

DIVISION OF ATOMIC, MOLECULAR AND OPTICAL PHYSICS NEWSLETTER

A Division of The American Physical Society

April 2001

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LETTER FROM THE CHAIR

Plans are now complete for the upcoming DAMOP meeting, joint with the Division of Atomic and Molecular Physics (DAMP) of the Canadian Association of Physicists, in London, Ontario. By the time you receive this newsletter, the meeting program should be available at the APS website. The invited and contributed papers reflect the tremendously interesting physics being done in a variety of areas in AMO science. I look forward to a terrific meeting and

hope to see you there.

The annual meeting is, of course, the most important activity of DAMOP. Efforts to shape the meeting to best meet the goal of maintaining and improving the vitality of the science and the community will be a constant part of planning for DAMOP. This newsletter contains a report on the results of the poll on meeting options sent out with the last newsletter. The results show substantial interest in some version of a joint meeting with the Division of Laser Science, less interest in returning to a pattern of meetings joint with the APS April meeting, and substantial support for keeping DAMOP meetings as they are currently. At a meeting of the officers of DAMOP and DLS at the APS Unit Convocation in January, we discussed how to increase the interactions between DLS and DAMOP without moving to a joint meeting. There was a strong feeling that increased interactions between the divisions would be good for the science and unanimous support for sharing symposia at each division's meeting. We agreed that DAMOP should sponsor an invited session at the 2002 ILS meeting and DLS should sponsor an invited session (perhaps emphasizing the "M" in DAMOP) at the 2002 DAMOP meeting in Williamsburg, Virginia. We also agreed to send representatives to each other's executive and program committee meetings. These connections should serve the science and the community well.

-- Dan Larson

ONE FINAL REMINDER..

The 2001 Division of Atomic, Molecular and Optical Physics Annual Meeting will be held May 16 - 19, 2001 in London, Ontario, Canada. Website:
<http://gandalf.physics.uwo.ca/DAMOP2001/>

The Invited Symposia are:

Plenary Session. Monroe, Datz.

Quantum Control in Atomic and Molecular Systems. Prezhdo, Jessen, Levis

NIST Centennial Symposium: A Revolution in Atomic Timekeeping. Bergquist, Salomon, Kitching, Maleki

From Atom Coherences to Slow Light. Harris, Hau, Hakuta, Tombesi

Interactions of Ions with Atoms, Molecules, and Surfaces. Belkacem, Weber, Hamza, Flechard

DAMOP Thesis Prize Session. Nogues, Weinacht, Moore, Callegari

Quantum Condensed Systems. Jin, Gustavson, Heinzen, Haljan

Undergraduate Research Session. Papp, Olson, Rosenband,
Campbell, Wagner

NIST Centennial Symposium: Fundamental Constants and
Spectroscopy. Gundlach, Udem, Steiner, Hessels

Non-Linear and Quantum Atom Optics. Moore, Orzel, Pritchard,
Rolston.

Dynamical Processes Involving 3-Body Fragmentation. Zajfman,
Esry, Baertschy, Ivanov

Nanostructures and Clusters. Lehmann, Bonin, McEuen, Renn

Quantum Information. Blatt, Caves, C"t , Bigelow.

Interaction of Photons with Atoms, Ions, and Molecules. Phaneuf,
Landers, Azuma, Southworth

Advances of Physics Frontiers with High Power Lasers. Freeman,
Corkum, DiMauro, Ditmire

Late Breaking Progress. Lukin, Rowe, Umstadter, Lagmago Kamta,
Zygelman.

Electron-Driven Processes: From Theory to Environmental
Applications. Gay, Donnelly, Becker, Orlando

CONGRATULATIONS TO NEW DAMOP APS FELLOWS!

We are proud to announce and to congratulate the following new DAMOP members as Fellows of the American Physical Society. Most were elected by the DAMOP Fellowship Committee; those with asterisks following their names were elected through other APS units. DAMOP Fellowship certificates will be presented at the Banquet at the 2001 London meeting this May.

Dana Zachery Anderson

University of Colorado

For his theoretical and experimental contributions to nonlinear optics and atom optics and for creating a number of remarkable optical devices for information processing and pattern recognition.

Rainer Blatt

University of Innsbruck

For outstanding work in quantum optics and precision spectroscopy with laser cooled trapped ions.

Michael John Cavagnero

University of Kentucky

For creative analyses of atomic collisions, fragmentation and electron correlation, which incorporate keen insight into innovative mathematical formulations; and for energizing many successful collaborations with experimental and theoretical colleagues.

Jerome Lewis Duggan*

(through the Forum on Industrial and Applied Physics)
University of North Texas

For outstanding contributions in the application of low energy nuclear technology for analysis in the semiconductor, metals, and geophysics industries, and for initiating an international conference as a forum for the interaction of industrial and academic physicists

Mark Andrew Edwards

NIST

For application of first-principles theory to the understanding of Bose-Einstein condensation in dilute atomic gases.

Roderick V. Jensen

Wesleyan University

For pioneering contributions to the understanding of strongly perturbed quantum systems that are classically chaotic, like Rydberg atoms in strong fields, and for the extension of the methods of nonlinear dynamics across many disciplines, from atomic physics and mesoscopic solid-state physics to biophysics and neuroscience.

Robert Rivers Jones, Jr.

University of Virginia

For the development of experimental probes of Rydberg atoms and for providing new insights about their behavior.

John W. Keto

The University of Texas - Austin

For studies of the energy transport phenomena in dense gases and clusters excited by resonant photon.

Murtadha A. M. Khakoo

California State University - Fullerton

For contributions to experimental electron scattering from fundamental targets and for involvement of undergraduate and high school students in front-line research.

Prem Kumar

Northwestern University

For pioneering experimental contributions to the generation, detection, and application of the twin-beam quantum state produced by means of pulsed parametric amplification.

Ann E. Orel

University of California, Davis

For pioneering the understanding and development of theoretical methods for studying excitation, ionization and dissociation of polyatomic molecules.

David R. Schultz

Oak Ridge National Laboratory

For development of novel lattice methods for solving the time-dependent Schrödinger equation, providing fundamental new insights in atomic collisions, and disseminating AMO data to other research communities.

Krzysztof Szalewicz

University of Delaware

For definitive contributions to the theory and calculation of intermolecular forces, electron correlation, exotic molecular phenomena, and neutrino mass experiments, using explicitly correlated basis functions.

Albert Anthony Viggiano

Air Force Research Laboratory/VSBP

For studies of the kinetics of ion interactions with neutral molecules, especially for the elucidation of internal energy effects and the influence of high temperatures and pressures, and atmospheric implications.

Colm Thomas Whelan*

(through the Few Body Systems Topical Group)

University of Cambridge

For many significant contributions to atomic collision theory and most especially for original work on (e, 2e) and related processes.

REGISTER YOUR EMAIL ADDRESS NOW!

If you are part of the last 5% of the DAMOP membership for whom we do not have an email address, please help us out by sending it to APS at coa@aps.org. We are sending out more and more announcements solely by email, and hope to start voting by email in the near future.

SHELDON DATZ WINS THE U.S. ENRICO FERMI AWARD

In December, Sheldon Datz was awarded the U.S. Government's Enrico Fermi Award, one of the oldest and most prestigious U.S. science awards. The award is given to "encourage excellence in energy science and technology; to recognize scientists, engineers, and science policy makers who have given unstintingly over their lifetimes to benefit humanity through energy science and technology; and to inspire people of all ages through the example of Enrico Fermi, whose achievements opened new scientific and technological realms." Datz's citation reads: "For his pioneering studies in the fields of crossed molecular beam chemistry and collisions at ultra low energies to cast light on the chemistry of the early universe, for his studies in atomic physics and ion channeling,

and for his use of the apparatus of particle physics to reveal new atomic effects at ultrarelativistic energies." Previous laureates have included E.O. Lawrence, Hans Bethe, and Edward Teller. Sheldon's share of the prize is a cool \$67K. He will be speaking at a plenary prize session at the London meeting.

CONFERENCE ON COHERENCE AND QUANTUM OPTICS

The Eighth Rochester Conference on Coherence and Quantum (CQO8) is inviting the submission of papers for presentation. The deadline for submission is March 1, 2001. The meeting will be June 13-16, 2001, in an informal atmosphere on the campus of the University of Rochester. Registration at the website <http://www.osa.org/cqo8> being maintained by OSA will provide updates on CQO8 information about contributions, program, deadlines, housing, etc.

In summary, all experimental and theoretical aspects of coherence and quantum optics will be of interest at the meeting. A special CQO8 session on historical aspects of quantum optics is being organized. A popular feature of CQO7 was invited plenary tutorial talks, and this feature will be continued. Tutorial speakers already confirmed for CQO8 include

- W. Ketterle (MIT): Coherence in BEC's;
- H.J. Kimble (Caltech): Cavity QED ;
- P.W. Milonni (Los Alamos): Slow light and fast light .

Specific topics to be addressed at CQO8 are expected to include:

- coherence effects in Bose and Fermi degenerate gases;
- generation, detection and entanglement of non-classical states;
- laser control of atomic and molecular motion and NL atom optics;
- cavity QED and control of single atom motion;
- coherence in condensed matter, and quantum nonlinear optics;
- collective and cooperative quantum coherence;
- EIT, LWI, slow light and fast light;
- quantum optical tests of QM;
- mesoscopic quantum coherence and quantum wave packets;
- classical statistical optics and space-frequency coherence;
- short-pulse propagation and quantum optical solitons.

Special note -- CQO8 will immediately follow and partially overlap the International Conference on Quantum Information (ICQI) which will be held at the University of Rochester on June 10-13, 2001. Several joint sessions of CQO8 and ICQI are planned for June 13. Additional information about ICQI is available at the website <http://www.osa.org/icqi>.

RESULTS OF DAMOP MEETING BALLOT

The results of the DAMOP meeting ballot/questionnaire from the last newsletter are as follows:

Option IA: Fall meeting every year with the Division of Laser Sciences (DLS)

-- 42 votes.

Option IB: Negotiate with the DLS to see if a spring meeting could work

-- 49 votes.

Option II: Start meeting again with the APS in April every third year

-- 56 votes.

Option III: Maintain the status quo

-- 108 votes.

This vote will be incorporated into the discussions of the Executive Committee regarding future meetings. Thanks to everyone who took the time to vote!

RABI PRIZE ANNOUNCED

This year's Rabi Prize has been awarded to Chris Monroe, of the University of Michigan. His citation reads: "For his pivotal experiments that implemented quantum logic using trapped atomic ions, and for his fundamental studies of coherence and decoherence in entangled quantum systems." Chris will present a talk on his work at the Plenary Prize Session at the London Meeting.

COMPUTATIONAL PHYSICS MEETING IN CAMBRIDGE, MASSACHUSETTS

The 2001 Annual Meeting of the Division of Computational Physics (DCOMP) will be held on the campus of the Massachusetts Institute of Technology, June 25- 28, 2001. The program committee has made special efforts to have the meeting reflect the breadth and richness of activities embodied by the phrase "computational physics." Everyone interested in computational physics is urged to attend. Selected highlights of the meeting can be viewed by going to </DCOMP/meet01/highlights.cfm>. For example, you might want to check the information about the hands-on tutorial on building a Beowulf cluster. The latest information about the program, including details on abstract submission, housing, and registration, are available at </DCOMP/meet01>. The program schedule and abstracts will be available in mid-April. Register now through May 31, 2001 and take advantage of reduced fees!

FREE MAGNETIC POLES!

No, no, it's not what you think. Dave Wineland has a couple of old Varian electromagnets (including power supplies), between 10 and 15 kilogauss with a pole-face gap of about 5cm. He is happy to give these away to a good home. You pay shipping. Contact:

David J. Wineland
Group Leader, Ion Storage
NIST, Division 847
325 Broadway, Boulder, CO 80305-3328
(303) 497-5286
david.wineland@boulder.nist.gov

LOS ALAMOS SUMMER SCHOOL

The Los Alamos Summer School will run for ten weeks from June 4 to August 10, 2001. The program consists of an intensive series of lectures, tutorials, and mentored research projects. Upper-division undergraduates remain the principal focus of the School. First-year graduate students and sophomores with exceptional physics backgrounds will also be considered. The deadline for applications is March 1, 2001. The School functions as a joint collaboration between the Los Alamos National Laboratory and the University of New Mexico. Recruiting this year originates from UNM-Albuquerque (Prof. Sally Seidel), and the summer program resides in Los Alamos. For further information and application forms, please see our Website at <http://www.phys.unm.edu/LASS/> or

Los Alamos Summer School
Department of Physics and Astronomy
University of New Mexico
800 Yale Blvd. N.E.
Albuquerque, NM 87131-1156
seidel@glueball.phys.unm.edu
505-277-1520 (fax)
505-277-2616 (voice)

Correspondent: Lee Collins (lac@lanl.gov)

INTERNATIONAL CONFERENCE ON QUANTUM INFORMATION

The International Conference on Quantum Information (ICQI) is inviting the submission of papers for presentation. The deadline for submission is March 1, 2001. The meeting will be June 10-13, 2001, in an informal atmosphere on the campus of the University of Rochester. Registration at the website <http://www.osa.org/icqi>

being maintained by OSA will provide updates on ICQI information about contributions, program, deadlines, housing, etc.

ICQI will be the first large-scale international conference on quantum information, covering topics spanning the field, including experimental and theoretical work. The conference will focus on issues of current interest, including: quantum communication, quantum cryptography, quantum computing, algorithmic development, quantum vs. classical theory, entanglement, distillability, and fidelity. All implementations of quantum information processing will be covered, including NMR, solid-state and atomic, molecular and optical platforms.

Confirmed tutorial speakers and their topics will include:

- P.L. Knight (Imperial College): Quantum Information Science
- D. Bruss (Univ. Hannover): Characterizing Entanglement
- D. Mermin (Cornell Univ.): Quantum Computing
- J. Preskill (Caltech): Quantum Error Correction

Special note -- ICQI will immediately precede and partially overlap the Eighth Rochester Conference on Coherence and Quantum Optics (CQO8) which will be held at the University of Rochester on June 13-16, 2001. Several joint sessions of CQO8 and ICQI are planned for June 13. Additional information about CQO8 is available at <http://www.osa.org/cqo8>.

LANL POSTDOC POSITION AVAILABLE

There is a Postdoctoral position available at Los Alamos National Laboratory in the Atomic & Optical Theory Group. The appointment would be for 2-3 years with the possibility of a permanent staff position at the end of this term. U.S. citizenship required. Work will involve basic and applied investigations of muonic atom and molecule formation, collisions, and catalyzed fusion. Position is theoretical but ability to model experiments is relevant. For further information or application, contact:

James Cohen
Group Leader, Atomic & Optical Theory (T-4)
MS-B212
Los Alamos, NM 87545
(505)667-5982
cohen@lanl.gov

TAMOC ELECTS NEW OFFICERS

The Theoretical AMO group has elected Jim Babb (Harvard Smithsonian) and Carl Williams (NIST) as Chair and Secretary, respectively. There will be a TAMOC meeting on the Tuesday evening of the DAMOP meeting in London. Check for the time and location when you register.

NUMBER OF DAMOP DIVISIONAL COUNCILLORS HALVED

By a vote of the APS Membership, the Divisions of the Society now have only one representative each on the APS Council, regardless of Division Size. This decision was put to the membership after a Task Force Report concluded that Council meetings were becoming too large. The DAMOP's current Divisional Councilor is Hal Metcalf (SUNY-Stony Brook), who will be replaced in 2003. Eric Heller (Harvard) will rotate off the Council this year without being replaced.

CANDIDATES FOR DAMOP OFFICE

Ballots are due 1 May 2001! DON'T FORGET TO SIGN YOUR BALLOT!

For Vice Chair: (will become Chair-Elect in 2002 and Chair in 2003)

DUNNING, F. BARRY.

B.Sc., University College London, 1966; Ph.D., University College London, 1969. I.C.I. Postdoctoral Fellow, University College London, 1969-71. Research Associate, 1971-74; Assistant Professor, 1974-78; Associate Professor, 1978-82; Professor, 1982-2000; Sam and Helen Worden Professor of Physics, 2000-present, Rice University. Chair, Department of Physics and Astronomy, Rice University, 1998-present. Alfred P. Sloan Foundation Fellowship, 1976. Nicholas Salgo Distinguished Teaching Award, Rice University, 1980. George R. Brown Prize for Excellence in Teaching, Rice University, 1983. Fellow of the American Physical Society, 1986. Member, DAMOP Program Committee, 1988-91; Executive Committee, 1990-93.

Secretary/Treasurer DAMOP, 1996-99. Member, Editorial Board, Review of Scientific Instruments, 1989-91. Member, NRC Panel on Future Opportunities in Atomic, Molecular and Optical Sciences, 1991-93. Chair, NRC Atomic- Molecular-Optical Sciences Assessment Panel, 1993. Member, NSF Advisory Committee for Physics, 1991-93. Member, EPSRC Atomic and Molecular Physics Review Panel, 1993-94. Chair, Will Allis Prize Committee, 1995. Member, Research Corporation Award Programs Advisory Committee, 1996- present. Member, Advisory Committee for the AIP Statistical Research Center, 1998-present.

RESEARCH INTERESTS: Atoms in high-lying Rydberg states and their application to studies of non-linear dynamics, control and manipulation of atomic wave functions, atom/surface interactions, and electron-molecule and ion- molecule reactions; use of electron-spin labeling techniques to examine the dynamics of atom/surface and ion/surface interactions; spin-sensitive surface spectroscopies; thin film magnetism.

GOULD, PHILLIP L.

B.S. (Physics and Mathematics) Bates College, 1979; Ph.D. (Physics), MIT, 1986; Senior Technical Associate, Bell Telephone Laboratories, Holmdel, NJ, 1979-80; NRC Postdoctoral Fellow, National Bureau of Standards, Gaithersburg, MD, 1986-87; Assistant Professor, Associate Professor, and Professor of Physics, University of Connecticut, 1988-present; NSF Presidential Young Investigator (1988-93); Alfred P. Sloan Foundation Fellow (1990-92); APS Fellow, 1997; Editorial Committee, Conference on Precision Electromagnetic Measurements (1986); U.S. Editor for Progress in Quantum Electronics (1989-92); Program Committee, International Laser Science Conference (1987-90, 2000); Program Committee, Quantum Electronics and Laser Science Conference (1995, 1997); Vice-Chair (1995) and Chair (1997), Gordon Conference on Atomic Physics; ICPEAC General Committee, 1997-present; Local Organizing Committee, 2000 DAMOP Meeting; NRC Committee on Atomic, Molecular, and Optical Science (CAMOS), 1996-99; Nominating Committee (Chair, 1998), APS Division of Laser Science, 1997-99.

RESEARCH INTERESTS: Laser Cooling and Trapping; Cold Collisions; Photoassociative Spectroscopy; Ultracold Molecules; Rydberg Atoms; Quantum Optics; Atom Optics; Laser Spectroscopy

For Executive Committee: (three-year term)**MADISON, DON H.**

B.A. (Mathematics), Sioux Falls College, 1967; Ph.D. (Physics), Florida State University, 1972; Postdoctoral Research Associate, University of North Carolina (Eugen Merzbacher), 1972-74; Assistant, Associate and Professor of physics, Drake University, 1974-1984; Ellis and Nelle Levitt Professor of Physics, Drake University, 1984-88; Professor of Physics, University of Missouri-Rolla; 1988-98; Curators' Professor of Physics, University of Missouri-Rolla, 1998-present; Visiting Scientist, University of M nster, 1984; Visiting Scientist, Flinders U. of South Australia, 1988; Visiting Scientist, Institute of Theoretical Physics, Santa Barbara, 1991; Director of the Laboratory for Atomic, Molecular and Optical Research, University of Missouri-Rolla, 1999- present; Fellow of the American Physical Society, 1993; President of TAMOC, 1994-1998; DAMOP Program Committee, 1994-1997; US Organizer for joint US- Australia Workshop, 1995; Organizer of DAMOP Undergraduate Research Competition, 1994-2000; AP Committee on Education, 1997-1999; DAMOP Committee on Publications, 1996-1999; DAMOP Education Committee, 1999-2002; ICPEAC general committee, 1999-2003; International Chair for "The International Symposium on (e,2e), Double Photoionization and Related Topics"; 1999-2001; International Chair for "Eleventh International Symposium on Polarization and Correlation in Electronic and Atomic Collisions", 1999-2001; Organizing committee for 13 different International meetings.

RESEARCH INTERESTS: Perturbative and non-perturbative

approaches to atomic scattering theory; Time-dependent scattering theory; Interaction of electrons, positrons and ions with atoms.

OREL, ANN E.

B.S., California Institute of Technology, 1977; Ph.D., University of California, Berkeley, 1981; Staff Scientist, Lawrence Livermore National Laboratory 1981-85 ; Member of the Technical Staff, The Aerospace Corporation, 1985-88 ; Assistant Professor, 1988-90, Associate Professor, 1990- 95, Professor, 1995-present, University of California, Davis, Staff Scientist Lawrence Livermore National Laboratory 1990-present; Visiting Researcher, Freie Universit"t, Berlin 1998-1999. Fellow of the American Physical Society, 2001; General Committee, International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC) 1997-2001; International Organizing Committee, International Symposium on Electron-Molecule Collisions and Swarms 1999- 2001; Nominating Committee, Few Body Systems Topical Group 2000-present; Selection Committee, Will Allis Prize 2001-2003; NRC Committee on Atomic, Molecular and Optical Science (CAMOS) 2001-present.

RESEARCH INTERESTS: Theoretical AMO physics: electron scattering from molecules and molecular ions; photoionization of molecules; photodissociation; dissociative attachment and recombination of electrons from molecular targets.

RAIZEN, MARK G.

B.Sc. (Mathematics) Tel Aviv Univ., 1980; Ph.D. (Physics), Univ. of Texas at Austin, 1989. Postdoctoral Fellow, NIST Boulder, 1989-1991. Assistant Professor of Physics, Univ. of Texas at Austin, 1991-1996. Associate Professor of Physics, Univ. of Texas at Austin, 1996-2000. Sid W. Richardson Foundation Regents Chair in Physics and Professor of Physics, Univ. of Texas at Austin, 2000-. **AWARDS:** Univ. of Texas Graduate Fellow, 1986-1987; IBM Graduate Fellow, 1987-1988; NRC Postdoctoral Fellow, 1989-1991; ONR Young Investigator, 1992-1995; Alfred P. Sloan Foundation Fellow 1992-1994; NSF Young Investigator, 1993-1998; Sid W. Richardson Foundation Regents Chair Fellow, 1991-1993, 1998-2000; Fellow of the American Physical Society, 1997; I. I. Rabi Prize, American Physical Society, 1999. **SERVICE:** Member and Chairman, A. L. Schawlow Prize Committee of APS, 1998-1999; Member and Chairman, Max Born Award Committee of OSA, 1998-1999; Member of technical program committees of IQEC, QELS and DAMOP. Member of 2001 Rabi Prize Committee of APS; Member OSA Book Committee, 1998-2000; Editorial Board Member, Institute of Physics, 1999-2002; Member Executive Committee, Division of Laser Science of APS, 1999-2002; Divisonal Associate Editor, Physical Review Letters, 2000-2003; Member of CAMOS, National Research Council, 2000-2002.

RESEARCH INTERESTS: Laser cooling and trapping of neutral atoms. Quantum chaos and quantum transport in optical lattices. Quantum reflection of atoms from surfaces. Development of methods for non-resonant laser cooling and trapping. Neutrino rest mass determination from beta-decay.

ROBICHEAUX, FRANCIS F.

BA w/ honors in physics: U. of Chicago 1985, Ph.D in physics: U. of Chicago 1991 NSF Young Investigator Award 1993-98
Asst.&Assc. Prof. Physics: Auburn University 1993-present
Visiting Scientist: AMOLF FOM Institute for Atomic and Molecular Physics, Amsterdam 1998-99

RESEARCH INTERESTS: Theoretical Atomic Physics, Rydberg states, wave packets, negative ions, 2-electron dynamics, time dependent atomic processes, damping & correlation in multielectron systems.

By a vote of the APS Membership, the Divisions of the Society now have only

[DAMOP Homepage](#)