

## Monday Morning January 7 2002

*Plenary Session*, George R. Welch, Chair

7:30 **Margaret Murnane**, *JILA*, “Coherent Control of Atoms and Molecules on Attosecond Timescales”

8:00 **Paul Corkum**, *National Research Council of Canada*, “Producing, Measuring and Using Attosecond Optical and Electron Pulses”

8:30 **Harm Muller**, *AMOLF Netherlands*, “Measurement of attosecond structure in XUV pulses from high-harmonic generation”

*Attosecond Science*

Erich Ippen, Chair

9:00 **Ken Schafer**, *Lund University/Louisiana State University*, “Theory of electron spectra from ultrafast cross-correlation processes”

9:20 **Justin Peatross**, *Brigham Young University*, “Controlling Laser High Harmonic Generation with Weak Interfering Light”

9:40 **Warren Warren**, *Princeton University*, “Femtosecond Pulse Shaping Throughout the Electromagnetic Spectrum”

*(Open)*

*Quantum Communication*

Charles M. Bowden, Chair

**Mikhail D. Lukin**, *Harvard University*, “Quantum Communication in Noisy Channels via Atomic Ensembles and Light”

**Prem Kumar**, *Northwestern University*, “Fiber-optic quantum communications”

*(Change:)*  
**Talk Cancelled**

— Break —

*Plenary Session*, Hersch Pilloff, Chair

10:20 **Jim Harris**, *Stanford University*, “GaInNAs Long Wavelength Lasers: The Potential and Challenges”

10:50 **Kohzo Hakuta**, *The University of Electro-Communications, Japan*, “Parametric Raman Beating in Solid Hydrogen: Towards Subfemtosecond Pulse Generation”

*Attosecond Science*

Margaret Murnane, Chair

11:20

*(Change:)*  
**Deniz Yavuz**, *Stanford University*, “Multiplicative technique for single cycle pulses”

11:40 **Alexei Sokolov**, *TAMU*, “Femtosecond Light Source Synchronized with Molecular Motion”

12:00 **Max Zolotarev**, *LBNL*, “Production and application of bunches of ultrarelativistic electrons with attosecond duration”

12:20

**Hersch Pilloff**, *JILA*, “The negative potential well in atom guiding and a new atom trap”

*Semiconductor Lasers*

Rolf Binder, Chair

**Dennis Deppe**, *University of Texas at Austin*, “Electrically Injected Microcavity Devices for Single Photon Sources”

**Weng Chow**, *Sandia*, “Anomalous dispersion in quantum dots - Deviations from the ‘atom-like’ picture”

*(Change:)*  
**Alexey Belyanin**, *TAMU*, “Nonlinear optical phenomena in semiconductor lasers with self-generated driving fields”

*Novel Optics*

Deborah Jackson, Chair

**Dmitry Budker**, *UC Berkeley*, “Nonlinear faraday magnetometry for the earth’s field”

**Irina Novikova**, *TAMU*, “Generation of Squeezed Vacuum via Zeeman Coherence in Hot Atomic Vapor”

**Michael Fitch**, *Johns Hopkins*, “High resolution quantum optics applied to metrology and clocks”

## Monday Evening January 7 2002

Plenary Session, Vladimir M. Shalaev, Chair

19:00 **Yoshi Yamamoto**, *Stanford University*, “Generation of single photons and entangled photon-pairs from a single quantum dot”

19:30 **Carlos Stroud**, *University of Rochester*, “Quantum Mechanics at the Classical-Quantum Interface”

20:00 **Richard Packard**, *University of California at Berkeley*, “The He3 dc-SQUID: a superFLUID quantum interference device”

— Break —

*Nanostructure Optics*

Yoshi Yamamoto, Chair

20:50 **Sergey Bozhevolnyi**, *Aalborg University, Institute of Physics, Denmark*, “Second-harmonic microscopy of individual nanostructures”

21:10 **David Nolte**, *Purdue University*, “Photorefractive Semiconductor Nanostructures”

21:30 **Hui Cao**, *Northwestern, Physics*, “Quantum Dot Microdisk Lasers”

21:50 **Vladimir M. Shalaev**, *Purdue University*, “Manipulating Light and Sensing Molecules with Plasmonic Nanomaterials”

22:10

*Wigner Distribution*

Carlos Stroud, Chair

**Patrick Loughlin**, *University of Washington*, “Application of the Wigner distribution to shallow-water sound propagation”

**Lorenzo Galleani**, *Politecnico di Torino, Italy*, “The Wigner distribution as a tool for studying differential equations”

**Leon Cohen**, *City University of New York (Hunter College)*, “Why do wave packets sometimes contract?”

(Change:)

**Mark Pilloff**, *UC Berkeley*, “Wigner Distributions and Condensate Statistics in the Weakly Interacting Bose Gas”

*Novel Optics*

Richard Packard, Chair

**Jean-Claude Diels**, *University of New Mexico*, “Stabilization of mode-locked trains, and dark resonance of two-photon lambda level structures”

**William Harter**, *University of Arkansas*, “Coherent Waves Make Space and Time Reference Frames: Symmetry properties of quantum revivals and fractals”

**Achim Peters**, *Universitaet Konstanz*, “Testing the foundations of special relativity using cryogenic optical resonators”

**Paul Voss**, *Northwestern*, “Experimental Realization of “Universal Homodyne Tomography” with a Single Local Oscillator”

## Tuesday Morning January 8 2002

Plenary Session, M. Suhail Zubairy, Chair

7:30 **Lov Grover**, *Lucent Technologies, Quantum Computing*

8:00 **W. Bartletta**, *Lawrence Berkeley National Laboratory*, “Dedicated Synchrotron Radiation Sources for Ultra-fast X-ray Science”

8:30 **Ercan Alp**, *Argonne National Laboratory*, “Inelastic X-Ray Scattering with Synchrotron Radiation”

*X-Rays*

W. Bartletta, Chair

9:00 **Olga Kocharovskaya**, *TAMU*, “Electromagnetically induced transparency in gamma-rays”

9:20 **David Attwood**, *UC Berkeley*, “Soft X-ray Microscopy and EUV Lithography: Imaging in the 20-50 nm Regime”

9:40 **Zameer Hasan and Aras Konjhodzic**, *Temple University*, “Coherent Control of Nuclear States: Mossbauer Studies of Eu<sup>2+</sup>/Eu<sup>3+</sup> in II-VI Materials”

*Quantum Computing*

Lov Grover, Chair

**Shaya Fainman**, *Univ. of California, San Diego*, “Quantum Device Technologies – Applying 2-D Photonic Crystals”

**Mark Gyure**, *HRL Laboratories*, “Scalable Quantum Information Processing Devices”

*(Change:)*  
**Talk Cancelled.**

*Novel Optics*

Jon Marangos, Chair

*(Change:)*  
**Paul Robinson**, *Sandia*, “A Brief Survey of Major Laser Programs at Sandia National Labs”

**Christopher Fang-Yen**, *M.I.T.*, “Multiple thresholds in the microlaser”

**Gerhard Paulus**, *MPQ, Germany*, “Measurement of the absolute phase of a femtosecond laser pulse”

— Break —

Plenary Session, Ali Javan, Chair

10:20 **Claire Gmachl**, *Bell Labs, Lucent Technologies*, “High performance Quantum Cascade lasers from the mid- to far-infrared and applications”

10:50 **Paul Brumer**, *University of Toronto*, “Developments in the Coherent Control of Molecular Processes: Controlling Chaos and Chirality”

*New Frontiers of Semiconductor Optoelectronics*

Vitaly Kocharovsky, Chair

11:20 **Rolf Binder**, *University of Arizona*, “Theory of intervalence band coherences in semiconductor quantum wells”

11:40 **Axel Schulzgen**, *University of Arizona*, “Coherently coupled optical Stark shifts in a semiconductor 3 band system”

*(Change:)*  
**Michele Saba**, *Federal Institute of Technology, Lausanne*, “Polariton Parametric Amplification in Semiconductor Microcavities”

12:20 *(Change:)*  
**Talk Moved.**

12:40

*Coherent Control*

Paul Brumer, Chair

**Jon Marangos**, *Imperial College*, “High order harmonic generation and electron wavepacket interference in aligned molecules”

**Robert Lewis**, *Wayne State University*, “Chemical Control Using Tailored, Strong Laser Fields”

**Tamar Seideman**, *National Research Council, Canada*, “Molecular Interferometry in Configuration Space”

**Victor Batista**, *Yale University*, “Coherent optical control of reaction dynamics in large molecular systems”

## Tuesday Evening January 8 2002

Plenary Session, Edward S. Fry, Chair

19:00 **Robert Byer**, *Stanford*, “Scalable High Power Solid State Lasers”

19:30 **Lu J. Sham**, *University of California, San Diego*, “Quantum Operations in Semiconductor Dots”

20:00 (*Changed:*) **Vern Schlie**, *AFRL/DELS*, “Scaling SSL: Realistic - Invariant Propagating Beams”

— Break —

*Scalable High Power Solid State Lasers*

Robert Byer, Chair

20:50

(*Change:*) **Sasha Betin**, *Raytheon*, “High Power Solid State Lasers with Phase Conjugation”

21:10

(*Change:*) **Dennis Harris**, *Boeing LEOS and LLNL*, “1 KW Yb: YAG Laser”

21:30

(*Change:*) **Scott Fochs**, *LLNL*, “Heat Capacity Operation of Solid-State Laser System Near Term Solution to Mobile High Avg Power Field Laser”

21:50

(*Change:*) **Ken-ichi Ueda**, *The University of Electro-Communications, Japan*, “Ceramic Lasers: New Generation of Solid State Laser Materials”

22:10

*Quantum Information*

Lu J. Sham, Chair

**Alexander Sergienko**, *Boston University*, “Hyper-entanglement and Quantum Cryptography”

**Janos Bergou**, *Hunter College, CUNY*, “Quantum State Filtering”

**Robin Cote**, *University of Connecticut*, “Mesoscopic molecular ions in Bose-Einstein condensates”

*National Security*

Paul Robinson, Chair

**Al Garroway**, *NRL*, “Detection of Landmines by Nuclear Quadrupole Resonance (NQR): better than a Pointed Stick?”

**Timothy Brucks**, *Raytheon*, “Target Detection Algorithms and Approaches for Uncooled Infrared Imagery”

**Marlan O. Scully**, *TAMU*, “FAST CARS: and Anthrax detection”

(*Change:*)

See **Leang Chin** and **Charles M. Bowden**, *Laval and U. S. Army Aviation & Missile Research*, “High-Power Ultra-Short Laser Pulse Propagation in the Atmosphere: White-Light Pulse”

## Wednesday Morning January 9 2002

Plenary Session, Charles M. Bowden, Chair

7:30 **Gerard Mourou**, *University of Michigan*, "Ultrahigh Intensity, Relativistic Optics and Applications"

8:00 **Henry Kapteyn, JILA**, "Compressing Light Pulses with Spinning Molecules"

8:30 (**Changed:**) **Rufus L. Cone**, *Montana State University*, "Overview of Rare Earth Materials for Quantum Information Applications"

*Ultra-Fast and Relativistic Optics*

Gerard Mourou, Chair

9:00 **Phillip Sprangle, NRL**, "Compression, Focusing, Filamentation and Spectral Broadening of Laser Pulses Propagating in Air"

*Rare Earth Materials and Applications*

Rufus L. Cone, Chair

9:20 **Uwe Happek, University of Georgia**, "Thermally stimulated laser excitation spectroscopy (TSLES): Another tool to locate the position of impurity energy levels relative to the host energy bands"

*Quantum Enhancement of Spatial Resolution*

Jonathan P. Dowling, Chair

9:40 **Deborah Jackson, NASA Jet Propulsion Laboratory**, "The Use of Correlated Photons in Optical Communications Links"

9:40 **Dinh C. Nguyen, LANL**, "Femtosecond Free-Electron Laser Laser Pulses"

9:40 **Deborah Jackson, NASA Jet Propulsion Laboratory**, "The Use of Correlated Photons in Optical Communications Links"

9:40 **Alexander Gaeta, Cornell University**, "Robust pulse collapse: observation of the Townes soliton"

9:40 **Colin Williams, Stanford University**, "Automated Design of Quantum Circuits and Interferometers"

— Break —

Plenary Session, Marlan O. Scully, Chair

10:20 **Award Lamb Medal**, "The presentation of the 2002 Willis E. Lamb medal for Laser Science and Quantum Optics to Jonathan Dowling, Luigi Lugiatto, and Yanhua Shih"

10:50 (**Changed:**) **John Holzrichter, LLNL**, "Review of optical projects at LLNL"

*Ultra-Fast and Relativistic Optics*

Henry Kapteyn, Chair

11:20 (**Change:**) **Jens Schwarz, University of New Mexico**, "Self-trapped filaments in air, how much energy can they carry, how will they go?"

*Applications of Optical Coherent Transients and Spectral Hole Burning*

Rufus L. Cone, Chair

11:20 **Kelvin Wagner, University of Colorado**, "Spatial-spectral holography for broadband RF array imaging and high resolution spectral analysis"

*Quantum Computing*

M. Suhail Zubairy, Chair

11:20 **Chia-Ren Hu, TAMU**, "A family of sure-fire quantum algorithms for solving a generalized Grover search problem"

12:00 (**Change:**) **Charles M. Bowden, U. S. Army Aviation & Missile Research**, "Intense Femtosecond Pulse Propagation in Air: Intensity Clamping and Third Harmonic Generation"

12:00 **Ivan Lorgere, Lab. Aim Cotton, CNRS**, "Broadband radio-frequency spectrum-analysis based on spectral hole burning"

12:00 (**Change:**) **Talk Cancelled.**

12:00 **Kris Merkel, Montana State University**, "Analog optical processing of high bandwidth, large dynamic range signals using spectral hole burning"

12:20 (**Change:**) **Talk Cancelled.**

12:20 **Thomas Bottger, Montana State University**, "Lasers Stabilized to Regenerative Spectral Holes - Experiment, Modeling, and SHB Material Optimization"

12:40 **Ravi Jain, UNM**, "Novel Tunable Fiber Lasers based on Rare-Earth Doped Glasses"

12:40 **Chitra Rangan, University of Michigan**, "Performing Grover's search algorithm on a Rydberg atom data register"

## Wednesday Evening January 9 2002

*Plenary Session, Marlan O. Scully, Chair*

19:00 Jonathan P. Dowling, *NASA Jet Propulsion Laboratory*, “Quantum Metrology”

19:30 Yanhua Shih, *UMBC*, “Quantum Imaging and Uncertainty principle”

20:00 Luigi Lugiato, *Universit dell’Insubria*, “Cavity solitons in semiconductor microresonators: theory and experiment”

— Break —

(Open)

*Ultra-Fast and Relativistic Optics*

Alexander Gaeta, Chair

20:50 See Leang Chin, *Laval*, “Intense Femtosecond Laser Pulse Propagation in Air”

21:10 Sudeep Banerjee, *University of Michigan*, “High Harmonic Generation in Plasmas by Relativistic Thomson Scattering”

21:30 Boaz Ilan, *Tel Aviv University*, “Self-Focusing and Multiple Filamentation of Circularly-Polarized Beams”

21:50 *(Change:)*

**Talk Cancelled,**

22:10

*Laser Interactions*

Edward S. Fry, Chair

21:00 Mingzhen Tian, *Montana State University*, “Optical Coherent Transient True-Time Delay: Broadband Programming Methods”

21:30 Martin Weitz, *Universitaet Tuebingen*, “Controlled Decoherence in Multiple Beam Ramsey Interference”

21:50 Robert Lucht, *TAMU*, “Time-Dependent, Multi-State Numerical Simulation of Laser Interactions”

22:10 Shi-Yao Zhu, *Hong Kong Baptist University*, “Spontaneous Emission manipulation by 2-pi pulses”

## Thursday Morning January 10 2002

*Plenary Session, Vitaly Kocharovsky, Chair*

7:30 **Randy Hulet**, *Rice University*, “Quantum Degeneracy in a Mixed Bose/Fermi Gas”

8:00 (*Changed:*) **Ron Folman**, *University of Heidelberg, Germany*, “The atom chip: manipulation of ultra cold atoms on nano-fabricated surfaces”

8:30 (*Changed:*) **Michael Feld**, *M.I.T.*, “Optical Spectroscopy for Cancer Detection: Final Diagnosis and Fractal Dimension”

*Novel solid state materials for EIT, QED, and quantum computing*

*B. E. C.*

Randy Hulet, Chair

*Ultra slow and fast group velocity and its applications*  
Yuri Rostovtsev, Chair

William Harter, Chair

9:00 **Robert Armstrong**, *New Mexico State University*, “Enhanced emission from fractal/microcavity composites”

**Vitaly Kocharovsky**, *TAMU*, “Exchange of Atoms between Condensate and Noncondensate”

**Daniel J. Gauthier**, *Duke University*, “Modulation-instability limits to “fast” light pulse propagation”

9:20 **Tom Kennedy**, *Naval Research Laboratory*, “A Model Qubit using Optics and Microwaves with the NV-Center in Diamond”

**Murray Barrett**, *Georgia Institute of Technology*, “All Optical BEC”

**Philip R. Hemmer**, *TAMU*, “Ultra slow and stopped light pulses in a solid”

9:40 **Zameer Hasan**, *Temple University*, “Doped II-VI semiconductors with large electric dipole moments”

**Juha Javanainen**, *University of Connecticut*, “A dense BEC: is there a scattering length?”

**Robert W. Boyd**, *University of Rochester*, “Slow Light in Nanostructured Optical Materials”

— Break —

*Plenary Session, Yuri Rostovtsev, Chair*

10:20 **Eric Mazur**, *Harvard University*, “Oscillating between semiconductor and metal: moving ions faster than electron wave functions can spread”

10:50 **Gunter Nimtz**, *University of Cologne/Germany*, “Universal Tunneling Time and Nonlocal Reflection by Photonic Barriers”

*Novel solid state materials for EIT, QED, and quantum computing*

*B. E. C.*

*Ultra slow and fast group velocity and its applications*  
George R. Welch, Chair

Zameer Hasan, Chair

11:20 **Alfred J. Meixner**, *Universitt Siegen, Germany*, “Nanoscale Surface-Enhanced Resonance Raman Spectroscopy at the Single-Molecule Level”

(*Change:*)  
**Talk Moved,**

**Yuri Rostovtsev**, *TAMU*, “Stop and Go Control of Light in Hot Gasses”

11:40 **E. Kuznetsova**, *TAMU*, “Atomic interference phenomena in solids with a long-lived spin coherence”

**Fam Le Kien**, *University of Electro-Communications, Japan*, “Slow Light in Solid Hydrogen”

12:00 **Byoung Ham**, *E.T.R.I.*, “Dark resonance coherence swapping for optical switching”

**Jacob Khurgin**, *Johns Hopkins University*, “Slow wave propagation and switching in nonlinear fiber gratings”

12:20

12:40

## Thursday Evening January 10 2002

*Plenary Session, Eric Mazur, Chair*

19:00 **Aleksander Rebane**, *Montana State University*, "Ultrafast coherent transients in one- and two-photon transitions in organic solids"

19:30 **Klaus-Juergen Witte**, *Max-Planck-Institut fuer Quantenoptik*, "Fusion and Star Plasmas Generated with Femtosecond Laser Pulses"

20:00 **Malvin Teich**, *Boston University and Columbia University*, "Multi-Photon Absorption"

— Break —

*(Open)*

*EIT*

Malvin Teich, Chair

20:50 **George R. Welch**, *TAMU*, "EIT and Radiation Trapping"

21:10 **R. Kolesov**, *TAMU*, "Optical continua generation in a coherently prepared Raman Medium"

21:30 **Cun-Yun Ye**, *TAMU*, "Three-Photon EIT in Hot Atomic Vapor"

21:50

22:10

*Quantum Entanglement*

Yanhua Shih, Chair

**Dmitry Strekalov**, *Jet Propulsion Laboratory, Caltech*,  
"Two-photon processes in faint biphoton field"

**Yoon Ho Kim**, *Oak Ridge National Laboratory*, "Preparing bright polarization-entangled photon pairs via temporal and spectral engineering"

**David Petrosyan**, *Weizmann Institute of Science, Israel*,  
"Entanglement transfer from dissociated molecules to photons"