

What is this? (Ans. p. 7)

1990 II

Newsletter of the
DIVISION OF ATOMIC, MOLECULAR, & OPTICAL PHYSICS
of the
American Physical Society
August 1990

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Chair's Letter

Dear Members of DAMOP:

The National Research Council (NRC) Committee on Atomic, Molecular, and Optical Science (CAMOS), currently chaired by Gordon Dunn, is gearing up to assess the scientific opportunities at the forefront of AMO science. The motivations, aims, and current status of this effort are clearly described in the following excerpt from a recent NRC publication:

"There is a growing sense in the atomic, molecular, and optical (AMO) sciences community that, in view of rapid progress in the field, a new disciplinary assessment of scientific opportunities to update the Kleppner report on AMO physics, part of the Brinkman physics survey, is needed. At the same time, agencies supporting work in AMO science, particularly DOE, feel a need for a strategy to capitalize on progress in research in this area ...

"Under the Board on Physics and Astronomy's Committee on Atomic, Molecular, and Optical Sciences, a panel of about 12 experts will be formed to design and carry out an assessment of the scientific opportunities opened up by recent rapid progress, particularly in experimental techniques... The report will build on the Kleppner report...it will not revisit all of AMO science. Its objective will be to assess the leading edge of the field...

"Among the topics to be considered for analysis in the report would be relativistic atomic collisions, synchrotron-based atomic physics, atomic structure theory, atomic collision theory, atomic processes in plasmas, high-energy collisions, low-energy collisions, atomic spectroscopy, quantum and nonlinear optics, atomic collisions on surfaces, and trapped atomic particles and laser cooling.

"As part of the process of developing the project, CAMOS cooperated with the DOE atomic physics program in holding a symposium at the National Academy of Sciences on March 26 and 27 at which talks were presented on forefront topics. Discussion groups were formed to elicit views of the community on key developments in the various topical areas. In addition, at the May meeting of the American Physical Society's Division of Atomic, Molecular, and Optical Physics, a Town Meeting was conducted to elicit further input from the AMO community..."

(from "CAMOS Plans Survey of Field," Board on Physics and Astronomy NEWSLETTER, June 1990, pp 3-5, as amended by D.C. Shapiro, BPA Staff Director.)

(continued on p. 2)

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The DAMOP Newsletter
 is prepared by K. Coy
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 CAMOS Survey

In addition to surveying the scientific opportunities in AMO science, CAMOS is surveying AMO experimentalists to determine their status and special needs. This AMO Experiment survey complements an earlier AMO Theory survey. That survey, I believe it is fair to say, has played a significant role in bringing about the recent improvements in Federal support for AMO theory.

These two CAMOS surveys will serve additional purposes. Both will provide the funding agencies with a basis for setting their priorities. Both will likely serve as DAMOP's initial submission to the APS's Physics Planning Committee (chaired currently by Eugen Merzbacher), which has asked each of the APS divisions to prepare a planning document.

Clearly, the CAMOS surveys will serve these many purposes only if they have the strong support of the AMO community. For this reason, I urgently invite your participation in the following ways:

(1) **Nominate Members of the CAMOS Survey Panel.** Please send me names of individuals together with a very brief indication of the reasons for their suitability. I will discuss all suggestions with the DAMOP Executive Committee, which will assist me in making DAMOP's nominations to the NRC. Please send me your suggestions by September 10th or as soon thereafter as possible.

(2) **Suggest Research Areas to Be Included.** The excerpt above indicates the fields to be covered by the survey of opportunities in AMO physics. If you feel there is another forefront area of AMO physics (or a particular one within the broad areas listed) that presents a special opportunity at this time, please draft a one-page description and send it to Gordon Dunn at JILA.

(3) **If you are an Experimentalist, please fill out the attached CAMOS "Questionnaire for AMO Experimentalists" and return it to the NRC by their deadline of October 1st.**

I thank you for your participation in these important activities.

Sincerely,
Anthony F. Starace

Election of Divisional Councillor

It is time to elect a new divisional councillor, who will represent DAMOP on the National Council of the American Physical Society. The vitae of the two candidates are given below and a ballot follows.

Larson, Daniel J., 45; B.A. Physics and Math, Summa Cum Laude, St. Olaf College, 1966, Phi Beta Kappa, Sigma Pi Sigma; M.A., Ph.D., Physics, Harvard University, 1967, 1971, Woodrow Wilson Fellow, National Science Foundation Graduate Fellow, Sigma Xi; Assistant Professor of Physics, Harvard University, 1970-75, Associate Professor, 1975-78; Associate Professor of Physics, University of Virginia, 1978-87, Professor of Physics, 1987-present; Associate Dean, Faculty of Arts and Sciences, University of Virginia, 1989-91; Visiting Scientist, National Bureau of Standards, Boulder, 1985-86; Visiting Professor, Chalmers University, Gothenburg, Sweden, 1986; Fellow, American Physical Society; Member, Optical Society of America; Program Committees, DAMOP, 1980, 1985-88; Nominating Committee, DAMOP, 1986-87; Program Committees, Gordon Conference on Atomic Physics, 1983, 1989; Review Committee, Advanced Research Program, Texas Higher Education Coordinating Board, 1989; DOE Atomic Physics Program Review Committees, Argonne National Laboratory, 1988, Kansas State University, 1989, Oak Ridge National Laboratory, 1990; NBS (NIST) Precision Measurements Grants Advisory Committee, 1986-present; NAS Committee on Atomic, Molecular and Optical Science (CAMOS), 1987-present; **RESEARCH INTERESTS:** Photodetachment spectroscopy of negative ions, Atomic and molecular structure and interactions in strong electromagnetic fields, Precision optical and microwave spectroscopy of atoms and ions.

Pratt, Richard H., 56, AB 1952, SM 1955, PhD 1959, University of Chicago. Research Associate, 1959-61, Assistant Professor, 1961-64, Stanford University. Associate Professor, 1964-69, Professor, 1969-present, University of Pittsburgh. Program Director for Atomic, Molecular and Optical Physics, National Science Foundation, 1987-89. Fellow of the American Physical Society, the American Association for the Advancement of Science. Member of the European Physical Society, the International Radiation Physics Society. National Academy of Sciences Fellow in Romania; Fellow of the Indian Institute of Technology (Bombay). Consultant, Lawrence Livermore National Laboratory. Executive Committee, DAMOP, 1981-82; DAMOP Program Committee 1980-81; Secretary and Councillor,

International Radiation Physics Society, 1985-present. Program Committee for International Symposium on Radiation Physics, 1985 (chair), 1988, 1991. Program Chair, Workshops on New Directions in Soft X-Ray Photoabsorption and Scattering, Asilomar, California 1984, 1985, 1987. Program Committee, X-82, Eugene, Oregon. Executive Editor, Newsletter of the International Radiation Physics Society, 1985-present. Pennsylvania Governor's Science Advisory Committee (1976); Academic Dean (Fall, 1984), Administrative Dean (Winter, 1990), Semester at Sea, University of Pittsburgh; Chair, Educational Policies Committee (1980-84), Chair, Budget Policies Committee (1976-80, 1986-87), University of Pittsburgh. **RESEARCH INTERESTS:** relativistic radiative processes in photon- and electron-atom interactions, photoionization, bremsstrahlung, anomalous dispersion in x-ray scattering, direct radiative recombination, pair production, Rayleigh and Compton scattering, polarization correlations, processes in high temperature and/or high density plasmas, analytic perturbation theory, zeroes in transition matrix elements.

On behalf of the members of DAMOP we wish to recognize the effectiveness of **Alex Dalgarno** who is retiring from the position of DAMOP Division Councillor. Thanks, Alex!

Please vote for one of the following for Division Councillor.

Daniel J. Larson ☐

Richard H. Pratt ☐

Return this ballot to:

Professor Jim McGuire
DAMOP Secretary-Treasurer
Physics Department
Kansas State University
Cardwell Hall
Manhattan, KS 66506-2601

New DAMOP Officers and Committees

The DAMOP officers for 1990 are:

Chairperson - Anthony Starace
Vice-Chairperson - Patricia Dehmer
Secretary-Treasurer - Jim McGuire

Pat Dehmer and Jim McGuire were elected this spring. We wish to thank the past chairperson, **Gordon Dunn**, for his thorough commitment to our interests and the retired (apparently happily so) secretary-treasurer **Win Smith** for his dedication during the last three years.

The 1991 DAMOP **Executive Committee** members are A. Starace, Chair, P.M. Dehmer, J. McGuire, A. Dalgarno, G. Dunn, D. Pritchard, G. Drake, B. Dunning, G. Gabrielse, and C. Clark

The **Program Committee** consists of Patricia M. Dehmer (*Chairperson*), Anthony F. Starace (*Ex-Officio*), Jim McGuire (*Secretary-Treasurer*), James E. Bayfield, John B. Delos, Barry Dunning, Andrew C. Hazi, Ronald Phaneuf, Thomas F. Gallagher, Kate Kirby, Stephen R. Leone, Stephen R. Lundeen, William C. Stwalley, Bernd Crasemann, Richard R. Freeman, Peter Lambropoulos, Keith McAdam, and David Pritchard.

The **Nominating Committee** members are Stephen R. Leone (chair), Bernd Crasemann, Alexander Dalgarno, Walter E. Kauppila, and Richard R. Freeman.

The **Fellowship Committee** members are C. Lewis Cocke, Jr. (chair), Kate Kirby, Alexander Dalgarno, Thomas F. Gallagher, and Kenneth C. Kulander. Nomination forms are available from Evelyn Bennett at the American Physical Society (212-682-7341).

The **Publications Committee** members are Gordon W.F. Drake (chair), Ronald J.W. Henry, Lorenzo M. Narducci, Joseph L. Dehmer, Stephen R. Lundeen, and William H. Parkinson.

Please submit suggestions to the chair or members of any of the above committees.

Minutes of DAMOP Business Meeting at Monterey

The meeting took place on Wednesday, May 23, 1990, as part of the APS Division of Atomic, Molecular and Optical Physics Annual Meeting at the Doubletree Inn, Monterey, CA. Outgoing Chairperson, Gordon Dunn, called the meeting to order at 11:15 AM, with the introduction of the newly elected officers of the Division.

Win Smith, outgoing Secretary-Treasurer, gave the Secretary-Treasurer's Report: DAMOP membership was 3827 in May 1989 and increasing; it declined to 2568 after the new \$5/division APS dues policy was instituted, but the number voting in the recent election changed very little. We seem to have retained most of the active members. Out of 110 responses to the approximately 1000 questionnaires sent out to APS members who did not renew DAMOP, only 25 or so indicated they had intended to renew. Many had retired or changed fields--Smith urged that DAMOP members communicate their suggestions for the 1992 program of invited speakers to the new Program Chair Pat Dehmer. Next year we will have to pay the new \$150/page charge for abstract publication in the BAPS. The opening balance in the DAMOP Treasury on 4/1/89 was \$31,893.44. The closing balance as of 6/1/90 is estimated to be \$29,078.65 exclusive of the \$6,000 advance made to Livermore for the Monterey Meeting, plus any surplus. APS divisional meetings are expected to generate a modest surplus from the registration fees to cover other division expenses (newsletters, etc.) during the year. The DAMOP Treasury's cash flow per year is approximately equal to the balance in the Treasury at the start of a year.

Chair Gordon Dunn announced that next year there would be two DAMOP-sponsored APS prize awards: the Rabi Prize and the Broida Prize.

The new president of the APS, Eugen Merzbacher (a DAMOP member) was invited to comment on the substantial changes occurring in APS this year.

(1) Bill Havens, APS Executive Secretary since the 1960s will retire from full-time service. His successor will be Richard Wertheimer of AT&T Bell Laboratories, one of the first APS Congressional Fellows in the 1970s, who will start June 1, 1990 and who is expected to formally assume the title of Executive Secretary on January 1, 1991.

(2) The APS has decided to go along with the move of the AIP (American Institute of Physics), in whose New York City building the APS has its headquarters, to the College Park, MD - Washington, DC area.

(3) APS has 41,000 members now. It continues to need volunteers on its many committees from all divisions, including DAMOP.

(4) APS is in the process of ratifying a new constitution and new bylaws. Pat Dehmer and N. Bloembergen played a major role in its rewriting. It provides more proportional representation for Divisions, Topical Groups and Sections. DAMOP will have two Divisional Councillors sitting on the APS Council instead of 1 as at present. The Topical Groups have been "legalized" with a straightforward numerical procedure instituted to become a Division when they grow to a certain size. There are also sunset clauses to "demote" a Division to a Topical Group if its membership declines below a certain level. The APS Council will pass on the budget as before, but daily operations will go to an Executive Board. In general the APS operations and procedures will become more democratic.

Ballot! Ballot!
(see reverse)

Be sure to vote!

Ballot! Ballot!

Incoming DAMOP Chairperson, Tony Starace commented on the 1991 DAMOP meeting program: a tutorial course on the properties and uses of diode lasers in atomic physics will be presented by Leo Hollberg on the Sunday preceding the meeting. This is a new feature of the DAMOP Annual Meeting. The opening plenary session will feature invited talks by the Broida and Rabi Prize winners. There will be 11 invited sessions sponsored by DAMOP at this meeting, including the plenary prize session. The 1991 DAMOP meeting will be held as part of the APS general Spring Meeting in Washington, D.C.

Bob Lewis announced plans for the ICAP-12 Conference this summer, July 29 - August 3 at the University of Michigan - Ann Arbor.

Mike Lubell, the new chairman of CAMOS announced plans for: (1) the first DAMOP Town Meeting on May 23, 1990 on funding priorities in AMO physics research; (2) that CAMOS is forming an Assessment Panel to produce a long-range planning document on funding priorities in Fall 1990 and incorporating the results of the DOE studies presented at the Town Meeting. Suggestions for panelists should be sent to Tony Starace; and (3) CAMOS has prepared a survey questionnaire on the needs and funding problems of AMO experimentalists which will be distributed at the Town Meeting and to members of the experimental AMO community by mail.

Steve Smith (NSF) reported on the AMO experimental and theory programs in the Physics Division. He handles 2/3 of the experimental program and Barry Schneider the remaining 1/3 plus AMO theory. The "experimental" AMO Physics funding history at NSF has been: FY85 to FY90 - \$12.5, 12.7, 13.1, 12.7, 13.2 and 13.7 (in millions), averaging +2.2% per year in current dollars. A typical grantee gets at least a 30% DECREASE in buying power over this period. New money has NOT been going into basic science programs, especially for individual investigators. It will be a tough squeeze in the Physics Division for FY91 with no increase, but in this Division of NSF "every program will give top priority to supporting the individual PI". Smith urged support of CAMOS' activities. He then described NSF's reviewing process for proposals: An up or down funding action is now required within 6 months (effectively 4 months) for review and decision. They will downplay the significance of

the overall ratings (Excellent, VG, etc.) and instead try to evaluate the qualitative comments of reviewers. Smith asked reviewers to omit personal and vitriolic comments, which are generally ignored anyway in favor of review consensus and consistency. He urged constructive evaluation of the scientific questions addressed in proposals. Proposals are usually sent to 5 people so reviewers should decide as soon as possible whether or not they have time to undertake a particular review.

Chairperson Dunn commented that he could not think of a time that the need was more critical to talk to Congress and urged people to express their views on research support. There being no other business, the meeting adjourned at 12:10 PM.

Respectfully submitted,
Winthrop Smith (Secretary-Treasurer)

NIST Precision Measurement Grant

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 1991 (Fiscal Year 1992). Each grant is in the amount of \$30,000 per year, renewable for up to two additional years, for a total of \$90,000. NIST sponsors these grants to encourage research in U.S. colleges and universities in the field of precision measurement and fundamental constants and foster contracts between NIST scientists and U.S. researchers actively engaged in such work. Candidates' pre-proposal summaries and biographical information must reach NIST by 1 February 1991 to be considered for the FY 92 awards. For more information, contact Barry N. Taylor, Chairman, NIST Precision Measurement Grants Committee, National Institute of Standards and Technology, Building 221, Room B160, Gaithersburg, MD 20899, (301) 975-4220.

Future DAMOP Meetings

1991 - Washington, DC, (Spring APS Meeting) April 22-24. Host: NIST, M. Kelley and J. McClelland. This meeting is a month earlier than usual.

1992 - Chicago, IL, May 20-22. Host: Argonne National Laboratory, G. Berry.

1993 - Reno, Nevada. Hosts: University of Nevada, Reno, P. Neill.

1994 - Washington, DC (Spring APS Meeting).

Other AMO Meetings

The Forty-third Annual Gaseous Electronics Conference will be held on 16-19 October, 1990, hosted by the University of Illinois, Urbana, Illinois. The meeting is a Topical Conference of the American Physical Society and is sponsored by the Division of Atomic, Molecular and Optical Physics. Inquiries should be sent to: Joseph T. Verdeyen, Department of Electrical and Computer Engineering, University of Illinois, Urbana, IL 61801.

The Eleventh International Conference on the Application of Accelerators in Research and Industry will be held November 5-8, 1990, in Denton, Texas. Inquiries should be sent to J.L. Duggan, University of North Texas, Department of Physics, P.O. Box 5368, Denton, Texas 76203.

The Sixth Interdisciplinary Laser Science Conference (ILS-VI) is scheduled to be held in Minneapolis, Minnesota, September 16-19, 1990, at the Minneapolis Marriott.

The Conference on Lasers and Electro-Optics (CLEO '91) will be held May 12-17, 1991 in Baltimore, Maryland. For more information contact the Optical Society of America, CLEO/QELS'91, 1816 Jefferson Place, NW, Washington, DC 20036.

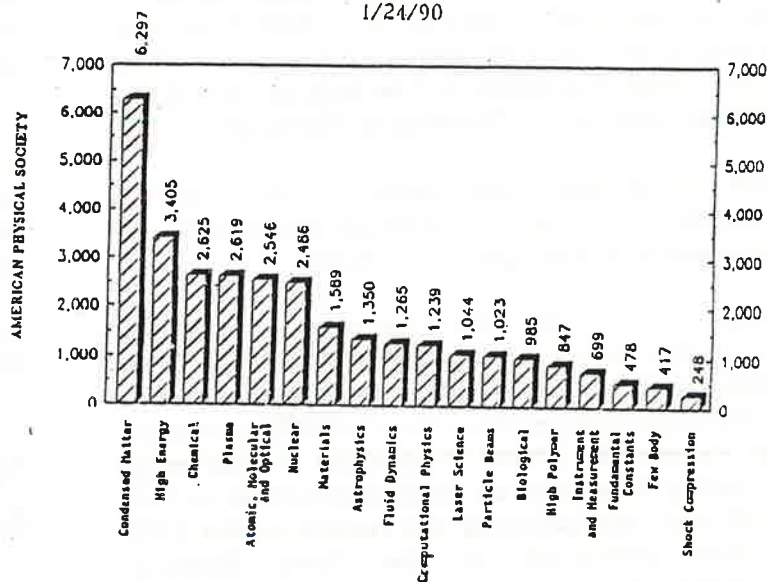
The Second Quantum Electronics and Laser Science Conference (QELS'91) will be held May 12-17, 1991, in Baltimore, Maryland. For more information contact the Optical Society of America, CLEO/QELS'91, 1816 Jefferson Place, NW, Washington, DC 20036.

APS Divisions and Topical Groups

Membership in the various divisions and topical groups has changed due to the new fees. The new 1990 memberships are shown below.

MEMBERSHIP RENEWALS+FY90

1/24/90



APS Electronic Newsletter

Bob Park of the APS provides a lively newsletter on a weekly basis on concerns ranging from the cold fusion and the SSC to the most recent location of Alan Bromley's (Presidential Science Advisor) office. This letter may be accessed electronically as follows:

- * Make sure your modem is hooked up and ready to dial

- * Dial the local number for GTE TELENET (537-0948). If the local number is not provided for you, call 1-800-336-0437 to obtain the number for your area.)

- * After you hear the high pitched tones, press <return> twice

- * The TERMINAL= prompt will be displayed. Press <return> again

- * At the @ symbol, type TELEMAIL and press <return>

* Telemail will ask for your user name: type GMEMBER and press <return>. (If that does not work for you, try another letter in front of the word MEMBER)

* Telemail will ask you for a password: type APS692 and press <return>

At this point you will automatically logon to the APS Bulletin Board and What's New will scroll up the screen. It will be approximately 55 lines of text. Remember to turn on your log if you need to do so, because telemail will automatically logout when What's New has been completely viewed.

The electronic bulletin board is cleared each Thursday at midnight. What's New is posted every Friday by 5:00 p.m. EST.

If you have further questions, please contact the APS Office of Public Affairs located at 2000 Florida Avenue, NW, Washington, DC 20009 or call (202) 232-0189 or write CMR@AIP.BITNET.

NSF Support Trends

Steve Smith, NSF Program Officer for Atomic, Molecular and Optical Physics reported briefly on trends in NSF support for the AMO program and, more generally, for basic science. The average AMO increase of 2.2% per year, over the past five budget years, before taking inflation into account, is typical for programs in the Physics Division and throughout the core sciences. The FY90 base allocation to AMO/PHY was \$13.7M. In addition \$325K was allocated specifically for Research in Undergraduate Institutions (RUI) grants, and \$44K for supplements to previously awarded research grants from the Research Experiences for Undergraduates (REU) program. A high priority is attached to opening the doors of opportunity in science for minorities and women at the undergraduate level. REU applicants have been responsive to the priority, and as a result, an additional \$28K of FY90 AMO program funds was awarded in REU supplements. Smith proposes to enforce an April 15, 1991 deadline for the next round of REU applications.

In each of FY89 and FY90, 25-30 research proposals (other than for supplements, conferences, etc.) had to be declined. Of these, approximately half appeared to merit funding, on the basis of the reviews. In FY90 five new research grants were awarded (to programs not supported in FY89). This is somewhat more than in immediately preceding years.

The role of reviewers in this process is crucial. The AMO program depends on conscientious, constructively critical reviews. Checked ratings are de-emphasized as much as possible in favor of careful consideration of what reviewers say about the importance of the scientific questions addressed; the originality, ability, and productivity of the proposer; and the technical quality of the proposal. The assignment of proposals to appropriate reviewers is a major challenge and assignments sometimes pile up on reviewers. Do not hesitate to return a proposal if you find you are overloaded, but make this decision when you receive the proposal, not weeks later. By all means, suggest good reviewers. This is very valuable.

Finally, write your reviews in a constructive mode, emphasizing the shortcomings of the proposal for the proposal writer's benefit, carefully avoiding derogatory words and phrases.

New Memberships, News, and Announcements

New membership in DAMOP is encouraged. Please contact Jim McGuire, Secretary-Treasurer concerning new membership or items of interest for this newsletter.

Answer to "What's this?" (front page)

Effective charge for three charged particles in hyperspherical coordinates. (Courtesy of C.D. Lin)

QUESTIONNAIRE FOR AMO EXPERIMENTALISTS

The National Research Council Committee on Atomic, Molecular, and Optical Science (CAMOS) is conducting a survey of the experimental AMO physics field. One objective of this effort is to identify needs and opportunities in experimental AMO physics, particularly at major universities, but also at industrial and national facilities. If you are an AMO experimentalist, we need your help to do this. Please fill out the attached questionnaire. It will be used to help CAMOS prepare a report on the status of the field that will be addressed to agencies supporting research in the field and the U.S. Congress.

We need responses from all individual scientists, even if you are a member of a larger group. If you belong to a larger group, identify yourself and your group leader and indicate that answers to certain questions may be more properly obtained from the group leader's response. Individual perceptions are as important as statistical information about the group (on funding, equipment, etc.).

The questionnaire was presented to the DAMOP membership at the May 20 - 23, 1990 Division meeting in Monterey, California. Many responses were obtained at that time, with additional questionnaires continuing to be returned. It is essential that ALL AMO experimentalists participate in this survey that we may do our best to ensure the health of the field.

Additional comments and anecdotal incidents about hardships or successes are valued and we will try to make use of them if you care to send such with your survey. If you have questions, feel free to contact Gordon Dunn (303-492-7824), Michael Lubell (212-650-5610), Daniel Larson (804-924-3782), or Ronald Taylor (202-334-3520 or BITNET: rtaylor1@nas).

Please return this questionnaire by mail (or FAX) as soon as possible and no later than October 1 to:

Dr. Ronald D. Taylor
Board on Physics and Astronomy
National Research Council
2101 Constitution Avenue
Washington, DC 20418
FAX: 202-334-2791

(If you have already completed this questionnaire it is not necessary to fill it out again.)