### Monday Morning

**7:20-7:25** Welcoming Remarks

**Plenary**

W. Schleich(Uni-Ulm)

**7:25-7:55** H. Walther(MPQ)

*Fock State Preparation in the Micromaser*

**7:55-8:25** A. Sokolov/S. Harris(Stanford)

*Raman Generation by Phased and Antiphased Molecular States*

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<table>
<thead>
<tr>
<th>Session</th>
<th>Speaker(s)</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foundations of Quantum Mechanics</strong></td>
<td>M. S. Zubairy(TAMU)</td>
<td>8:30 J. Clauser(Berkeley) <em>Hidden Variable History</em></td>
</tr>
<tr>
<td><strong>High Power Lasers and Laser Physics I</strong></td>
<td>G. McCall(LANL)</td>
<td>8:50 E. Fry(TAMU) <em>Locality in Quantum Mechanics</em></td>
</tr>
<tr>
<td><strong>Femtosecond Physics and Applications I</strong></td>
<td>A. Gaeta(Cornell)</td>
<td>9:10 Y. Shih(Maryland) <em>New Quantum Eraser Experiments</em></td>
</tr>
<tr>
<td><strong>9:30</strong></td>
<td>M. Scully(TAMU) <em>Coherent control meets thermodynamic dogma</em></td>
<td>9:50-10:10 Coffee Break</td>
</tr>
<tr>
<td><strong>Plenary</strong></td>
<td>M. Feld(MIT)</td>
<td>10:10-10:40 J. Kimble(Caltech) <em>Single Atoms Bound in Orbit by Single Photons</em></td>
</tr>
<tr>
<td><strong>Nonlinear Optics and Quantum Entanglement</strong></td>
<td>M. Lukin(Harvard)</td>
<td>11:15 C. Bednar(TAMU) <em>Quantum Coherence and Quantum Dense Coding</em></td>
</tr>
<tr>
<td><strong>Rare Earths I</strong></td>
<td>R. Cone(Montana SU)</td>
<td>11:55 L. Orozco(Stony Brook) <em>Time-resolved Quantum Fluctuations of the Wave Amplitude of Squeezed Light</em></td>
</tr>
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<td><strong>Femtosecond Physics II</strong></td>
<td>R. Boyd(Rochester)</td>
<td>12:15 O. Pfüster(Virginia) <em>The two-photon laser: a novel source of nonclassical light?</em></td>
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<td>11:35 J. Franson(Johns Hopkins) <em>Nonlinear optics at single photon intensities</em></td>
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**Femtosecond Physics and Applications I**

A. Gaeta(Cornell) *Directed Energy Overview*

A. Hill(TAMU) *TBA*

W. Bohn(Stuttgart) *High Power IR Gas Lasers in Europe - Achievements and Perspectives*

A. Rebane(Montana SU) *Femtosecond holography and pulse interactions in inhomogenously broadened media*

**Nonlinear Optics and Quantum Entanglement**

M. Lukin(Harvard) *Quantum Coherence and Quantum Dense Coding*

J. Franson(Johns Hopkins) *Nonlinear optics at single photon intensities*

L. Orozco(Stony Brook) *Time-resolved Quantum Fluctuations of the Wave Amplitude of Squeezed Light*

O. Pfüster(Virginia) *The two-photon laser: a novel source of nonclassical light?*
### Monday Evening

**Plenary**

H. Walther(MPQ)

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<tr>
<td>7:00-7:30</td>
<td>S. Svanberg(Lund)</td>
<td>Spectroscopic Lasers for the Diagnostics and Treatment of Malignant Disease</td>
</tr>
<tr>
<td>7:30-8:00</td>
<td>M. Feld(MIT)</td>
<td>Diagnosis of Disease with Fluorescence!</td>
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#### Optical Microscopy

Bruce Barrett(U. Arizona)

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<td>N. Kroo(Budapest)</td>
<td>Novel Optical Microscopy</td>
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<tr>
<td>8:25</td>
<td>J. Rivoal(Paris)</td>
<td>Scanning near-field optical microscopy</td>
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#### Rare Earths II

A. Craig(Montana SU)

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<td>X. Chen(Wheaton)</td>
<td>Thermal Effects on the Spectra of Rare Earth Ions in Solids</td>
</tr>
<tr>
<td></td>
<td>Z. Hassan(Temple)</td>
<td>High Density Fast Spectral Hole Burning in Thin Films of II-VI Materials Doped with Rare Earths</td>
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#### Coherence Effects I

H. Pilloff(ONR)

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<td>New Applications of EIT in Nonlinear and Quantum Optics.</td>
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<td>S.-Y. Zhu(Hong Kong)</td>
<td>Time delay of light propagation via defect modes in one dimensional photonic crystals</td>
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| Time  | | |
|-------| | |
| 8:45-9:05 | Coffee Break | |

#### Plenary

S. Harris(Stanford)

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#### Novel Lasers

B. Barrett(U. Arizona)

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<td>FEL without inversion: gain optimization</td>
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<td>10:00</td>
<td>P. Roos/J. Carlsten(Montana SU)</td>
<td>Development of nonresonant cw Raman Lasers</td>
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#### High Power Lasers and Laser Physics II

A. Hill(TAMU)

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<td>H. Bruesselbach/D. Sumida(HRL Labs)</td>
<td>High power Yb:YAG lasers</td>
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#### Coherent Control I

M. Shapiro(Weizmann)

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<td>Femtochemistry - The Vision of Coherent Chemistry</td>
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<td>9:05-9:35</td>
<td>R. Gordon(Illinois)</td>
<td>What Have we Learned From the Phase Lag in Coherent Control Experiments?</td>
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30th Winter Colloquium on the Physics of Quantum Electronics

Tuesday Morning

Plenary
N. Bigelow(Rochester)

7:25-7:55  M. Kasevich(Yale)
Atom Interferometer force sensors

7:55-8:25  V. Shalaev(NMSU)
Nonlinear optics and spectroscopy in fractal and percolation composites

Coherence Effects in Solids I
O. Kocharovskaya(TAMU)

8:30  T. Mossberg(Oregon)
Self-Driven Dynamics of Coherently Prepared, Cryogenic, Rare Earth Atoms in a Cavity.

8:50  S. Rand(Michigan)
Nonlinear Effects and Bistability

9:10  O. Kocharovskaya(TAMU)
Laser Control of nuclei in solid hosts

9:30  V. Shalaev(NMSU)
Microlaser made of Disordered Medium

Nano-Optics I
V. Shalaev(NMSU)

9:50-10:10  Coffee Break

Plenary
Y. Yamamoto(Stanford)

10:10-10:40  J. Sipe(Toronto)
"...with a little help from the lattice."
Coherent current control in the solid state

10:40-11:10  G. McCall(LANL)
TBA

Coherence Effects in Semiconductors
A. Smirl(UIowa)

11:15  A. Smirl(UIowa)
Quantum beating of dynamically interacting excitons in semiconductors: Vectorial dynamics and polarisation selection rules

11:35  R. Binder(Arizona)
Atomic models for semiconductors?

11:55  D. Citrin(Washington SU)
Dynamics of Excitonic Wavepackets in Semiconductors at High Fields

Bose Einstein Condensation(BEC) and Atom Optics
M. Kasevich(Yale)

12:15  H. Wang(Oregon)
Coupling nanocrystals to a high-Q silica microsphere: cavity QED of semiconductor quantum dots

Nano-Optics II
S.-Y. Zhu(Hong Kong)

11:15  A. Smirl(UIowa)
Quantum beating of dynamically interacting excitons in semiconductors: Vectorial dynamics and polarisation selection rules

11:35  G. Kurizki(Weizmann)
Laser Induced Gravity: 1/r forces in cold gases

11:55  H. Piloff(ONR)
The van der Waals effect on atom guiding of excited states.

12:15  Y. Zhu(Florida)
Manipulation of neutral atoms with dark hollow laser beam

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Tuesday Evening

Plenary
R. Gordon(Illinois)

7:00-7:30  M. Shapiro(Weizmann)
Control of Chiral Molecule Production and Photoassociation of Ultracold Atoms by Coherent Population Transfer

7:30-8:00  R. Packard(Berkeley)
Progress toward a superfluid $^3$He quantum interference gyroscope

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Coherence Effects II
V. Kocharovsky(TAMU)

8:05  G. Welch(TAMU)
Slow Group Velocities and Index Enhancement Via Quantum Coherence.

8:25  D. Yavuz/S. Harris(Stanford)
Eigenvectors of a Raman Medium

---

Gyroscopic Physics
R. Packard(Berkeley)

F. Karwacki(Navy)
Multiple quantum well visible light micro-structure modulator for a ring laser gyroscope.

S. Aseyev/P. Korkum(Ottawa)
Experimental demonstration of optical centrifuge for molecules

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Optical Lattices
M. O'Hare(Dayton)

I. Deutsch(UNM)
Entangling atoms in an optical lattice

V. Milner(UTexas)
Chaos and Decoherence in Time-Dependent Optical Potentials

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8:45-9:05  Coffee Break

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Plenary
M. Fedorov(Moscow)

9:00-9:30  M. Lax(New York)
The Lax-Onsager Regression Theorem Revisited

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Coherent Control II
V. Velichansky(TAMU)

9:40  M. Motzkus(MPQ)
Coherent Control in atoms and molecules with shaped femtosecond pulses and feedback optimization

10:00  T. Weinacht (Michigan)
Using quantum systems to solve algorithms and using algorithms to learn about quantum systems

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Corelated Emission Laser (CEL) Gyro
M. O'Hare(Dayton)

M. S. Zubairy(TAMU)
CEL : concepts and recent advances

J. Bergou(CUNY)
Nonlinear theory of CEL gyro

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Frontiers in Applied Optics
N. Kroo(Budapest)

S. Wilkinson(Raytheon)
General Studies in Infrared Countermeasure Systems

J. Dowling(JPL)
Quantum Interferometric Lithography
### 30th Winter Colloquium on the Physics of Quantum Electronics

**Wednesday Morning**

#### Plenary

- **7:25-7:55**  
  **M. Lax (New York)**  
  *Quantum Cascade Lasers*

- **7:55-8:25**  
  **F. Capasso (Lucent)**  
  *The Growth of Quantum Cascade Lasers and communication Lasers with Solid Source Molecular Beam Epitaxy (MBE)*

- **8:25-8:45**  
  **A. Cho (Lucent)**  
  *The Growth of Quantum Cascade Lasers and communication Lasers with Solid Source Molecular Beam Epitaxy (MBE)*

- **8:50-9:10**  
  **F. Tittel (Rice)**  
  *Spectroscopic Applications of Quantum Cascade Lasers*

- **9:10-9:30**  
  **M. Taubman (JILA)**  
  *Stabilizing Quantum Cascade Lasers*

- **9:30-9:50**  
  **E. Whittaker (Stevens)**  
  *Frequency Modulation Spectroscopy Using the Quantum Cascade Laser*

- **9:50-10:10**  
  **Coffee Break**

- **10:10-10:40**  
  **S. Svanberg (Lund)**  
  *Quantum Information*

- **10:40-11:10**  
  **L. Cohen (CUNY)**  
  *Wigner Distributions*

- **11:15-11:35**  
  **J. Dowling (JPL)**  
  *The universality of the quantum Fourier decomposition in forming the basis of quantum computation*

- **11:35-11:55**  
  **C. Williams (JPL)**  
  *Quantum Constraint Satisfaction*

- **11:55-12:15**  
  **L. Wang (NEC)**  
  *Can an ideal quantum logic gate maintain entanglement?*

- **12:15-12:35**  
  **D. Abrams (JPL)**  
  *Is quantum computing useful?*

**Quantum Cascade Lasers**

- **F. Tittel (Rice)**  
  *Spectroscopic Applications of Quantum Cascade Lasers*

**BEC and Atom Optics II**

- **M. Holthaus (Uni-Muenchen)**  
  *Density independent phase evolution of multicomponent condensates*

- **M. Moore (Arizona)**  
  *Magnetic Guides and a Neutral-Atom Beamsplitter*

- **D. Mueller / D. Anderson (Colorado)**  
  *Local-field effects in atom optics and the diffraction of dense atomic beams*

**Quantum Computation**

- **J. Dowling (JPL)**  
  *The universality of the quantum Fourier decomposition in forming the basis of quantum computation*

- **C. Williams (JPL)**  
  *Quantum Constraint Satisfaction*

- **L. Wang (NEC)**  
  *Can an ideal quantum logic gate maintain entanglement?*

- **D. Abrams (JPL)**  
  *Is quantum computing useful?*

**Wigner Distributions and Quantum-Classical Interface**

- **L. Cohen (CUNY)**  
  *Reduced Interference Time-Frequency Distributions*

- **L. Atlas (Washington)**  
  *TBA*

**Coherence Effects in Solids II**

- **T. Mossberg (Oregon)**  
  *Interference Effects in Solids*

  *Implementation of 'hard optical pulses' and NMR-like pulse sequences in optical spectroscopy*

- **Y. Rostovtsev (TAMU)**  
  *Interference Effects in Solids*

**Wigner Functions and Tunneling**

- **W. Schleich (Uni-Ulm)**  
  *Wigner Functions and Tunneling*

**Index Enhancement & Nonlinear Effects in Mesoscopic Media**

- **O. Keller (Denmark)**  
  *Index Enhancement & Nonlinear Effects in Mesoscopic Media*
30th Winter Colloquium on the Physics of Quantum Electronics

Wednesday Evening

Plenary
Y. Shih (Maryland)

7:00-7:30 P. Richards (Berkeley)
*Anisotropy of the cosmic microwave background radiation—Was the early universe a phase conserving linear amplifier?*

Squeezed Light
J. Bergou (CUNY)

7:35 A. Matsko (TAMU)
*Reduction of quantum fluctuations of electromagnetic field via coherent medium*

7:55 M. Xiao (Arkansas)
*Sub-shot-noise-limited optical heterodyne detection using an amplitude-squeezed local oscillator*

8:15-8:35 Coffee Break

BEC and Atom Optics III
G. Kurizki (Weizmann)

8:35-9:05 Y. Yamamoto (Stanford)
*Single Photon Turnstile*

Coherence effects III
J. Bergou (CUNY)

8:35-9:05 V. Velichansky (TAMU)
*High precision magnetometry in dense coherent media*

9:10  K. Eikema/T. Hänisch (MPQ)
*Continuous coherent Lyman-alpha radiation: a step closer to antihydrogen physics*

9:30  R. Huang (Stanford)
*Stimulated scattering of excitons into cavity polaritons*

9:30  R. Jain (UNM)
*Advanced Mid-IR Lasers Based on New, Highly-Efficient Cross-Relaxation Processes*

9:30  S. Wilkinson (Raytheon)
*T. Chuang (Fibertek) Multi-band Solid-State Laser for Infrared Countermeasures*

9:30  A. Belyanin (TAMU)
*Coherent far-infrared radiation from quantum-dot semiconductor heterostructures*