

**U.S.-Japan Seminar:**  
**“Manipulation of Matter by Coherent Light”**

Kusatsu, Gunma Prefecture, Japan

Sponsorship: JSPS & NSF

September 1 - 5, 1997

Organized by Kohzo Hakuta and Philip H. Bucksbaum

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**Monday**

- 15:25 - 15:30            **Opening Remarks**
- 15:30 - 16:05        **Ultrasensitive spectroscopy using high finesse cavities**  
                         J.L. Hall, JILA
- 16:05 - 16:40        **Spectroscopy of atoms and molecules in liquid helium and cold  
                         helium gas**  
                         M. Takami, Institute of Physical and Chemical Research
- 16:40 - 17:15        **Microwave Spectroscopy of Atoms in Slow-wave Structure and Its  
                         possible application in Manipulation of Atoms**  
                         Y.Z. Wang, SIOFM, Shanghai
- 17:15 - 17:50        **Laser Spectroscopy of neutral atoms interacting with liquid helium,**  
                         T. Yabuzaki, Kyoto University
- 18:30 - 20:30            **Reception**
- 21:00 - 22:30        **Poster/Discussion**

## Tuesday

8:15 - 8:50      **Quantum Interference Effects in Atoms**

George Welch, Texas A & M University

8:50 - 9:25      **Solid Hydrogen: New Possibility in Nonlinear/Quantum Optics**

K. Hakuta, University of Electro Communications

9:25 - 10:00    **Nonlinear Optics With Maximum Coherence**

Andrew Merriam, Stanford University

### Break

10:30 - 11:05    **Nonlinear Optics with Polaritons**

M. Gonokami, University of Tokyo

11:05 - 11:40    **Controlling the position dependent degree of excitation inside an optical medium**

R. Grobe, Illinois State University

11:40 - 12:15    **Nonlinear Nonreciprocal Optical Responses of Transition-Metal Oxides**

E. Hanamura, University of Tokyo

### Lunch

16:30 - 17:05    **Control of Foeerster energy transfer between molecules in a microcavity**

T. Kobayashi, University of Tokyo

17:05 - 17:40    **Cavity QED experiments, quantum superpositions and decoherence**

M. Brune, E.N.S., Paris

17:40 - 18:15    **Spin Manipulation by Absorption-free Optical Pumping**

Masao Kitano, Kyoto University

### Dinner

20:30 - 22:30    **Poster/Discussion**

## Wednesday

8:15 - 8:50 **Atom Holography**

F. Shimizu, University of Tokyo

8:50 - 9:25 **Atom Interferometry**

M. Kasevich, Yale University

9:25 - 10:00 **An atom interferometer comprised of copropagating traveling laser beams**

A. Morinaga, Science University of Tokyo

### Break

10:30 - 11:05 **Atoms in Optical Lattices**

W. Phillips, NIST at Gaithersburg

11:05 - 11:40 **Observation and control of the atomic motion in an optical potential**

K. Nakagawa, Tokyo Polytechnic University

11:40 - 12:15 **No title yet**

Stephen Smith, Harvard University

### Lunch

16:30 - 17:05 **Interactions and Bose-Einstein Condensation of Ultracold Atomic Rb**

Dan Heinzen, University of Texas

17:05 - 17:40 **Kinetic evolution of evaporative cooling and BEC for atomic gas in a magnetic trap**

M. Yamashita, NTT

17:40 - 18:15 **Bose-Einstein Condensation of Lithium - It's Not Just Another Condensate!**

R. G. Hulet, Rice University

18:15 - 18:50 **Macroscopic quantum tunneling of a Bose-Einstein condensate with attractive interaction**

M. Ueda, Hiroshima University

### Dinner

20:30 - 22:30 **Poster/Discussion**

SH(CH<sub>2</sub>)CH<sub>3</sub>  
SAM

## Thursday

- 8:15 - 8:50      **Optical frequency comb generator over 10 THz**  
M. Kourogi, Tokyo Institute of Technology
- 8:50 - 9:25      **Atom optics using hollow optical systems**  
W. Jhe, Seoul National University, Seoul
- 9:25 - 10:00     **The hyper-continuum coherent light source and its application for  
high-speed , broad-band measurements**  
H. Nishioka, University of Electro-Communications

### Break

- 10:30 - 11:05    **Quantum Control of atomic wavefunctions**  
P. Bucksbaum, University of Michigan
- 11:05 - 11:40    **Molecular Optics**  
H. Sakai, Electrotechnical Laboratory
- 11:40 - 12:15    **Single and Multiple Electron Dynamics in the Strong-Field Limit**  
L. DiMauro, Brookhaven National Laboratory

### Lunch

- 16:00 - 16:35    **No title yet**  
R. Falcone, U.C. Berkeley
- 16:35 - 17:10    **Calculation of high-order ATI enhancement by dynamic single-  
electron resonances**  
H. Muller, FOM Institute, Amsterdam
- 17:10 - 17:45    **High-Intensity Laser Physics Project at JAERI**  
H. Takuma, Japan Atomic Energy Research Institute
- 17:45 - 18:05    **Opportunities for U.S.-Japan Cooperative Research**  
Edward O. Murdy, Director of NSF/Tokyo

18:30 - 20:30                    **Banquet**

21:00 - 22:30      **Poster/Discussion**

## Friday

Leave for Tokyo

### Presiders

	<b>Morning I</b>	<b>Morning II</b>	<b>Afternoon</b>
<b>Monday</b>			K. Hakuta
<b>Tuesday</b>	R. Falcone	T. Yabuzaki,	J. Hall
<b>Wednesday</b>	E. Hanamura,	R. Hulet,	F. Shimizu
<b>Thursday</b>	W. Phillips,	T. Kobayashi,	P. Bucksbaum

# Poster Presentations

## Monday

### **Two-Atom Correlation of an Laser-cooled Ne Atomic Beam**

Masami Yasuda and Fujio Shimizu, University of Tokyo

### **Precise frequency-difference measurement of the 1.66-micron-band transitions of methane**

H. Sasada, Keio University

### **Limit of controlling quantum bits by coherent lights**

N. Imoto, K. Igeta, and M. Koashi, NTT

### **Optical Bragg Hologram for Atoms**

T. Kishimoto, Univ. of Tokyo

## Tuesday

### **Photonic Band Calculations with High Accuracy**

Y. Ohfuti, University of Electro-Communications

### **Light amplification without inversion by using laser-cooled rubidium atoms**

N. Shiokawa et al, University of Tokyo

### **High frequency stabilization of an Injection-locked Nd:YAG laser for gravitational wave detection**

Mitsuru Musha , Spacetime Astronomy Section, National Astronomical Observatory

## Wednesday

### **Efficient detection of longlife time transitions using laser cooled atoms**

T.Kurosu, National Research Laboratory of Metrology

### **Optical dipole trap of atoms with a Laguerre-Gaussian laser beam**

Y. Torii et al., University of Tokyo

### **Anomalous Dynamics of a Single Ion in an Optical Lattice**

Hidetoshi Katori, Stefan Schlipf, and Herbert Walther, Max-Planck-Institut für Quantenoptik, Garching, Germany

### **Velocity-selective coherent population trapping: Cooling or monochrotization?**

Fam Le Kien and V.I. Balykin, University of Electro-Communications

## Thursday

### **Ionizing collisional rate of metastable rare-gas atoms in an optical lattice**

Tetsuya Ido, University of Tokyo

### **Extension of FIR Laser Spectroscopy to Higher Frequencies**

M.Tachikawa, H.Odashima, L.Zink, and K.Evenson, NIST-Boulder

### **Sub-Poissonian light generation by light-emitting diodes**

T. Hirano, J. Abe, T. Kuga, M. Yamanishi, University of Tokyo, Hiroshima University