

# March 2001 Newsletter

## In this Issue

Chair's Message Calendar

2000 Ballot Results New Laser Scientists Conference

Deadlines ILS-XVII Meeting

2001 APS Award Winners Student Travel Grants

2000 APS Fellows Calls for Nominations

Conference Name Change DLS Committee Members

# Chair's Message, March 2001

It was a great honor to assume the position of Chair of the APS Division of Laser Science at the end of last October's Interdisciplinary Laser Science Conference (ILS-XVI) in Providence, RI. I succeed Bob Boyd, who now becomes Past-Chair. On behalf of the Division, I thank Bob Boyd for doing a wonderful job as Chair during the past year. Tony Heinz has become Chair-Elect, and Win Smith is our newly elected Vice-Chair. Rick Freeman stays on as Secretary-Treasurer for the 2nd year of his 3-year term. Carl Lineberger continues to serve as our Division's APS Councillor. Also newly elected are Duncan Steel and Wayne Itano, who join Randy Hulet, Linda Young, Tom Gallagher, and Mark Raizen as Members-at-Large of the DLS Executive Committee. I look forward to working with the members of the DLS Executive Committee, and I thank those who have generously given of their time in important service to the Division in the past year, especially our out-going members of the executive committee, Bill Phillips, John Miller, and Margaret Murnane.

Several members of the Division of Laser Science have been honored with major APS awards this year. Our congratulations to David Wineland (NIST) who has received the Schawlow Prize for his pioneering studies combining trapped ions and lasers, to W. E. Moerner (Stanford) for the Plyler Prize recognizing his development of single molecule optical detection methods, and to David Chandler (Sandia) and Paul Houston (Cornell) for the Broida Prize based on their invention and development of the photofragment imaging method. The Schawlow and Broida

Prizes will be awarded at the 2001 ILS Conference in Long Beach, CA. We also congratulate the newly elected APS Fellows sponsored by DLS: James Coleman (Illinois), Mordechai Segev (Technion), Harry Tom (Riverside), Ian Walmsley (Rochester), and Tim Zwier (Purdue).

The Division of Laser Science sponsors many program to benefit our community, which are funded primarily by income generated from the CLEO/QELS meeting. These educational, outreach, and scientific programs include:

## New Laser Scientists Conference – October 13, 2001

The DLS is pleased to announce the first New Laser Scientists Conference, a one-day conference intended to allow new researchers in areas of laser science (Ph.D. received after October 1, 1996) to meet each other, discuss topics of mutual interest, and ask questions of expert panels. The first New Laser Scientists Conference will held on Saturday, October 13, 2001 in Long Beach, CA on the day before the start of the Interdisciplinary Laser Science (ILS) Conference and OSA Annual Meeting. The DLS is offering generous travel support for the first 25 registrants. Please pass this information along to one of your junior colleagues. More information is available in this newsletter as well as on the DLS web site. We thank Joe Eberly, Paul Houston, and Mark Raizen for their tireless efforts in bringing this concept to reality!

## **Distinguished Traveling Lecturer Program**

The enormously successful Distinguished Traveling Lecturer Program, aimed at bringing distinguished laser scientists to primarily undergraduate institutions for public lectures, is being expanded in scope and size. The deadline for applications for Fall 2001 visits is April 30, 2001. The DLS thanks Rainer Grobe (Chair), Matt Anderson, Margaret Murnane, and Ian Walmsley for overseeing this program.

# Interdisciplinary Laser Science Conference: October 14 – 18, 2001

In this newsletter, you will find a proposal to change the name of annual meeting of the APS Division of Laser Science from the Interdisciplinary Laser Science XVII Conference (ILS-XVII) to Laser Science XVII. Please read the article on page 8 explaining the rationale for the name change and vote using the enclosed ballot.

The DLS thanks Hal Metcalf and Gustav Gerber (ILS-XVII Program Co-Chairs) & Margaret Murnane (ILS-XVII Conference Chair) for their hard work in planning the scientific program for the next ILS conference in Long Beach, CA. Check the web at www.osa.org/annual/2001/tech/ilssymp.cfm for a detailed description of ILS symposia and listing of invited speakers. We also acknowledge the enormous efforts of Ian Walmsley and Lou DiMauro (ILS-XVI Program Co-Chairs) & Lewis Rothberg (ILS-XVI Conference Chair) in organizing the successful ILS-XVI Conference in Providence, RI this past October.

The DLS is pleased to continue its program to support graduate student travel to the ILS and QELS conferences. A limited number of grants for travel and living expenses (up to \$700) are available to graduate students who are DLS members and who co-author an oral or poster paper at a DLS-sponsored conference. Be sure to encourage students to apply! The DLS also covers registration fees for all graduate students who attend the ILS Conference.

Finally, the APS Division of Laser Science is working toward a closer relationship with the APS Division of Atomic, Molecular, and Optical Physics (DAMOP), particularly with regard to our conferences. While a joint meeting of these divisions is not yet on the horizon, we do plan to organize a DLS-sponsored symposium at the 2002 DAMOP Meeting and we anticipate a DAMOP-sponsored symposium at the 2002 ILS Conference.

The official DLS web site is moving to www.dls.ucdavis.edu under Rick Freeman's guidance. With this change, let me thank Bill Cooke for his many years of service as the DLS Webmaster. We also thank Jeanne Hossenlopp for her continued service as Editor of the DLS Newsletter.

Thank you for your continued participation in the activities of the Division of Laser Science. Every APS member who works in the field of Laser Science should be a member of DLS and take advantage of our programs. Please encourage your colleagues to join DLS!

Marsha I. Lester

#### Fall 2002 Ballot Results

#### **New Members of the DLS Executive Committee**

We would like to congratulate the winners of this fall's election. **Winthrop Smith** was elected as the Vice-Chair, and **Duncan Steel** and **Wayne Itano** were elected as Executive Committee Members-at-Large. Their term of office began at the conclusion of the ILS-XV Conference. We thank the out-going members of the Executive Committee.

#### **DLS Bylaws**

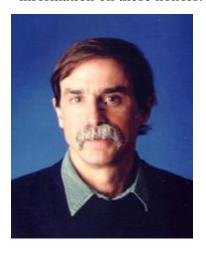
The proposed Division of Laser Science Bylaws were also approved by the membership of the division.

#### **Deadlines**

- April 2, 2001: APS 2001 Fellow Nominations
- April 15, 2001: New Laser Scientists Conference Applications
- April 15, 2001: Proposed Conference Name Change Ballots Due Date
- April 20, 2001: ILS Abstract Deadline
- April 30, 2001: Distinguished Traveling Lecturer Applications for Fall 2001
- July 2, 2001: 2002 Arthur L. Schawlow Prize in Laser Science Nominations
- August 17, 2001: ILS-XVII Student Travel Grants

## 2001 APS Award Winners

Congratulations to our DLS colleagues who were the recipients of 2001 APS awards or prizes for their research in laser science. See <a href="http://www.aps.org/praw/01winners.html">http://www.aps.org/praw/01winners.html</a> for more information on these honors.



Arthur L. Schawlow Prize in Laser Science

David J. Wineland

National Institute for Standards and Technology

## **Citation:**

For an extraordinary range of pioneering studies combining trapped ions and lasers.

## **Background:**

WINELAND, DAVID J., B.A. 1965, University of California, Berkeley; Ph.D. 1970, Harvard University (adviser, Norman Ramsey); postdoc, University of Washington, 1970-75 (adviser, Hans Dehmelt); staff scientist, NBS, 1975 -; Ion Storage Group Leader NBS/NIST, 1979 -; NBS/NIST Fellow, 1988 - . Fellow, American Physical Society; Fellow, American Optical Society; Member, National Academy of Sciences. E.U. Condon Award (NBS, for written exposition, 1978, 1985); Dept. of Commerce Silver Medal, 1980, for laser cooling (shared with F. L. Walls and R. E. Drullinger); Dept. of Commerce Gold Medal, 1985, for cooled-ion frequency standard (shared with J. C. Bergquist, J. J. Bollinger, and W. M. Itano); 1990 Davisson-Germer Prize (APS); 1990 William F. Meggers Award (OSA); Soc. of Opt. & Quant. Electronics (medal for laser science, shared with Peter Knight), 1996; I.E.E. International Frequency Control Symposium, I.I. Rabi Award (for laser cooling and application to clocks), 1998; 2000 International Award on Quantum Communications (shared with Chris Monroe and Paul Benioff).

## **Research Interests:**

Laser cooling and spectroscopy of trapped ions with applications to atomic clocks, cold plasmas, and fundamental tests; quantum state engineering with applications to quantum information processing and quantum-limited measurement.



# Earl K. Plyler Prize for Molecular Spectroscopy

W. E. Moerner Stanford University

#### **Citation:**

For the development of single molecule optical detection methods that remove ensemble averaging from spectroscopic measurements, thereby revealing the behavior of individual molecules; for the application of these methods to the study of spectral diffusion, photon antibunching, photon hole burning and intermittent fluorescence in solids, proteins and liquids.

## **Background:**

Dr. W. E. Moerner showed multidisciplinary interest from an early age, receiving three bachelor's degrees (Physics, Electrical Engineering, and Mathematics) in 1975 from Washington University in St. Louis. During his graduate study at Cornell University, he received the MS in Physics in 1978 and the Ph.D. in Physics in 1982. He then spent thirteen years as a Research Staff Member, Project Leader, and occasional Manager at the IBM Almaden Research Center in San Jose, California. He received the Roger I. Wilkinson Outstanding Young Electrical Engineer Award from Eta Kappa Nu (1984). After an appointment as Visiting Guest Professor of Physical Chemistry at ETH-Zuerich (1993-1994), he became Distinguished Chair in Physical Chemistry in the Department of Chemistry and Biochemistry at the University of California, San Diego in 1995, and Professor of Chemistry at Stanford University in 1998. He is a Fellow of the American Physical Society and the Optical Society of America, and a senior member of the IEEE.

Professor Moerner's early research at IBM focused on spectral hole-burning optical storage, and in 1989 he was the first to perform optical detection and spectroscopy of a single molecule in a condensed phase system. In addition, he led the IBM team which invented the first photorefractive polymer. Since joining academia, Dr. Moerner's group has explored mechanisms of photorefractivity in polymers as well as room temperature single-molecule spectroscopy and microscopy in crystals, polymers, and biomolecules including the green fluorescent protein and the kinesin molecular motor.

Herbert P. Broida Award



David Chandler Sandia National Laboratory



Paul L. Houston Cornell University

#### **Citation:**

For their critical contributions to the investigation of vibrationally- and rotationally-resolved molecular photodissociation and reaction dynamics, in particular for the invention and development of the photofragment ion imaging method.

## **Background:**

**Dave Chandler** was born on November 12, 1953 in Albuquerque New Mexico. He received his bachelor degree from the University of New Mexico (1975) and his Ph.D. from Indiana University (1980) under the direction of Dr. George Ewing. He held a postdoctoral position at Stanford University with Dr. Richard Zare and joined Combustion Research Facility at Sandia

National Laboratories in 1982. Dave became a fellow of the American Physical Society in 1998, was chairman of the Atomic and Molecular Interactions Gordon Conference in 1999 and serves on the executive committee of the Physical Chemistry Section of the American Chemical Society. Dave was promoted to Senior Scientist at Sandia in 2000. He has published over 80 papers in the area of gas phase physical chemistry. His interests include vibrational and rotational energy transfer, unimolecular dissociation dynamics and bimolecular reaction dynamics. Recent work involves the study of unimolecular and bimolecular chemistry using position sensitive ion detectors to obtain three-dimensional velocity, alignment and orientation information about reaction products.

**Paul Houston** was born on January 27, 1947 in Hartford, Connecticut. He received his BS from Yale University (1969) and his PhD from MIT (1973). Following postdoctoral work at the University of California at Berkeley (1973-75), he joined the faculty at Cornell University, where he is now Peter J. W. Debye Professor of Chemistry (1999-) and Chairman of the

Department of Chemistry and Chemical Biology (1997-2000). He is also a member of the Cornell Center for Materials Research and the Field of Applied Physics. Dr. Houston has held visiting positions at the Max Planck Institute for Quantum Optics (1982), Columbia University (1986, 1987), and the Institute for Molecular Science (1989). He has been an Alfred P.

Sloan Research Fellow (1979-81), a Camille and Henry Dreyfus Teacher Scholar (1980), and a John Simon Guggenheim Fellow (1986-87). He has served as a Senior Editor of the Journal of Physical Chemistry (1991-97), as Chair of the APS Division of Laser Chemistry (1997-98), and as a member of the Science and Technology Steering Committee of Brookhaven National Laboratories (1998-). Houston has authored or co-authored approximately 130 publications in the field of physical chemistry and a textbook on chemical kinetics.

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#### 2000 APS Fellows

Congratulations to the DLS members who were named as APS Fellows in 2000! In this edition of the newsletter we honor the new Fellows who were nominated by the DLS. A listing of all DLS members who were named as Fellows in 2000 will be published in the next edition of the newsletter.

## James J. Coleman, University of Illinois

For outstanding contributions to the functionality, performance and reliability of semiconductor lasers through innovative epitaxial growth techniques and device designs.

# Mordechai Segev, Technion-Israel Institute of Technology and Princeton University

For his contributions to the physics of spatial solitons and the discovery of the photorefractive soliton.

## Harry W.K.Tom, University of California, Riverside

For pioneering contributions to our understanding of the ultrafast dynamics of surface chemical and physical reactions, particularly femtosecond laser-induced nonequilibrium phase transitions and chemical reactions.

#### Ian A. Walmsley, University of Rochester

For contributions to methods for quantum state measurement in matter and the characterization of wave fields in general.

## **Timothy Scott Zwier, Purdue University**

For significant contributions to the understanding of intramolecular and intermolecular interactions, particularly of hydrogen bonded species, by application of double resonance laser spectroscopy to isolated molecules and molecular clusters.

# Proposed Conference Name Change to Laser Science XVII

Enclosed in this edition of the DLS Newsletter, you will find a ballot concerning a proposed change in the name of the annual meeting of the APS Division of Laser Science from the **Interdisciplinary Laser Science XVII Conference** (ILS-XVII) to **Laser Science XVII**. The DLS Executive Committee voted unanimously in favor of this name change at its October 2000 meeting. A brief review of the history of the conference, along with some of the issues involved in the proposed name change, is presented below as background material.

The ILS meeting was established in 1985 as the **International Laser Science Conference** with its inaugural meeting (ILS-I) held in Dallas. The APS Laser Science Topical Group was also founded in 1985 and ILS-I was its first annual meeting. ILS has continued to be the annual meeting of the Laser Science Topical Group (LSTG) and the Division of Laser Science (DLS); APS divisional status was achieved in 1996. The conference name was changed to the **Interdisciplinary Laser Science Conference** in 1989 at the request of the APS. ILS has been held as a stand-alone meeting (meetings I, III, and V-VII), in cooperation with the American Vacuum Society (IV) and in cooperation with the OSA Annual Meeting (II and VIII – present). The University of Iowa, the APS, and the OSA have each contributed to the conference administration during its history.

The ILS name is well known, but unlike many conferences, does not identify the meeting with its sponsoring organization. The proposed name change to **Laser Science XVII** would more clearly identify the conference as the annual meeting of the APS Division of Laser Science. This is particularly important in our case where the meeting is held jointly with the OSA Annual Meeting and the ILS/DLS affiliation can easily be lost or confused.

The ILS name is, however, associated with the sixteen-year history and tradition of the conference. One concern about the proposed name change is that identification of the meeting as an interdisciplinary forum may be lost. The ILS meeting attracts laser scientists working in a wide variety of research fields as is reflected in the program subcommittees (Laser Applications, Lasers in Chemistry, Lasers in Physics, Lasers in Nonlinear Ultrafast Phenomena, and Physics of Laser Sources).

The Executive Committee asks the Division of Laser Science membership to vote on the proposed conference name change using the ballot enclosed. Comments are also welcome.

#### Calendar

#### CLEO/QELS 2001

May 6-11, 2001 Baltimore, MD http://www.osa.org/mtg\_conf/

ILS-XVII, Annual Meeting of the DLS (colocated with OSA 2001)

October 14-18, 2001 Long Beach, CA http://www.osa.org/mtg\_conf/

#### **New Laser Scientists Conference**

The Division of Laser Science (DLS) of the American Physical Society announces the first New Laser Scientists Conference, a one-day meeting to be held on Saturday, October 13, 2001, in Long Beach CA on the day before the start of the joint annual meeting of the Division of Laser Science, the Interdisciplinary Laser Science (ILS) Conference, and the Optical Society of America (October 14-18).

The conference is intended to allow new researchers in areas of laser science to meet each other by presenting short research/update talks or posters, discussing mutual interests, and asking questions of expert panelists on topics of interest (e.g., research funding opportunities).

For the first 25 registrants to the New Laser Scientists Conference, the DLS will subsidize the costs of their room on Friday and Saturday as well as their meals on Saturday and will also pay the cost of registration for the ILS/OSA meeting. Recipients of support are expected to attend the ILS meeting. An overall limitation to approximately 40 attendees is expected to be necessary, so early registration is advised.

To qualify for participation in the New Laser Scientists Conference, a researcher must have received his/her doctoral degree in an area of laser science after October 1, 1996 and must contribute a short update of his/her research interests and/or recent results during the conference. The presentations will be a mix of 10-12 minute talks and posters. Applications should include a curriculum vitae as well as the title and a 200-word abstract of the presentation. They should be sent by mail (preferred) or as an e-mail attachment to:

Prof. Richard R. Freeman DLS Secretary-Treasurer Department of Applied Science University of California Davis, CA 95616 rrfree@ucdavis.edu

before the deadline of April 15, 2001. Accepted applicants will be informed before June 15 whether or not they will receive the subsidy and whether their presentation will be an oral one or a poster.

The tentative schedule for Saturday, October 13, is as follows:

8:30-9:30 welcome & scientific presentation by Carl Weiman, JILA 9:30-10:00 coffee break and poster set-up 10:00-12:00N poster presentations 12:00-1:00 lunch 1:00-3:00 short talks 3:00-3:30 coffee break

#### **ILS-XVII**

The 17th Interdisciplinary Laser Science Conference (ILS-XVII) is to be held October 14-18, 2001 in Long Beach, California and the abstract deadline is April 20, 2001. The ILS Conference serves as the annual meeting of Division of Laser Science of the American Physical Society and provides a forum for the latest work, both in laser source development and laser applications, on a broad range of important scientific problems in physics, chemistry and biology. As in the recent past, ILS will be held in conjunction with the Annual Meeting of the Optical Society of America (OSA). This year's conference will have a distinctly international flavor, with over 30 invited speakers from Europe and many from Asia as well.

The conference is structured around a series of symposia that highlight the use of lasers in basic and applied areas, including space sciences, lasers in general relativity, and life sciences. Needless to say, there will also be many symposia on the traditional topics of this meeting, including short pulses, atom optics, quantum control, cooling and trapping, precision spectroscopy, as well as a plethora of joint sessions with various OSA technical groups on non-linear optics, microscopy below the diffraction limit, clocks and metrology, etc.

Several other special talks should also be on your schedule. We are honored to have Neal Lane, former director of the NSF and White House Science and Technology advisor, as our Plenary Speaker. David Wineland will receive the Schawlow Prize and will present the Schawlow Lecture at a special symposium. Also, Paul Houston and David Chandler, co-recipients of this year's Broida Prize, will present their prize lectures in two special symposia on Imaging Studies. These will be connected with several other symposia on the dynamics of complex systems.

To encourage student participation, the DLS is offering special travel support for those who are presenting oral or poster papers (see page 11 of this newsletter). We are also planning at least one special symposium on undergraduate research, and perhaps more.

In addition to the conference technical sessions, please be sure to attend some of the social and professional society events that will occur throughout the week. In particular, the ILS Banquet will provide an opportunity for all conference attendees to gather in a non-technical atmosphere to renew old friendships and make new ones.

Finally, we are indebted to the Program Committee for their considerable effort in organizing an outstanding array of symposia that have attracted a large number of contributed papers. The Conference promises to continue in the tradition of excellence established in past years, and we look forward to joining you in an exciting meeting.

Gustav Gerber, Program Co-Chair

Harold Metcalf, Program Co-Chair

Margaret Murnane, Conference Chair

Details about the ILS program can be found at http://www.osa.org/annual/2001/tech/ilssymp.html

# Student Travel Support

The Division of Laser Science (DLS) is pleased to continue its program to support student travel to DLS-sponsored meetings. A limited number of grants for travel and living expenses, up to \$700, are available to graduate students who are DLS members and who co-author either an oral or poster paper at the ILS-XVII meeting, or at the at the QELS conference. To make these funds as widely available as possible, some priority will be given to distribution of these grants to students of different institutions. For more information see: <u>Student Travel Grants</u>. The deadline for applications for the ILS-XVII meeting is August 17, 2001.

#### **Call for Nominations**

#### **APS FELLOWS**

The DLS has made many distinguished contributions to the list of APS Fellows, including the seven elected this year. Nominations for next year's fellowships are now being solicited.

The number of DLS nominations chosen to be forwarded to the APS for confirmation as Fellow in a given year is typically in the range 5-10. This depends on the good judgement of the nominators and the Divisional Committee on Fellows headed by the DLS Vice-Chair, Win Smith, but the Committee can do nothing without nominations. This is where DLS members must come into the picture. The Executive Committee is urging all DLS members to consider whether they know of a colleague who is deserving of the prized honor of APS Fellowship. If you are uncertain about a colleague's status, consult the APS Membership Directory, where an asterisk identifies Fellows. Nominations for deserving women, minority, and foreign DLS members are especially sought.

Any member can nominate any other member, and the supporting documentation is not difficult to assemble. The deadline for a nomination and supporting letters to reach the APS, in time for DLS consideration, is April 2, 2001. All of the required information is available on the WWW at <a href="http://www.aps.org/fellowship/fellinfo.html">http://www.aps.org/fellowship/fellinfo.html</a>. Further information can be obtained from the APS at (301) 209-3268 (phone), (301) 209-0865 (fax), or email at <a href="mailto:fellowship@aps.org">fellowship@aps.org</a>.

#### SCHAWLOW PRIZE

The Arthur L. Schawlow Prize in Laser Science recognizes outstanding contributions to basic research which uses lasers to advance our knowledge of the fundamental physical properties of materials and their interaction with light. Nominations for the 2002 Schawlow Prize are due July 2, 2001. See <a href="http://www.aps.org/praw/schawlow/">http://www.aps.org/praw/schawlow/</a> for complete details on the nomination guidelines.

# **DLS Executive and Appointed Committee Members**

#### Chair

Marsha I. Lester, University of Pennsylvania

#### **Chair-Elect**

Tony F. Heinz, Columbia University

#### Vice Chair

Winthrop W. Smith, University of Connecticut

## **Secretary-Treasurer**

Rick Freeman, University of California, Davis

#### **Past-Chair**

Robert W. Boyd, University of Rochester

## **Divisional APS Councillor**

Carl Lineberger, University of Colorado-Boulder

#### **Members at Large**

Thomas Gallagher, University of Virginia Randall Hulet, Rice University Wayne Itano, NIST Mark Raizen, University of Texas-Austin Duncan Steel, University of Michigan Linda Young, Argonne National Laboratory

## **APS Representatives to Joint Council on Quantum Electronics**

Nicholas P. Bigelow, University of Rochester Richard R. Freeman, UC-Davis William C. Stwalley, University of Connecticut

#### **Newsletter Editor**

Jeanne M. Hossenlopp, Marquette University

#### **Schawlow Prize Committee**

Stephen Leone, U. Colorado (Chair)

Richard Zare, Stanford University, ('00 Recipient) Dick Slusher, Lucent Tech.-Bell Labs

# **CLEO Steering**

Duncan Steel, University of Michigan

# DLS Representative to the US Advisory Committee to the International Commission for Optics

Joseph Haus, Univ. of Dayton Winthrop Smith, U. Connecticut

## **DLS Fellowship Committee**

Winthrop Smith, University of Connecticut Tony Heinz, Columbia University Wayne Knox, Lucent Tech.-Bell Labs John Thomas, Duke University Steve Leone, University of Colorado, Boulder

## **Distinguished Travelling Lecturer Program**

Rainer Grobe, Illinois State University (Chair) Matthew Anderson, San Diego State Univ. Margaret Murnane, U. of Colorado, Boulder Ian Walmsley, University of Rochester

#### **ILS Conference**

#### **Program Co-Chairs**

Gustaf Gerber, Univ. Wuerzburg Harold Metcalf, SUNY-Stony Brook

## **Conference Chair**

Margaret Murnane, University of Colorado-Boulder

#### **New Laser Scientists Conference**

Joseph Eberly, University of Rochester Paul Houston, Cornell University Mark Raizen, University of Texas-Austin