DIVISION OF ATOMIC, MOLECULAR AND OPTICAL PHYSICS NEWSLETTER

A Division of The American Physical Society **January 2001**

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INSIDE...

CHAIR'S LETTER

-Dan Larson

After being elected Vice-Chair of DAMOP two years ago by literally the narrowest possible margin, I joked that the election had provided a resounding mandate for change. Happily, the most significant changes in our community are being driven, as they should be, by the

wonderful advances in the science. Other than the scientific advances, I suspect that most members of DAMOP see little need for significant change. Virtually all of the indicators show that AMO science is a very healthy enterprise. AMO is seen as a vibrant and exciting intellectual and technical enterprise, not just in the community, but also well beyond. Since the purpose of DAMOP is to help maintain a healthy AMO science community, we can take satisfaction in the fact that things are going very well. At the same time, we need to take care to maintain and improve the vitality of the science and the community. In one area of great concern, federal funding for AMO research, there has been some progress, and this year's 13.5% increase in the NSF budget will certainly help, but there is more that needs to be done. The progress that has been made is in part due to the dedicated efforts of many people in the community. One key element has been working to convince Congress that federally- funded basic research has been a driver for improvements in our society. The vibrant national prosperity we enjoy today is directly traceable to our investment in education and research. Individually and collectively, we need to continue and increase our participation in the efforts to get the word out about the value of basic research. More locally, we need to consider whether or not there are opportunities to modify DAMOP practices in ways that would enhance our support of the science and the community. Provoked primarily by a proposal from the Division of Laser Science for joint meetings, this issue of the newsletter asks for your opinion about possible changes in future meetings. We need to have the guidance of the community to make informed choices. I personally think that joint meetings with the DLS could turn out to be a very positive thing, but in order to make really informed and appropriate choices, we need the advice of the community. Please respond to the opinion poll.

2001 DIVISION OF ATOMIC, MOLECULAR AND OPTICAL PHYSICS ANNUAL MEETING

May 16 - 19, 2001
London, Ontario, Canada

Websites:
http://www.aps.org/meet/DAMOP01/ (meeting announcement)
http://gandalf.physics.uwo.ca/DAMOP2001/

CALL FOR PAPERS - Special Session on Undergraduate Research at DAMOP 2001

There will be a special session featuring research performed by undergraduate students at the 2001 DAMOP meeting. The papers will be 20 minutes long including discussion. Interested students should submit an electronic abstract for their talk in standard APS format and a one page summary of their contribution to the project by 19 January 2001. From the submitted materials, a committee will select four students to be invited to give talks in the special session. Participation is limited to currently enrolled undergraduate students.

The participation of women and minority undergraduate students is especially encouraged.

PLEASE NOTE EARLY ABSTRACT DEADLINE!

The deadline for regular abstracts for the DAMOP meeting is **26 January 2001**. The deadline for abstracts for the undergraduate session is **19 January 2001**. Abstracts should be sent (email preferred) to:

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THANKS TO OUTGOING DAMOP COMMITTEE MEMBERS

The DAMOP Executive Committee would like to thank these people who have completed their elected or appointed terms recently. Your service to the Community is greatly appreciated!

Most Recent Past Chair

Carl Wieman

Executive Committee

Tom Rescigno
Thad Walker

Nominating Committee

Tom Gallagher (Chair)
Ron Olson

Fellowship Committee

Ron Phaneuf
Katherine Gebbie

Publications Committee

Lew Cocke (Chair)
Charlie Havener
Marjatta Lyyra
Program Committee
Ennio Arimondo
Phil Bucksbaum
Luis Orozco
Thad Walker

Thesis Prize Committee

Eric Cornell (Chair)
Barbara Levi

Davisson-Germer Prize Committee

King Walters (Chair)
Sheldon Datz
Barry Schneider

Rabi Prize Committee

Steve Lundeen (Chair)
Wolfgang Ketterle
Gerald Gabrielse

Broida Prize Committee

John Delos (Chair)
William Happer
Robert Field

Allis Prize Committee

William McConkey (Chair)
Ray Flannery
Jon Weisheit

A LETTER TO DAMOP FROM JOE MARTINEZ

This newsletter allows me a much welcomed opportunity to amplify on the remarks I made upon my receiving the DAMOP Award for Outstanding Service presented during its most recent meeting held at the University of Connecticut.

Receiving this award, for which I am very grateful, was a humbling experience indeed. Its presentation followed immediately the awards made to recently elected Fellows. Their citations served to re-enforce in my mind the extraordinary caliber of scientific achievements made by DAMOP members. One of my most sincere regrets is that the public has been aware of so few of them. Nonetheless, I see a continued exciting and productive future for the community

If I am deserving of the award, I attribute it in large part to following a well-defined discipline in managing the Atomic, Molecular and Optical Physics Program that included serving as a strong advocate for AMO scientists. Along with the realization that funds allocated for support of their research were derived from U.S. taxpayers was my being cognizant of the democratic principle that any qualified U.S. scientist should have an equal opportunity to compete for federal funds. I adhered closely to these guides in my program management but foremost was insistence on scientific merit.

It was troublesome that over the period of my twenty-five year tenure as program manager too many scientists who submitted competitive proposals did not receive research support. The funds needed to support all the meritorious proposals were simply not available. This problem was made worse by the constant flow of exciting new ideas in AMO physics. The lack of sufficient support for research is not unique to our field, but is widespread in the United States.

The health and welfare of the country's science enterprise is reflected in the percentage of the Gross Domestic Product (GDP) allocated to research by the federal government. That fraction has dropped from near 1.8% in 1965 to nearly 0.8% in 1997. The respective figures for private funded research increased from 1.0% to 1.8%[1]. Unfortunately, these opposing trends do not imply that private sector research compensated for the loss in research funded by the government. It is well known that research supported by the private sector is strongly mission-oriented and applied in its focus.

The drop in federal research support, as far as the health and welfare of science in this country is concerned, invites close scrutiny by, and comment from, the public. It also seems clear that if the prime stakeholder, the scientific community, does not take the leadership role in exercising this scrutiny and providing the necessary comment to responsible parties, the public at large cannot be blamed if it remains unaware of the health and benefits of the scientific enterprise. I believe that no group of professional physicists is in a better position than DAMOP to join in this aspect of scientific leadership. If DAMOP needs any inspiration in this regard, it can be found in a statement made by the head of the Federal Reserve, Mr. Alan Greenspan, who in his report to Congress in July, 1997, alluded to the accomplishments of optical physics as a factor in the development of "...new opportunities for value creation." He mentioned specifically "...fiber optics, [that] engendered a revolution in telecommunications.[2]"

DAMOP activity is characterized in large part by simultaneous pursuit of a multiplicity of goals. The field of atomic, molecular and optical physics encourages the sharing of different professional interests that serves to promote cross-fertilization of ideas. It is because of this diversity that members of DAMOP are in an excellent position to respond to the call for altering teaching of physics as cited in a recent issue of APS News[3]. However, the diversity in the field of AMO sciences is also its weakness[4]. As a group of scientists whose interests are spread across a number of subdisciplines, we are not as visible as we would be if we were seeking the solution to a single problem. This makes our need to reach the public and the people who determine scientific policy at the federal level all that much more challenging.

With regard to the federal legislative process, the first public appeal

for assistance from the science community of which I am aware was made by former Representative George Brown. He was the wrap-up speaker in a session I organized in 1981 for the American Association for the Advancement of Science: "Scientific Evidence and the Legislative Process." In his remarks, he strongly encouraged scientists to participate in the drafting of legislation. As he put it, "[Congress will pass legislation]...with your help or without it." The implication of that admonishment is clear: decisions made by Congress that affect the scientific enterprise are better if scientists participate in the process.

Efforts are underway in the U.S. to cope with the frustration among scientists that their enterprise is being taken for granted. One such effort is the Coalition for National Science Funding. Another is Research!America. The Coalition is an advocate exclusively for the National Science Foundation (http://www.sfn.org/legislative/policy/cnsf.html) and Research!America (http://www.researchamerica.org) concentrates its efforts on the medical and health sciences. The recently announced Project Research Agenda led by Dr. Mary Good plans to confine its advocacy to the physical and mathematical sciences and engineering. Incidentally, an examination of Research!America's web page reveals the sophisticated way in which it carries out its mission. Anyone interested in this type of advocacy would do well to examine it.

Serving a role of scientist/statesperson has been a crucial one in the past. Too few scientists serve in this role now, a situation that needs to be changed. My hope is that scientists will very soon recognize that the nation's technical infrastructure cannot be maintained without scientists who are willing to serve in this capacity. Urging scientists to accept this role must be done apologetically, because it is not something most of us have been trained to do or where we do our best work. But without considerably more involvement of scientists in such roles, the health and welfare of the scientific enterprise will suffer. Seen in this light, research practitioners must consider that non- involvement in the processes that affect the allocation of the nation's resources to research can potentially lead to a reduction or even elimination of the work they were trained to do and are most competent to perform.

References:

1. Jim Hartz and Rick Chappell, Worlds Apart (First Amendment Center; Nashville, TN, 1997), page 4.
2. Committee on Optical Science and Engineering, Harnessing Light (National Academy Press, Washington, D.C. 1998), page 6.
3. David Goodstein, "The Coming Revolution in Physics Education." APS News (The American Physical Society, June, 2000).
4. Alex Dalgarno, opening plenary presentation, The International Conference of Electronic and Atomic Collisions (ICPEAC), Gatlinburg, TN (1981).

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:

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ICPEAC TO MEET IN SANTA FE

The 22nd International Conference on Photonic, Electronic and Atomic Physics (ICPEAC XXII) will be held in Santa Fe July 18 - 24, 2001. This continuing series of biennial international conferences promotes the growth and exchange of scientific information on photonic, electronic and atomic collisions and related areas of atomic and molecular physics. Please contact: http://icpeac2001.phy.ornl.gov/home.html. The Conference has received support from the NSF for travel for young scientists. Information on this support is available at http://bartschat.drake.edu/ICPEAC/travel.html. The general Conference address is:

ICPEAC 2001
Oak Ridge National Laboratory
P. O. Box 2008
Oak Ridge, TN 37831-6377 USA
(865) 574-4779
(865) 574-1118 FAX
E-mail: icpeac@phy.ornl.gov

WORKSHOP REPORT AVAILABLE

"Electron-Driven Processes: Scientific Challenges and Technological Opportunities"

Two workshops were held in the past 2 years addressing experimental, theoretical, and computational aspects of the interaction of electrons with molecules in the gas phase, in liquids, and in the condensed phase as well as at their interfaces (e.g. clusters and surfaces). The first workshop on "Fundamental Challenges in Electron-Driven Chemistry", organized by Bill McCurdy and Tom Rescigno at Berkeley on October 9 & 10, 1998 addressed primarily

questions regarding theory, computation, and simulation. The second workshop on "Electron-Driven Processes: Scientific Challenges and Technological Opportunities", organized by Kurt Becker, Bill McCurdy, and Thom Orlando at the Stevens Institute of Technology on March 16 & 17, 2000 focused largely on experiments. Electron interactions with molecules result in the formation of chemically reactive species which initiate and drive the key reactions in many environments and applications. These include mixed radioactive/chemical waste storage tanks, processing plasmas used in the manufacture of microchips, combustion sources, lighting sources, and the atmospheres of planets, comets, and stars. Studying these electron-driven processes provides a microscopic understanding of the chemical reactions in these environments and thus helps advance many technologies that are based on these processes. The workshops summarized the current status of electron-driven processes, highlighted recent advances in other fields of science that have the potential to stimulate future advances in the study of electron-driven processes, identified the most promising scientific challenges for future studies, and pointed out crucial needs for an improved understanding of electron-driven processes in selected applications and technologies.

The outcome of these workshops has been summarized in a report that can be downloaded from the Web (http://attila.stevens-tech.edu/physics/People/Faculty/Becker/EDP). Those who prefer a WORD file of the report can send an e-mail to **kbecker@stevens-tech.edu**. A limited number of printed copies of the report are also available and can be obtained on a first-come, first-served basis by writing to: K. Becker, Dept. of Physics, Stevens Institute of Technology, Hoboken, NJ 07030. Please enclose $15 for each paper copy of the report.

FUNDING OPPORTUNITIES AT DOE (from Eric Rohlfing)

As I mentioned at the DAMOP 2000 Business Meeting back in June, the only clearly identifiable opportunity for increased university support in the BES AMOP Program in FY2001 will be through the National Nanotechnology Initiative (NNI). BES received approximately $36M in funding in FY2001 for NNI and these funds will be partitioned roughly equally between university grants and new projects at the DOE laboratories. The solicitation for university proposals is currently being drafted and will ultimately appear on the Grants and Contracts website for the Office of Science, **http://www.sc.doe.gov/production/grants/grants.html**.

The solicitation will provide a very broad interpretation of nanoscale science that should provide ample opportunity for AMO science. It will follow the five broad themes that are detailed in the BES report, "Complex Systems: Science for the 21st Century." This report and other information describing the role of BES in NNI can be found on the BES website, **http://www.sc.doe.gov/production/bes/NNI.html**. I encourage you to take the time to look at the information there and to

begin thinking about how your research interests might fit with NNI at BES.

Eric Rohlfing
Program Manager
Atomic, Molecular and Optical Physics
Office of Basic Energy Sciences
Office of Science, U.S. DOE

M?LLER AND REED NAMED APS FELLOWS

Alfred M?ller of the University of Giessen, and Kennedy Reed of Lawrence Livermore Laboratory, both DAMOP members, have been named Fellows of the American Physical Society through the Forum on International Physics. Because their award came through a different APS Unit, their names were inadvertently omitted from the last Newsletter's list of newly-elected Fellows. M?ller was cited "for fundamental experimental studies of charge-changing collisions of highly charged ions, and for leadership in the application of heavy-ion storage rings to such studies." Reed's citation reads "for his tireless efforts to promote collaboration in atomic, molecular and optical physics among US, European and African laboratories and for his success in organizing international workshops to showcase these collaborations." Congratulations to both!

FELLOWSHIP NOMINATION DEADLINE

The deadline for Fellowship nominations this year is 31 March 2001. Check the APS Fellowship Website for details of the nomination procedure.

NIST CENTENNIAL APPROACHING

The National Institute of Standards and Technology (NIST) will celebrate its 100th birthday this March. Basic information about the various Centennial events can be found at http://www.100.nist.gov/. There will be two NIST-themed symposia at the forthcoming DAMOP meeting: one on precision measurements and fundamental constants organized by Peter Mohr and another on atomic clocks, organized by Don Sullivan. There will also be a Centennial Symposium at the April APS meeting organized by Charles Clark on "Science, Standards, and Society."

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 2001 (Fiscal Year 2002). 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 such faculty members actively engaged in such work. Candidates' pre-proposal summaries and biographical information must reach NIST by 1 February 2001 to be considered for the FY 2002 awards. For more information, contact:

Peter J. Mohr, Chairman
NIST Precision Measurement
Grants Committee
National Institute of Standards
and Technology
Building 225, Room B161
Gaithersburg, MD 20899-0001
(301) 975-3217
mohr@nist.gov

An announcement that gives more detailed application information is available from Michelle Hane at the same address or **michelle.hane@nist.gov**.

ASOS 7 TO MEET IN BELFAST

The 7th International Colloquium on Atomic Spectra and Oscillator Strengths (ASOS 7) will be held August 5 through August 9, 2001 at the Queen's University of Belfast, Northern Ireland. This conference will feature significant advances in atomic structure calculations, in high precision laser spectroscopy, in atomic lifetime measurements, in oscillator strength measurements and related topics. Also, current spectroscopic data needs for specific astrophysical and laboratory plasma applications will be discussed. For further information contact:

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DAMOP FUTURE MEETINGS OPINION POLL

Ballot

There has been considerable discussion during the last year about the format of future DAMOP Meetings. At the Executive Committee Meeting in Storrs, the Division of Laser Science (DLS) made a proposal for DAMOP to meet jointly with them in the Fall, starting in 2003. The APS urged us to consider re-joining them at the traditional April Meeting, at least once every three years. (This was standard procedure until the Executive Committee voted in 1999 to suspend future joint meetings with the APS.) In addition, the Precision Measurements Topical Group (PMTG) would like to meet

with DAMOP every other year, and this is scheduled to occur for the first time in 2002 at Williamsburg.

In response to the formal requests from APS and DLS, and in order to push the discussion further along, the Executive Committee took a straw poll to determine the most popular option amongst themselves. The three options came out roughly even, with a very slight preference for maintaining the status quo or returning to the old situation with APS. Three days later at the DAMOP business meeting, there appeared to be significant, broad opposition expressed to the idea of rejoining APS at the April meeting every third year. In order to further clarify for the Executive Committee the will of the membership, we ask that you fill out the **ballot** and return it as soon as possible.

DAMOP Homepage