Perspectives on Quantum Technologies*
	Ballroom 1	Magpie A	Magpie B	Wasatch A
	Leonid Butov, Chair	Luca Argenti, Chair	Anil Patnaik, Chair	Stephen Fleming, Chair
9:10	**Scott Crooker**, *Los Alamos National Laboratory*, "Many-Body Excitons in Doped Monolayer Semiconductors: Trions, Tetrons and Hexcitons"	**Arvinder Sandhu**, *University of Arizona*, "Autoionizing Polaritons and Coherent Control in the Continuum"	**Enam Chowdhury**, *Ohio State University, Columbus*, "Ultra-Intense Laser Based Next Generation Particle Accelerators"	**Alireza Shabani**, *Cisco Systems*, "An Industry Perspective on Quantum Networks and Photonic Quantum Computing"
9:30	**Elaine Li**, *University Texas, Austin*, "Angle Control of Excitons and Phonons in van der Waals Heterostructures"	**Reinhard Kienberger**, *Max Planck Institute for Quantum Optics, Garching*, "Measuring the Timing of the Photoelectric Effect"	**Stephen Hageman**, *Air Force Institute of Technology, Dayton*, "Structured Targets for Ultra-High Intensity Lasers at High Repetition Rates"	**Wil Oxford**, *Anametric*, "A highly-integrated hybrid platform for Quantum Photonic and Classical processing"
9:50	**Feng Wang**, *University of California, Berkeley*, "Moire Excitons in Transition Metal Dichalcogenide Heterostructures"	**Olga Smirnova**, *Max Born Institute, Berlin*, "Geometric Fields and New Enantio-Sensitive Observables in Photonionization of Chiral Molecules"	**Sivanandan Harilal**, *Pacific Northwest National Laboratory, Richland*, "Optical spectroscopy of fs laser produced plasmas"	**Zachary Dutton**, *Raytheon, BBN*, "What quantum networks can do for Raytheon Technologies and our customers"
10:10	**Joshua Lui**, *University of California, Riverside*, "Signatures of Moire Trions in WSe-2/MoSe-2 Heterobilayers"	**Thomas Pfeifer**, *Max Planck Institute for Nuclear Physics*, "Time-resolved emergence of a Rydberg series and a laser-driven continuum threshold"	**Thomas Bullar**, *Air Force Research Laboratory, Wright-Patterson AFB*, "Ultrashort-Optical-Pulse Triggered Microwave/Terahertz Emission from an Array of Inductively Charged Superconducting Rings"	**Domenico Di Mola**, *Juniper*, "Future evolution of Network in the era of Cloud-distributed solutions and massive AI/ML driven operations. Where and When Quantum Networking?"
10:30	— Break —			**William Clark**, *General Dynamics Mission Systems*, "TBA"

Plenary Session [Ballroom 1+2] Marlan Scully, Chair

10:50 **Robert Duncan**, *Texas Tech University*, "Quantum Nucleonics and Novel Nuclear Physics"

11:20 **Alessandro Alabastri**, *Rice University*, "Photothermal Effects and Resonant Heat Transfer for Decentralized Solar Desalination"

	Quantum Nucleonics and Novel Nuclear Physics	*Photonics and Nanomaterials for Energy-Efficient Processes*	*Attosecond Physics 2*	*Biophotonics and medical applications*
	Ballroom 1	Magpie A	Magpie B	Wasatch A
	Robert Duncan, Chair	Alessandro Alabastri, Chair	Robert Jones, Chair	Narangerel Altangerel, Chair
12:00	**Florian Metzler**, *MIT*, "Nuclear Excitation Transfer via Low-energy Couplings"	**Guru Naik**, *Rice University*, "Phase Transitions for Energy-Efficient Nanophotonics"	**Robert Jones**, *University of Virginia*, "Exploiting Rotational coherences to Probe Strong-Field Molecular Ionization dynamics"	**Naragerel Altangerel**, *Texas A&M University*, "The Bindings of COVID 19 Spike Protein's Receptor-Binding Domain (RBD) by Neutralizing and Non-Neutralizing SARS Coronavirus Specific Human Monoclonal Antibodies Investigated by Raman Microscopy"
12:20	**Jeremy Munday**, *University of California, Davis*, "Engineered Elctromagnetic Screening for Increased Fusion Rates"	**Nickolas Borys**, *Montana State University*, "Nanoscale Raman Imaging of Lateral 2D Semiconductor Heterostructures: The Interface is Not Always What We Think"	**Nicolas Douguet**, *Kennesaw State University*, "Attosecond Interferometric Schemes in Atoms and Molecules"	**Pu-Ting Dong**, *Boston University*, "Photoinactivation of Endogenous chromophores Sensitizerwide-Ranging Pathogenic Microbes to Reactive Oxygen Species"
12:40	**Andrew Gillespie**, *Texas Tech University*, "Triton Generation Pathways: Enhanced Shielding from Quantum Nucleonics in Metal Hydrides"	**Artur Davoyan**, *University of California, Los Angeles*, "Taming Light with Ultra-thin 2D Platforms"	**Misha Ivanov**, *Max Born Institute, Berlin*, "Toward Valleytronics at PHz Rates"	**Tao Peng**, *Texas A&M University*, "Enhancing Resolution of Lateral Flow Assay for SARS-CoV-2 Antibodies"

Poster session

Konrad Banaszek, *University of Warsaw*
"Intensity modulation/direct detection optical key distrubtion" [**??**]

C. Cariker, *University of Central Florida*
"Autoionizing plaritons in attosecond transient absorption" [**??**]

I.R. de Farias JR, *Texas Tech*
"Quantum Walk on the Generalized Birkhoff Polytope Graph" [**??**]

Sahar Delfan, *Texas A&M University*
"Antibody Detection with Magnetic Nanoparticles" [**??**]

Zehua Han, *Texas A&M University*
"Wide-field Stimulated Raman excited fluorescence imaging" [**??**]

Zhenfei Jiang, *Texas A&M University*
"Stable Isotope Probing (SIP) Raman spectroscopy of *Aspergillus nidulans* conidial pigment" [**??**]

Yiyun Li, *Texas A&M University*
"Identification of solitary pollinators in flight based on optical characteristics" [**??**]

S. Mehmood, *University of Central Florida*
"Control of Parent-Ion Coherence in Helium Ion ensemble" [**??**]

Vesna Radisic, *Northrop Grumman Corporation*
"Time Modulated Impedance Matching Network for Electrically Small Antennas" [**??**]

Wenhan Ren, *Texas A&M University and Xi'an Jiaotong University*
"Deep-learned speckle pattern and its application to ghost imaging" [**??**]

Stefan Richter, *Friedrich-Alexander-Universität Erlangen-Nürnberg*
"Imaging of a trapped ion crytal via Intensity Interferometry" [**??**]

Jizhou Wang, *Texas A&M University and Zhejiang University*
"Femtosceond Time-Resolved Infrared-Resonant Third-Order Sum-Frequency Spectroscopy of Hydrogen Bonding in Water-Acetone Mixture" [**??**]

Wenzhuo Zhang, *Texas A&M University and Xi'an Jiaotong University*
"Frequency modulation on speckle patterns with kernels" [**??**]

PQE-2022 SIPQNP Session:

What are the Needs to Scale Quantum Technologies? Panel Discussion with Audience Participation

(Thursday, January 13, 3:00-5:00 pm at Magpie A)

Session description: The session is a **Special Event of the SIPQNP Meeting and is open to PQE registrants as well**. It will be focused through the theme – What is needed to build and operate a distributed quantum computer across a laboratory-scale or an inter-city scale? – but the discussion will be more broad ranging. The panel will consist of experts representing various platforms and applications areas. Each panelist will give a brief presentation, followed by moderated questions and open discussion by audience members brainstorming where the field might go next. 'Pie-in-the-sky' visions are welcome, as well as discussion of down-to-Earth problems and hoped-for solutions.

Chair: Michael Raymer, *University of Oregon*

3:00pm – 3:15pm **Quntao Zhuang**, *University of Arizona*
"Distributed quantum sensing with entangled sensor networks"

3:15pm – 3:30pm **Chris Monroe**, *Duke University*
"Distributed quantum computing in the cloud"

3:30pm – 3:45pm **Konrad Banaszek**, *University of Warsaw*
"Quantum enhanced receivers for communications"

3:45pm – 4:00pm **Mihir Bhaskar**, *Harvard University / AWS*
"Quantum repeater networks"

4:00pm – 4:15pm **Peter Johnson**, *Zapata Computing*
"Robust Quantum Algorithms"

4:15 – 5:00pm **Moderated discussion** – led by **Michael Raymer**, *University of Oregon*