Division of Atomic, Molecular and Optical Physics NEWSLETTER

A Division of The American Physical Society — August 1996

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Inside...

1996 AMO Doctoral Thesis Award Winner Announced!

The 1996 award for Outstanding Doctoral Thesis Research in Atomic, Molecular or Optical Physics goes to Aephraim M. Steinberg currently at the National Institute of Standards and Technology. The award consists of a check for $1,000 and a certificate from the American Physical Society. His thesis was entitled *"The single-photon tunneling time"* and was undertaken at U. C. Berkeley under the direction of Raymond Y. Chiao.

The prize winner was selected following a special invited session at the DAMOP Meeting in Ann Arbor. All of the finalists presented excellent talks to a large, receptive audience. This session is now one of the highlights of the annual DAMOP Meeting.

We are grateful to this year's selection committee, consisting of Phil Cosby (chair), Ken Kulander (vice-chair), Mark Kasevich, Paul Julienne and Peter Koch.

DAMOP Election Results!

We congratulate the 1996 DAMOP election winners:

Vice Chair:
Carl Wieman

Executive Committee:
Timothy Gay
Marsha Lester

Divisional Councillor
Eric Heller

The nominating committee consisted of Joe Dehmer (chair), Phil Bucksbaum, James Cohen, Gordon Dunn and Tony Starace. It is noteworthy that the number of ballots received has been increasing steadily: 173 in 1993, 267 in 1994, 360 in 1995 and 513 this year.

Message From the Chair

....Gordon Drake

As incoming Chair of DAMOP, I would like to express my appreciation to Rick Freeman, Past Chair, and to Paul Berman, Chair of the Local Organizing Committee, for a very successful and well run meeting in Ann Arbor last May. The ongoing success of these annual meetings attests to the strength and vitality of DAMOP, the oldest Division of the APS.

According to the established three-year cycle, the next annual meeting will be held jointly with the Spring Washington meeting of the APS, April 18-21, 1997. Although many of our members cherish the more intimate nature of separate meetings, the joint meeting planned for 1997 promises to be a particularly exciting one. It will feature special sessions to mark the 100th anniversary of the discovery of the electron (organized by Norman Bardsley), together with symposia organized jointly with the Division of Chemical Physics, the Topical Group on Precision Measurements and Fundamental Constants, and others. It will also be designated as the 1997 Canadian/American/Mexican (CAM) meeting with participation from all three countries. Special provisions will be made for members of DAMOP to meet together informally.

These joint meetings with the APS and other Divisions provide an opportunity to keep up with developments in other areas of physics. They help

to assert the essential unity of physics at a time when its funding is under severe pressure. Despite the apparent diversity of topics covered, the great strength of physics lies in its search for the unifying elements of understanding. Physicists have a long history of recognizing the importance of new phenomena and applying them in completely different situations. For all of these reasons, it is important to support the Washington meeting with your presence. Further details will be given in subsequent issues of the Newsletter.

Special Thanks!

Three DAMOP members deserve our special thanks:

Our outgoing chair, Rick Freeman, has served with dedication and provided effective leadership during the last year. *Thanks Rick!*

Joe Dehmer has just completed a four year term as Divisional Councilor and has ably represented DAMOP on the APS Executive Council. *Thanks Joe!*

As incoming Secretary-Treasurer of DAMOP, I wish to extend my sincere thanks to Ron Phaneuf who has served us so well during the past three years. Ron leaves the records and finances of DAMOP in excellent shape and continues to be a tremendous help in this transition period. *Thanks Ron!*

1996 DAMOP Meeting in Ann Arbor

The Ann Arbor meeting, which drew a record 732 participants, was a great success with 539 contributed and 58 invited papers.

We are grateful to the local organizing committee for their careful planning and attention to detail that made it so. The local organizing committee included Paul Berman (chair), Phil Bucksbaum, Tim Chupp, Ralph Conti, Kevin Coulter, Boris Dubetsky, Dave Gidley, Robert Gordon, Bob Lewis, Gerard Mourou, Ted Norris, Steve Rand, Mark Skalsey, Duncan Steel, Don Umstadter, John Ward, John Yukich, and Jens Zorn.

The local organizing committee deserve our heartfelt thanks for a job extremely well done!

Future DAMOP Meetings

Washington 1997:

The 1997 DAMOP meeting will be held in conjunction with the APS Spring meeting and will run from Friday, April 18 to Monday, April 21. This will also be the third joint meeting of the Canadian, American and Mexican Physical Societies, and the gas-phase constituent of the Division of Chemical Physics will meet concurrently. The meeting organization will satisfy DAMOP requirements for contiguous meeting rooms, a DAMOP reception, and space for participants to meet outside the sessions. DAMOP plenary and poster sessions will be held in the Renaissance Hotel, where the APS and other units will meet. All other DAMOP sessions will be held across the street in the Washington Convention Center.

Santa Fe 1988

The Executive Committee has voted to accept a proposal from a group from the Los Alamos National Laboratory headed by James Cohen to hold the 1988 DAMOP meeting in Santa Fe (New Mexico). The Sweeney Conference Center has been booked for May 27-29, 1988. Registration will take place on May 26. A government rate of ~$112 per night has been guaranteed at nearby hotels in the Plaza area. There are numerous less expensive hotels (< $70.00 per night) a few miles away, some of which operate shuttle vans. Student housing is available at St. John's College.

Atlanta 1999: APS Centenary Meeting

In 1999 the APS March and April meetings will be combined into one large meeting to be held the week of March 20-26 in the Atlanta Convention Center and the Westin Hotel. The DAMOP Executive Committee in Ann Arbor voted to meet there as a division. It is understood that the arrangement with the APS as regards the level of DAMOP's autonomy will remain the same as expected for a Spring meeting. Paul Neill has agreed to serve as DAMOP liaison person for this meeting.

More Thanks!

Thanks to Phil Bucksbaum and to Katherine Gebbie who just completed three-year terms on the DAMOP Executive Committee.

Electronic Submission of Abstracts

Of the abstracts received for the 1996 DAMOP meeting, 70% were transmitted electronically. The APS Meeting Department received nearly all these abstracts, and entered the titles and author's names of abstracts submitted by mail into the data base. The complete DAMOP program was available on line to members on March 15.

For the 1997 meeting only abstracts submitted electronically will be included in the Bulletin. Abstracts received by mail will be listed by title and author's names only.

DAMOP Membership

The official APS membership statistics show that as of January 1, 1996 DAMOP had 2,568 members, 6.33% of the total APS membership. This figure is little changed from the previous year and secures the division two representatives on the APS council. (APS bylaws grant divisions, forums and topical groups one representative for each 3% of total APS membership.)

The Washington Scene

The APS made its first major public foray into legislative affairs just over five years ago, when 150 physicists walked the corridors on Capitol Hill during the Society's April 1991 meeting. Months earlier, members of the DAMOP Executive Committee had wrestled with the problem of raising the image of physics among government leaders and the public. The result was the first Congressional Visits Program.

That year, as part of its triennial cycle, DAMOP was scheduled to participate in the APS Washington Meeting and the Congressional Visits Program was originally intended to be a divisional activity. But the APS leadership immediately embraced the idea and launched it as a Society function. Its success propelled the APS into the Washington scene in a way that would have been almost unimaginable even a year or two before.

The modest proposal that DAMOP advanced more than six years ago has grown into a much wider range of APS governmental activities. The Congressional Visits Program has become an annual event, although it is now held in the home districts and states of Representatives and Senators. This year, the 300 participating physicists received expanded packets of information that contained an assessment of the voting record of their Member of Congress and a break-down of federal science spending in their district. They also received a set of attention-grabbing physics impact sheets, prepared by the American Institute of Physics, that highlight some of the key applications of physics in medicine, transportation, consumer products, the environment and defense. All this in addition to the usual policy briefing materials, congressional bio, contact information and Tips on Communicating with Congress.

About eighteen months ago, the APS Washington Office established the Physics and Government Network to keep interested physicists informed on hot issues and to provide a constituent base for legislative contacts on pending bills. Today, PGNet counts almost 1000 members. By almost all accounts, their work during the last year is reflected in the final congressional action on a variety of science policy decisions: the rejection of the proposed closure of the NIST laboratories, a brake on the proposed sale of the strategic helium reserve and, of course, the allocations for science in the appropriations bills for the DOD, DOE, NASA and the NSF.

In the APS Washington Office, we are still feeling our way in this new environment of governmental activism. During the last year, we have issued a number of electronic alerts to selected APS members. And the response has been extraordinary. Last January, together with several other science societies, we told the community about the difficulties the NSF was facing in the absence of a full year's appropriation. Within days, Congress was inundated with more than 10,000 letters, phone calls and faxes. The silent scientists spoke out and Congress listened--with amazement.

On this and some other issues we have taken on, we have succeeded beyond expectations. On a few, we have foundered. But in an atmosphere of government downsizing and political change, a 100 percent success rate would mean that we were being insufficiently daring.

And what of the future? Continued cutbacks on R&D spending by American industry and continuing pressure on discretionary spending in the federal budget virtually guarantee that American science will face a very trying era. This much is already clear. We will be asked to justify in concrete terms the faith the American people have placed in scientific research. And we will be asked to do more for our nation with less.

How well we meet these challenges depends upon our collective and individual will. We have an excellent story to tell. And we must make sure the public hears it. We must also make sure that our governmental leaders and representatives understand how much our nation's economic future and national security rest on scientific discovery and technological innovation.

More than six years ago, DAMOP led the APS into the government affairs arena. The Society looks to the continuing commitment of its members during the coming years.

If you wish to join PGNet or the Congressional Visits Program, notify the APS Washington Office by telephone (202-662-8700), Fax (202-662-8711), e-mail (slakey@aps.org) or letter (The American Physical Society, 1050 National Press Building, Washington, DC 20045). We welcome all comers.

Mike Lubell, APS Director of Public Affairs and Physics Dept., City College of CUNY.

Nominations for APS Fellowship

The DAMOP Fellowship Committee relies on the AMO community to nominate outstanding individuals to receive this honor. Because fellowship selection within DAMOP is highly competitive, submission of additional supporting material such as the candidate's vita, bibliography and letters of support in addition to the nomination form is encouraged. The nomination form is printed in the January 1996 issue of *APS News* and is also available on the APS homepage at http://aps.org. Nomination pack-

ages should reach the APS (Ken Cole, cole@aps.org) by February 1, 1997.

Carl Weiman, Chair, Fellowship Committee

APS Hans Bethe Prize

There is an effort underway to create a new APS prize in honor of Hans Bethe. As Hans has long been a member of the Divisions of Astrophysics and Nuclear Physics, these Divisions are spearheading the campaign. However, Hans's work has touched much of modern physics and includes seminal contributions to atomic physics. The breadth of his work is reflected in the membership of the Hans Bethe Prize Committee, which is in charge of the fund raising.

The Committee has set as its goal the completion of fund raising by the time of Hans's 90th birthday in July of this year. Approximately two-thirds of the required $100,000 has been raised. Hans is aware of our efforts and wishes us well.

Several of Hans's friends from atomic physic have learned about this campaign and have contributed. We wanted to inform you of the Bethe Prize effort in the hope that you would also like to help. Checks made out to the "APS Bethe Prize" can be sent to either of us at the address below. We intend to let Hans know of the breadth of support for this prize. Thank you.

Wick Haxton and Ernest Henley
Co-Chairs, Beth Prize Committee
Department of Physics
University of Washington
Box 351560
Seattle, WA 98195

Editor's note: *This item was received too late for inclusion in the February newsletter.*

NIST Precision Measurement Grants

Applications are being solicited for two new Precision Measurement Grants, sponsored by the National Institute of Standards and Technology, to be awarded beginning 1 October 1997 (Fiscal Year 1998). Each grant is in the amount of $50,000 per year, renewable for up to two additional years, for a total of $150,000. NIST sponsors these grants to encourage research by U.S. university and college faculty members in the field of precision measurement and fundamental constants and to foster contacts between NIST scientists and faculty members actively engaged in such work. Candidates' pre-proposal summaries and biographical information must reach NIST by 3 February 1997 to be considered for the FY 98 awards. For more information, contact Barry N. Taylor, Chairman, NIST Precision Measurement Grants Committee, National Institute of Standards and Technology, Building 245, Room C229, Gaithersburg, MD 20899-0001, (301) 975-4220, barry.taylor @nist.gov.

Atomic, Molecular, and Optical Physics Handbook Unveiled

Gordon Drake

After nearly four years in the making, the Atomic, Molecular, and Optical Physics Handbook was finally unveiled at the Ann Arbor DAMOP meeting last May. The project, initiated by AIP, had DAMOP support throughout. The initial response to the book was very enthusiastic, thanks to the many fine authors (115) who contributed, and to the efforts of the Editorial Board (see list below).

The aims of the book are to provide the key ideas, techniques, and results of AMO Physics in a concise and authoritative manner, and in a style that is accessible to people new to the field, and to workers in related fields such as engineering, chemistry, materials science, etc. The nearly 1100 pages are organized into 88 chapters covering mathematical methods, atoms, molecules, scattering theory, scattering experiment, quantum optics, and applications, together with extensive references as a guide to the literature. There is also a CD-ROM version with complete search capabilities.

I would like to express my thanks and appreciation to the authors and members of the Editorial Board, to my Associate Editor Nigel Hedgecock, and to AIP for their support of this project. To the extent that its aims are achieved, the AMO Physics Handbook should prove valuable to students and established researchers alike.

The book can be ordered by writing to:

American Institute of Physics
Order Department
P. O. Box 20
Williston, VT 05495-0020

or by calling 1-800-809-2247 (fax: 802-864-7626). The cost is about $104.

Editor: Gordon W. F. Drake
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- W. E. Baylis - atoms
- Kate Kirby - molecules, theory
- Peter Smith - molecules, experiment
- Ray Flannery - scattering theory
- R. N. Compton - scattering experiment
- Pierre Meystre - quantum optics and lasers
- Alex Dalgarno - applications

New NIST Spectroscopic Data Volume Now Available

Atomic Transition Probabilities of Carbon, Nitrogen, and Oxygen - A Critical Data Compilation
Journal of Physical and Chemical Reference Data, Monograph No. 7 (1996)
W. L. Wiese, J. R. Fuhr, and T. M. Deters

This 532-page volume provides atomic spectroscopic reference data for three of the most common elements: carbon, nitrogen, and oxygen. Atomic transition probabilities for about 13000 spectral lines have been critically compiled, based on all available theoretical and experimental literature sources. Allowed and forbidden lines of all states of ionization are covered, and the data are ordered in multiplets and presented in separate tables for each element and ion.

The volume can be ordered by writing to:

American Chemical Society
1155 Sixteenth Street, NW
Washington, DC 20036 USA

or by calling 1-800-227-5558 (Fax: 202-872-6067; e-mail: kxw96@acs. org)

Few-Body Systems and Multiparticle Dynamics Topical Group

The Few-Body Systems and Multiparticle Dynamics Topical Group of the APS has traditionally been composed of more or less equal membership from DAMOP and the Division of Nuclear Physics. The current Chair is Ken Kulander of Livermore. This group sponsors invited talks at several meetings of the APS, including the annual Spring Meeting, which will include DAMOP next year in Washington, DC. Since this topical group is relatively small, it can be used effectively to promote discussion of new and interesting physics. For example when cold fusion was a hot topic several years ago, it was the FBMD Topical Group who sponsored an evening session attended by several thousand people. If you are interested in joining this topical group, you should contact either the Secretary, Don Kouri (kouri@uh.edu) or the APS. The cost is $6 per year.

Related Future Meetings

The 49th Annual Gaseous Electronics Conference (GEC) will be hosted by Argonne National Laboratory on 20-23 October 1996. The Conference will be held in the conference facility of the Advanced Photon Source and attendees will be housed in the Hyatt Oak Brook.

For additional information consult the GEC web site at http://www.gec.org/gec/.

The XX International Conference on the Physics of Electronic and Atomic Collisions (ICPEAC) will take place 23-29 July 1997 in Vienna, Austria.

For further information consult the Conference homepage at http://www.iap.tuwien.ac.at/icpeac97/ or contact Prof. H. P. Winter, Institut für Allgemeine Physik, T. U. Wien, A-1040 Wien, Austria, e-mail: ICPEAC97@iap.tuwien.ac.at.

The second International Symposium on Symmetries in Subatomic Physics will be held June 25-28, 1997, University of Washington, Seattle, WA. Contact Ernest Henley, Physics, Box 351560, University of Washington, Seattle, WA 98195-1560; e-mail: henley@phys.washington.edu, or see: http://www.phys.washington.edu/~henley/symmetries.

There will be a number of invited talks on atomic physics.

AMO Outreach

Jim McGuire

The toughest audience for the research I do is third grade teachers. They don't know much quantum mechanics and they are more interested in health, creepy creatures and safety in the home than atoms, molecules and light. But I have a talk on the work I do that I give to K - 12 teachers. It has taken a few years to develop this talk, and it still ranks somewhere behind high school football in popularity with these teachers, but I keep working on it. This is a demanding test of whether anyone is interested in AMO physics.

There are some rewards. I know more about high school football than I used to. I can sometimes talk with professors in English and History. And occasionally with politicians. More surprisingly, most of the materials that work at the K - 12 level can be used in my introductory physics class. I feel that I have a better overview of how AMO physics fits into what others find interesting and useful and important. In my case I work with an outreach organization called the National Faculty (TNF), which is funded directly by Congress. TNF organizes two week workshops in the summer. There are four instructors (typically physics, math, biology and computers or science, math, history and writing). We meet for two days in the spring to plan the workshop together with a Ph.D. staff member from TNF. We also eat well, especially when we meet as usual in New Orleans. We then work for two weeks at a small college with about 40 selected K - 12 teachers. All of our expenses are paid. Demonstration materials are provided by a small on site TNF support staff. Some of the fellow instructors with whom I have worked include a Dean from Dartmouth, a chemist who teaches a course in wine tasting at Rhoades College, and a writer who has published 25 novels. In addition to

travel, housing, materials and incidentals, we are well paid for our services. The National Faculty also sets up two day workshops in the schools for teachers.

If you are interested in participating or learning more about this activity, contact Jim McGuire, Department of Physics, Tulane University, New Orleans, LA 70118-5698 or mcguire@mcguire.phy.tulane.edu.

Newsletter Input

If you have any information, ideas, announcements, etc. that are of general interest to DAMOP members, please send them to me at any time.

Barry Dunning
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FAX: (713) 285-5143

NEWS FROM TAMOC

In light of the present crisis regarding federal funding for science and technology, it was not surprising that this year's TAMOC "Forum on Funding" drew a large crowd of both theorists and experimentalists at the Ann Arbor DAMOP meeting. After reports from the Rochester, JILA, and ITAMP theory centers, Pat Dehmer (OBES, DOE), Ron McKnight (OFES, DOE), Barry Schneider (NSF), Denise Caldwell (NSF) and Mike Lubell (APS) each made brief presentations regarding their perspectives on the status and future of funding for AMO physics.

Dehmer presented a general overview of the Office of Basic Energy Sciences, showcasing many of the successful and interesting enterprises funded through its sponsorship. She indicated that the anticipated best case would be for flat out-year funding and that AMO physicists should seek new linkages to other funded communities within OBES. The status of AMO funding through the Office of Fusion Energy Sciences presented by McKnight reflected the more than 100M$ cut experienced by the fusion program in the last fiscal cycle. AMO funding is not a large part of the OFES program and is not likely to increase. The Fusion Energy Advisory Committee has mapped out a new plasma science program oriented towards being "ready when it is important for the US to develop fusion," he said.

Schneider recommended that people track current events at NSF of interest through the world wide web site at www.nsf.gov, and Caldwell presented in detail the NSF Physics Division funding of AMO theory and experiment over the past several years. They emphasized the opportunity for AMO scientists to work in cross disciplinary subjects, citing successful preproposal cycles last year with "optics" as the common theme. Further, continued attention is being paid at NSF to coordination of research with education. Of general interest is also the fact that proposals must now conform to a submission deadline (separate deadlines for theory and experiment) at NSF rather than being accepted throughout the year.

Lubell (APS Director of Public Affairs) gave an overview of the science and technology budget situation. He cited the example of the planned FY97-FY00 decrease of approximately 25 percent in the DOE funded general science as the direction in which things are proceeding. His message was "whoever doesn't speak up to their congressional representatives risks being cut," urging the community to become involved in a dialog with their local senators and representatives. He also suggested joining the Physics and Government Network (contact Dr. Francis Slakey, slakey@aps.org) and the Congressional Visit programs.

A lively discussion followed the presentations. Although the future for AMO funding is unclear, it is clear that the community should anticipate major changes.

The latest news from TAMOC along with links to the theory centers and job announcements are posted on the TAMOC home page on the world wide web (http://www-cfadc.phy.ornl.gov/tamoc.html). Submissions are welcome in plain text or html (email to TAMOC secretary).

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David Schultz, Secretary, schultz@orph01.phy.ornl.gov

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