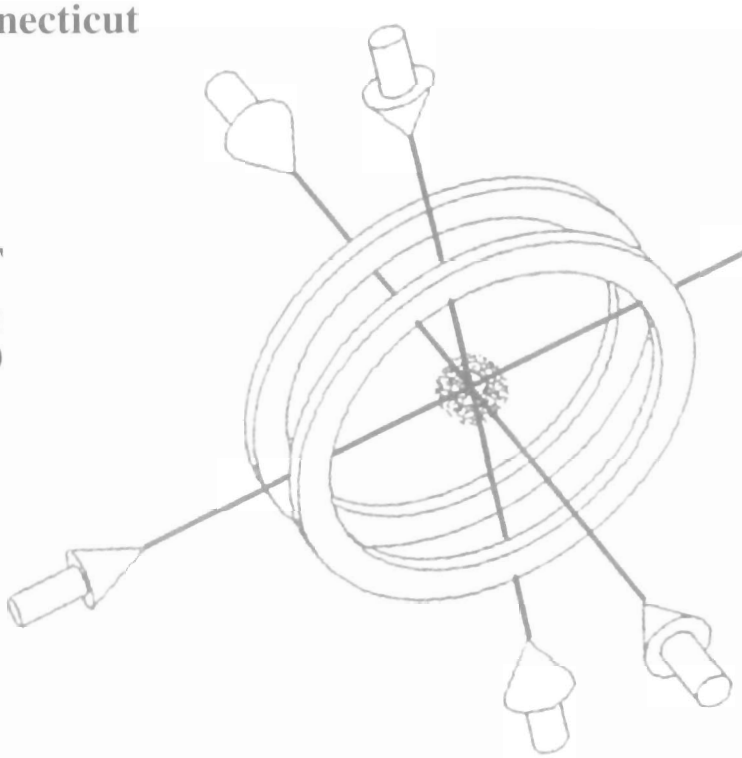
The University of Connecticut

2152 Hillside Road
Storrs, CT 06269-3046

DEPARTMENT OF PHYSICS NEWS

Volume I
Issue 2
August, 1998



W. D. Phillips

1997 Nobel Laureate to Deliver Second Annual Katzenstein Distinguished Lecture

William D. Phillips, winner of the 1997 Nobel Prize in Physics, will deliver the Second Annual Katzenstein Distinguished Lecture on Oct. 23, 1998. Phillips, from the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland, shared the award with Steven Chu from Stanford University and Claude Cohen-Tannoudji from Ecole Normale Supérieure in Paris "for development of methods to cool and trap atoms with laser light." This work will be the subject of his lecture. Earlier this year, Prof. Chu visited UConn and delivered one in the series of Hascoe Lectures (see page 7) on "Optical Tweezers and What Can You Learn in Biology and Polymer Physics from the Study of Single Molecules."

The use of laser light to slow atoms from the speed of a jet plane to that of a slow walk has revolutionized atomic physics. It has enabled the recent observation of "Bose-Einstein Condensation," a macroscopic quantum state of matter, and paved the way for the next generation of extraordinarily precise atomic clocks. Atomic vapors with temperatures well below a milliKelvin are routinely prepared, and extensions of the techniques allow submicroKelvin temperatures to be reached.

Dr. Phillips grew up in Pennsylvania and received the B.S. in Physics from Juniata College in 1970 and the Ph.D. from MIT in 1976. After two years as a Chaim Weismann Postdoctoral Fellow at MIT, he joined the staff at NIST (then the National Bureau of Standards) in 1978. He is currently the leader of the Laser Cooling and Trapping Group in the Atomic Physics Division of NIST's Physics Laboratory, and is a NIST Fellow.

Dr. Phillips is a Fellow of the American Academy of Arts and Sciences and a member of the National Academy of Sciences. He is a recipient of the Gold Medal of the U.S. Department of Commerce (1993), the Albert A. Michelson Medal of the Franklin Institute (1996), and the Schawlow Prize of the American Physical Society (1998).

The UConn Physics Department has a personal connection with Dr. Phillips. Prof. Phillip Gould worked as a postdoctoral fellow in his group at NIST before joining the UConn faculty in 1988. There is now a large research effort at UConn involving several faculty members in the area of "ultracold physics," the field spawned by the techniques recognized by the Nobel Committee.

You are all invited to attend this year's Katzenstein Lecture and to learn about this fascinating area of physics from one of its pioneers. Plan to attend the banquet after the lecture (see p. 12).

Research Excellence Award

Four faculty members were recognized during the graduate commencement ceremony on May 17 as recipients of the inaugural Chancellor's Research Excellence Awards. One was Gerald Dunne, associate professor of physics. Gerald's research specialty is low-dimensional field theory, a branch of quantum field theory with applications to fundamental particle physics and condensed matter physics. It is a field of study that has potential implications for future technologies, including solid state devices.

Dunne has become an acknowledged authority on the quantum Hall effect and on Chern-Simons theory, two theories that provide insight into the topological structures thought to lie at the heart of the structure of elementary particles. His book, Self-Dual Chern-Simons Theories, has been described as a seminal work and has become a standard reference. As one of a group of UConn researchers working on particle theory, he is a co-principal investigator on a U.S. Department of Energy research grant of more than $400,000, that has just been renewed for three years. In addition, a proposal he prepared in collaboration with colleagues in Italy and Switzerland has led to a NATO international collaborative grant for research in Self-Duality in Planar Gauge Theories.

Four New APS Fellows

Four physics professors have been elected fellows to the American Physical Society. Fellowship to the society comes through peer recognition and election is limited to no more than one half of one percent of the society's total membership per year.

The fellows, all professors of physics, are:

Edward E. Eyler, whose citation included recognition for his work with precision spectroscopic measurements of simple atomic and molecular systems;

Moshe Gai, cited for his measurements of critical reaction rates in nuclear astrophysics and his measurements of enhanced E1 decays in nuclei;

Phillip L. Gould, cited for his pioneering research in the use of lasers for diffracting and manipulating atoms and his work with ultracold atomic research;

Edward Pollack, cited for pioneering work in keV energy ion-molecule and atom-molecule collisions.

Best High School Physics Teachers

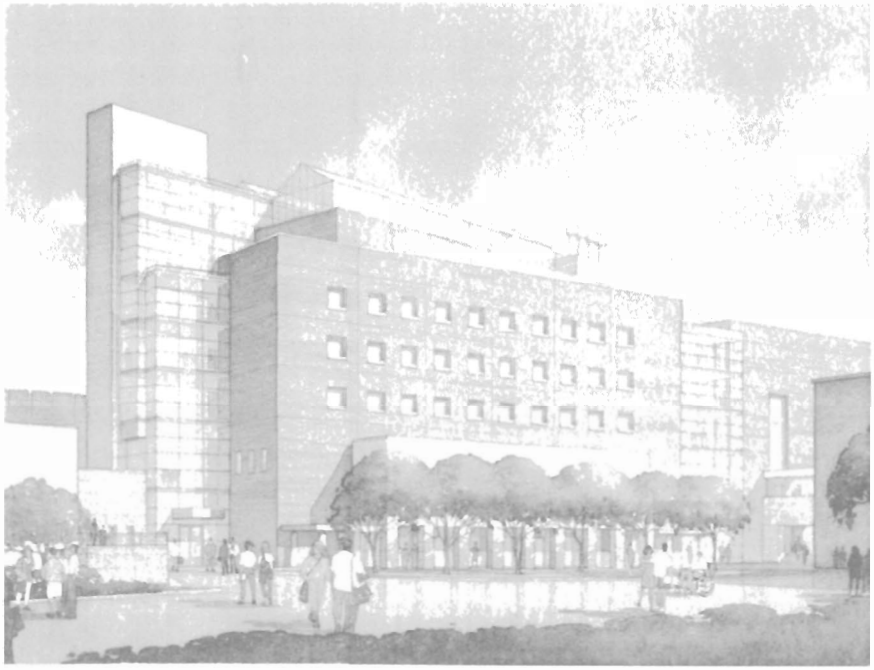
Two Connecticut teachers have received the inaugural University of Connecticut Excellence in High School Physics Teaching Award.

Alan Haught of Weaver High School in Hartford and **Fred Meyers** of Farmington High School were chosen as this year's winners by a six-judge panel. The judges included representatives from the University's physics department, industry, and the Connecticut Association of Physics Teachers. The panel was chaired by Philip Best. The award is presented by the physics department.

Sarah Donnelly Named Goldwater Scholar

Sarah Donnelly, a physics and mathematics major from Windham, Connecticut, has received a 1998-99 Barry M. Goldwater Scholarship. This prestigious national award, now in its tenth year, was designed to encourage outstanding students to pursue careers in the fields of mathematics, engineering, and the natural sciences. It is the premier undergraduate award of its type in these fields. Nationwide, there were 316 awards this year, with only 3 going to Connecticut residents. Sarah recently finished her junior year and is currently participating in a Summer Research Experience for Undergraduates program at the University of Washington. Interestingly, she is working with Prof. Ramsey-Musolf, a new member of the UConn physics faculty, who is on leave at Washington. She plans to pursue graduate studies in physics and eventually to teach and do research in theoretical physics. Congratulations, Sarah!

Our Expanding Universe



ALLAN DEHAR ASSOCIATES
ARCHITECTS & PLANNERS

Progress on the new Biological Sciences Building is now visible to all of us from our office windows. The Physics Department will occupy space on the ground floor of this $42 million project, scheduled for completion in August, 1999. Five large laboratories are being constructed for physics research, each with about 1600 square feet of experimental space. Four of the labs include integrated offices and work areas. The fifth features a large overhead crane and extra-thick shielded walls, suitable for an accelerator. Because of the rapid growth of the department, we have already allocated two of the laboratories to Phillip Gould and George Gibson. They will move their laser laboratories from the fourth floor of the Physics Building, leaving behind labs to be occupied by new faculty members.

❖ ❖

William F. Meggers Award

The William F. Meggers Award for outstanding work in spectroscopy was awarded to William C. Stwalley by the Optical Society of America for his important contributions to the theory of long-range molecular states, the spectroscopy of alkali-dimer and alkali-hydride diatomic molecules, and the theory of the stability of spin-polarized hydrogen. Recognition is also given to his leadership and teaching in the field of laser science and a lifetime of professional services to the scientific community.

William C. Stwalley received his B.S. (1964) in chemistry from Caltech and his Ph.D. (1969) in physical chemistry from Harvard University. He joined the University of Iowa faculty in 1968 and was the George Glockler Professor from 1988-1993. In 1993, he became head of the physics department and professor of physics and chemistry at the University of Connecticut.

Stwalley's career-long interest has been in atomic and molecular interactions. His Ph.D. thesis studied atom-atom interactions using collisions in molecular beams, long-range theory, and electronic spectroscopy. He has continued such studies, increasingly emphasizing multiple resonance laser spectroscopy and recently photoassociative spectroscopy of ultracold ($T < 1$ mK) atoms, with particular focus on the long-range ($R > 1$ nm) interactions and the connection between bound molecules and their separated atoms.

"Dr. Stwalley is one of the University's truly outstanding researchers," said Ross MacKinnon, Dean of the College of Liberal Arts and Science. "Though he's been here only five years, he has had a tremendous impact on the quality of scientific inquiry on campus."

The Brookhaven Connection in Condensed Matter Physics

The Physics Department is greatly enhancing involvement with Brookhaven National Laboratory (BNL) in condensed matter research, with the hiring of two new faculty. Boris Sinkovic brings expertise in various spectroscopies and microscopies, with emphasis on magnetic materials studied by spin-resolved electron emission. His efforts extend to artificially-layered magnetic structures and nanostructures, and high-temperature superconductors (HTS). Magnetic films are created with novel properties, such as colossal magnetoresistance and spin-dependent tunneling. His techniques include ultra-high vacuum for spin-resolved spectroscopy, and photon emission microscopy, which shows promise for imaging of antiferromagnetic domains.

Barry Wells is a leader in photoelectron spectroscopy, neutron and Xray scattering, and XAFS. He is experienced in ultra-high vacuum techniques and in materials preparation, particularly using an electrochemical method for growing large single crystals of lanthanum cuprate-based compounds. His groundbreaking studies of photoemission in HTS have been on such compounds. He presented his results as a guest lecturer at the Tenth Anniversary Symposium of the NATO Advanced Study Institute on HTS and published them in Science magazine.

The addition of Boris and Barry complements our long-standing program at BNL. Xray studies at the National Synchrotron Light Source (NSLS) are led by Joe Budnick and Doug Pease. Joe's efforts have made The University of Connecticut one of the participating research teams at the X-11 line at NSLS. A very wide range of recently synthesized alloys and compounds is being studied. These investigations are coordinated with NMR and other measurements carried out on the Storrs campus, in the Physics Department and the Institute of Materials Science (IMS). Bill Hines is studying materials lacking long-range structural order. Joe Budnick is part of an international collaboration on the properties of HTS through muon spin-rotation experiments. Budnick, Hines and Yide Zhang are uncovering many aspects of newly discovered types of rare-earth and iron combinations, while Pease is carrying out metallurgy and mechanical engineering programs that have brought new state-of-the-art Xray diffraction facilities to IMS.

In condensed matter theory, Gayanath Fernando's group has been working with BNL scientists for at least the past seven years. They have revealed magnetic properties of iron nitrides, electronic structure of intermetallics, and a host of other elusive quantities. They continue to develop more powerful and efficient computational techniques for first-principles studies. Through frequent contact, theory and experiment in the department are closely allied.

Professor T. D. Lee, Nobel Laureate, 1957, Delivered the First Charles A. Reynolds Distinguished Lecture in Physics, Friday, April 3, 1998

Friends of Professor Charles A. Reynolds have recently begun a distinguished lectureship in physics in his memory. Professor Reynolds was on the UConn faculty from 1952 until his death in 1971. He received his Ph.D. from Yale in 1949, working with Professor Lane in low temperature physics, and served as an assistant professor at Rutgers, 1949-1952, where he was a co-discoverer of the isotopic effect in superconductivity. This discovery of the dependence of the critical temperature on the isotopic mass led to the fundamental understanding of superconductivity as a medium-induced effect and thus to the BCS theory. Professor Reynolds used this effect to study the purity of single crystals in his low temperature lab at UConn. It is fitting (see below) that Professor T. D. Lee, of Columbia University, was invited to deliver the first Charles A. Reynolds distinguished lecture in Physics. Professor Lee has recently been appointed Director of the RIKEN BNL Research Center.

Professor Lee's address, entitled "Symmetry and Asymmetry," was a review of the dichotomy between symmetry in concept and asymmetry in reality, as examined in its historical perspective and its impact on modern science. Professor Lee delivered a superb lecture to a hall packed with students, faculty and other guests. He reviewed the role of symmetry and symmetry-breaking in the physical world starting with his startling hypothesis, in collaboration with C. N. Yang, of the breaking of parity symmetry, and moving to the modern application of (chiral) symmetry-breaking in QCD and the conjectured quark-gluon plasma. His lecture concluded a day-long visit to the department with several informal discussions. During one of these discussions, T. D. Lee gave us the privilege of sharing a note he received from Professor Bardeen in mid-fifties, asking him to recommend a young field theorist. Leon Cooper, then a recent Columbia Ph.D. graduate, was invited to join the Bardeen group. Later in January 1957, Professor Lee delivered a lecture at Stevens Tech in Hoboken, NJ, on polaron theory and many body problems. That talk was for the most part ignored, and people asked Lee only about the discovery of parity violation. According to Schrieffer, however, this Hoboken meeting stimulated him to derive the BCS gap equation during his train ride back from Hoboken to Illinois.

The University of Connecticut Memorandum of Understanding (MOU) with the Jefferson Lab (JLab) for Three Joint Bridge Positions in Nuclear Physics

In April 1995, the University of Connecticut signed a Memorandum of Understanding (MOU) with the Jefferson Laboratory (JLab) at Newport News, VA, for hiring in three joint bridge positions in nuclear physics. Under this agreement, the JLab will finance 50% of three positions at UConn for the duration of three years. The partnership is intended to bolster experimental research in nuclear physics and theoretical studies in QCD. The JLab includes the Continuous Electron Beam Accelerator Facility (CEBAF) that is currently operating at 4 GeV and soon will be upgraded to higher energies. The facility, which is operated by the Nuclear Physics Division of the U.S. DOE (under the management of UConn's own Dr. Sherman Fivozinsky, Ph.D. 1971), is dedicated to the study of the quark structure of matter and QCD. With this MOU in place, we have hired one experimentalist, Professor Richard T. Jones, and one theorist, Professor Michael J. Ramsey-Musolf. They joined the Physics Department, working in the Laboratory for Nuclear Science (LNS) that was established in 1994 by Professor Moshe Gai, also the current director. Professor Rick Jones is already taking a leadership role in studies of rare radiative decays of phi mesons, and Ramsey-Musolf is an established authority in electroweak theory and parity violations in hadrons. Professor Ramsey-Musolf is an NSF National Young Investigator and came to UConn from the University of Washington at Seattle, while Jones arrived from CERN at Geneva. In addition to these three, the LNS includes Professor Jeffrey S. Schweitzer and may soon be joined by another senior professor in experimental nuclear physics to whom an offer was made. Professor Gai's and Schweitzer's activities in nuclear astrophysics and George Rawitscher's investigations in nuclear theory complement those of the JLab group in QCD and form a very broad-based research program in nuclear physics at our department.

Nathan Isgur of the JLab signs the UConn-JLab MOU while (from left) Romano, Giolas, Stwalley, Gai and Maryanski of UConn watch

❖ ❖

Program Assessment of the Department of Physics

In September of 1997, the Physics Department embarked on its "Self-Study," the first major portion of the University's new Program Assessment Process to be carried out by all units of the University during the next seven years and repeated periodically thereafter. The second major portion was the external review of the department, described below, and the third and final major portion will be a memorandum of understanding of departmental directions and needs between the department and the administration to be developed in the coming months.

The Self-Study Committee, with input from other faculty, staff, graduate and undergraduate students, alumni and others, discussed the following mandated topics (drafted and coordinated by the faculty member(s) in parentheses): Current Departmental Status, Goals and Needs (Gary Bent/Bill Stwalley), Research (Phil Gould), Graduate Program (Kurt Haller), Undergraduate Program (Doug Hamilton), Outreach (Quentin Kessel), External Collaborations (Munir Islam), University Facilities and Other Units (Joe Budnick), and General and Executive Summaries (Kurt Haller/Bill Stwalley); and the following special topics: Undergraduate Recruitment and Retention (Ed Eyler), Regional Campuses (Mark Swanson), and Departmental and University Infrastructure (Quentin Kessel). Comparisons were also made to "Peer" Universities (Delaware, Nebraska, Oklahoma, Massachusetts and Colorado State) and to higher rated "Target of Aspiration" Universities (Stony Brook, Santa Barbara, Irvine, Virginia and North Carolina). These were public universities with no more than 50% more faculty than UConn (the top ten public universities average 65 faculty versus 31 at UConn). A copy of the

full document (two volumes, excluding faculty curriculum vitae) is available for perusal outside the Department Head's office.

Principal findings of this Self-Study included:

1. A faculty of 31 (with three more hires under way), with approximately 60 graduate students and 23 undergraduate majors, a staff of only 9, and a physical plant receiving some much needed renovations and growth.
2. Strong research programs in atomic, molecular and optical physics, condensed matter physics, nuclear physics and particle and field theory, with special interests in laser physics, ultracold science, nanoscale science, materials science, photonics and astrophysics. All areas are experiencing modest to strong growth in external recognition (external funding, invited lectures, national awards, APS Fellowship, etc.).
3. Rigorous and challenging graduate and undergraduate programs producing highly qualified doctoral, masters and bachelors students.
4. An impressive array of outreach and scientific collaborations, highlighted by special arrangements with Brookhaven National Laboratory, the Thomas Jefferson National Accelerator Facility, and the International Institute for Theoretical and Applied Physics.
5. Specific departmental needs of high priority include:
   a. additional staff (computer specialist, electronics technician, research facilitator and machinist)
   b. improved recruitment and retention of undergraduate physics majors
   c. improved recruitment of domestic graduate students and development of improved English proficiency among foreign graduate students
   d. continued replacement and growth of faculty, with special emphasis on restoring condensed matter physics to its former level.

On April 30 and May 1, 1998, an outstanding team of external reviewers (Carl Bender, Washington Univ.; Ernest Henley, Univ. of Washington; Humphrey Maris, Brown Univ.; Hal Metcalf, Stony Brook; and Jeff Koberstein, Institute of Materials Science/Chemical Engineering, UConn) met with administrators, faculty, staff and students. Their exit interview strongly endorsed the departmental self study, including its findings and needs, and will be followed soon by a written report. This report and the self-study will then be discussed with the Administration to outline a Memorandum of Understanding of the Department with the Administration, the final phase of our program assessment, which will be reported in our next newsletter.

We Are Within Reach of Our Goal: $100K for Katzenstein Endowment in Physics.

In the Fall of 1996, Dr. Henry S. Katzenstein, who earned the first Ph.D. granted by this department, established the Katzenstein Endowment in Physics. The first priorities for the income from this fund are to establish a distinguished lectureship and to make permanent the Katzenstein Prize in Physics, awarded to the undergraduate writing the best paper on his or her research. The department has pledged to raise at least $20,000 for this fund, which will be matched by an additional $20,000 from the UConn 2000 program. Should we manage to exceed this goal, there will be additional cost-sharing, but only on a 1:2 basis. Our last newsletter warned you that the current newsletter might include a more blatant call for help, so here it is! Checks may be made out to "University of Connecticut Foundation/ Katzenstein Fund." Actually, we have been very pleased by the response from our alumni; we received several thousand dollars, which have been matched by the UConn 2000 program and deposited in the fund. Checks may be sent directly to the University of Connecticut Foundation, UConn, Storrs, CT 06269 or to Quentin Kessel, Department of Physics, UConn, Storrs, CT 06269. If they are sent to the department, via Dr. Kessel, we can make certain the Foundation matches them with UConn 2000 money and credits them to the correct endowment! It also allows us to write notes of acknowledgment and appreciation directly to you. We are very grateful to those of you who have contributed to the Katzenstein Fund. The income from this fund provides the department with a flexibility we have not had in the past. There are many levels of giving; please let us know if you would like to endow (and name!) a lectureship or an endowed chair in physics.

The Norman Hascoe Lectures on the Frontiers of Science.

The Department of Physics has played a leading role in a new lecture series funded by Mr. Norman Hascoe of Greenwich, Connecticut aimed at exciting undergraduates with scientific interests in frontier areas of science. Each lecture is followed by an informal panel discussion. In our first year, we had five outstanding lectures in the general field of nanoscale science:

1. Prof. Wolfgang Ketterle (Physics, MIT) "Matter Made of Matter Waves: Bose-Einstein Condensation and the Atom Laser."
2. Prof. Paul Alivisatos (Chemistry, Berkeley) "Semiconductor Nanocrystals: New Materials Through Control of Size."
3. Prof. James Skinner (Chemistry, Wisconsin) "Single Molecule Spectroscopy in Crystals, Glasses, Liquids and Proteins"
4. Prof. Steven Chu (Physics, Stanford and 1997 Nobel Laureate in Physics) "Optical Tweezers and What Can You Learn in Biology and Polymer Physics from the Study of Single Molecules."
5. Prof. Moungi Bawendi (Chemistry, MIT) "Nanocrystallites: from Artificial Atoms to Heterostructures."

One view of nanoscale science is that it is the application of the concepts and techniques of physics to systems at a higher level of complexity (e.g. the macromolecular and the cellular). This series is being renewed for a second year and a comparably exciting program for next year is being planned.

❖ ❖

A Note from Quentin Kessel:

As the individual named on the return form from our first newsletter, I was the recipient of interesting correspondence. The most remarkable of these was from Isaac "Ike" S. Blonder, who graduated with his B.S. in physics (High Honors) in 1938. I responded with a request for any good stories that we might use in the present newsletter. In 1938 the department consisted of Professors Ferguson and Kinsey, and it was Ferguson who told Ike "you are a physicist, why do you wish to become a dentist?" And so, he became what I believe to have been the University's only physics major at that time, possibly the State College's first physics major. Mr. Blonder wrote that "Professor Ferguson spent a lot of his spare time hunting crystalline fluorescent rocks and built a stone house in Storrs with a fireplace brilliantly glowing from ultraviolet lamps. I hope it still survives in its former glory with new generations able to view one of the wonders of nature even if they don't know who put it together!" He also added that "My greatest pleasure at Connecticut... was working under Dan Noble on his FM police radio as an NYA student. Not so pleasurable was my 25 cent an hour job as an NYA laborer, scraping the flyspecks off the windows in the bull barn." For those of you who don't recognize the name of Dan Noble, he later became the head of Motorola. I also checked with the present owner of the home built by Professor Ferguson; turns out he, Emeritus Professor of Psychology and National Academy of Science member Alvin Liberman, knows about the fireplace, but has never observed it under ultraviolet light. I told him that I would bring one over so that we could check it out.

I had the pleasure of meeting Mr. Blonder this spring, when he attended his 60th class reunion in Storrs. He is concerned, rightly I believe, about science education in the U.S. and how few students go on for advanced degrees in science and engineering. He certainly remains active: he is President of Blonder Broadcasting and Chairman Emeritus of Blonder Tongue Laboratories, a manufacturer of TV equipment such as cameras, antennas and cable amplifiers and modulators. The holder of 39 patents, he left me a copy of his most recent one, dated Sept. 3, 1996. This device would combine our present analog TV signals with the new HDTV signals to provide stereoscopic (3-D) television. He also served as a columnist for a number of years, writing "Blonder's View" for Communications Technology Magazine. I'm impressed and hope that I can be as productive 60 years from the date of my graduation.

One of our more recent Ph.D.s is Xinsheng Ling, Assistant Professor of Physics at Brown University. He recently received a Research Corporation award, a Sloan Foundation award and his first NSF grant. Professor Ling addressed our "Research Experience for Undergraduates" program members this past June on his career in research. This summer program, sponsored by the NSF and the University's Harold Schwenk Endowment Fund for Innovative Education in Science, brings 15 outstanding undergraduates from across the country to Storrs to participate in research in our department.

Ultracold Science

It has long been recognized that new physics develops as the temperature is lowered, e.g. superfluidity and superconductivity. Pioneering studies of superconductivity were carried out at UConn by Charles Reynolds and his colleagues in the 1950s and 1960s; during this period, two of our most eminent graduates, John Reppy (B.S. 1957) and David Lee (M.S. 1965 [and Nobel Laureate, 1996 in Physics]) went on to develop a leading center for milliKelvin physics at Cornell University, including the discovery of superfluidity in liquid ^{3}He. Among current UConn faculty, Bill Stwalley proposed Bose-Einstein condensation (BEC) of a dilute atomic gas (spin-polarized atomic hydrogen) in 1976, and Juha Javanainen has studied the quantum optics of BEC since 1985; Phil Gould worked on some of the classic studies of laser cooled and trapped atoms in the 1980s in the National Bureau of Standards (now National Institute for Standards and Technology) Laboratory of Bill Phillips (1997 Nobel Laureate) and a number of us now collaborate with this NIST group.

A wide variety of experimental studies is under way at UConn in dilute gases at microKelvin temperatures, including highly quantum mechanical atomic collisions, ultracold plasmas, photoassociative spectroscopy and ultracold molecular production. This work involves the research groups of Phil Gould, Ed Eyler, George Gibson, Win Smith and Bill Stwalley, with important theoretical support from Juha Javanainen and Yukap Hahn (as well as George Rawitscher, who is primarily a nuclear theorist). In addition, Robin Côté, currently a postdoctoral fellow at the Institute for Theoretical Atomic and Molecular Physics at Harvard, and a specialist in theoretical ultracold physics, will join our faculty in Fall 1999. This work is funded by a variety of grants, including a major block grant from NSF's Optical Science and Engineering Initiative (one of 18 funded following 627 preproposals). It is clear that this ultracold regime promises major advances in fundamental science (coherent and quantum control of collisions, coherent atomic and molecular beams ["atom lasers" and "molecule lasers"], new atomic and molecular BECs and quantum degenerate Fermi gases [perhaps BCS paired]) and perhaps some important new technologies as well (better atomic clocks, quantum cryptography and computing, enhanced lithography, improved gyroscopes and gravitometers).

Any Chance That You Can Join Us in Atlanta March 20-26?

The American Physical Society (APS) is holding its Centennial Meeting in Atlanta, Georgia March 20-26, 1999. On Tuesday March 23, The University of Connecticut Physics Department has reserved space for a UConn alumni and alumnae get-together. Together with other departments and major research laboratories we will have space in the Atlanta World Congress Center for this event. Please check off, on the return form, if you would like to receive more details about this get-together. The APS is planning a series of special events for its centennial meeting.

Recent Solid State Research on Optical Materials

A collaborative international research program (with the Research Laboratory for Crystal Physics - now merged with the Research Institute for Solid State Physics and Optics, Budapest), initiated in 1984 with grant support from NSF and the Hungarian Academy of Sciences, actively continues with UConn participants Profs. Kappers, Hamilton and Madacsi, Emeritus Profs. Bartram and Gilliam, and Hungarian scientists Drs. Foldvari and Watterich. Exchange visits have been especially effective. The laboratory emphasis has been on crystal materials preparation at Budapest and measurements of their physical properties at UConn. For the European Conference on Defects in Insulating Materials (EURODIM98) held at Keele Univ., Staff., UK, July 6-11, 1998 two presentations resulting from this collaboration were made. In one, a new Sn-impurity-related defect in undoped $ZnWO_4$ scintillator crystals was characterized by Drs. Watterich, Kappers and Gilliam. In the other, an unexpected finding (using ESR and optical absorption methods) of greatly enhanced radiation damage susceptibility of TeO_2 crystals for γ–ray or electron irradiations at elevated sample temperatures (>120 °C) was reported by Drs. Kappers, Gilliam, Bartram, Foldvari and Watterich. $Te0_2$ crystals are well-known to have important applications for acousto-optic filters and modulators.

In another collaboration, defect studies are being conducted in new scintillator crystals with high stopping powers, namely, cerium-doped lutetium aluminate ($Ce:LuAlO_3$) and lutetium oxyorthosilicate ($Ce:Lu_2SiO_5$). The latter material, nicknamed LSO, is the most effective detector for positron emission tomography (PET) medical scanners. Also at EURODIM98 a paper was given by Profs. Bartram, Hamilton, Kappers, Schweitzer (UConn), and Drs. Lempicki (ALEM Assoc.) and Melcher (CTI, Inc.) on the effect of deep electron traps on the efficiency of scintillator response. The electron Van de Graaff accelerator with the beam stopped by a copper target was employed as the γ-ray source. Scintillation and thermoluminescence light outputs were compared by utilizing a common apparatus and detection scheme for both measurements. Further research is planned to identify the electron traps, which might facilitate their elimination and the preparation of better scintillator crystals.

The Department of Physics welcomes your communications! Our phone numbers (Storrs area code 860) and e-mail addresses are listed below. Our mailing address is: Department of Physics, University of Connecticut, 2152 Hillside Road, Storrs, CT 06269-3046. The main office phone number is: (860) 486-4915. Our web site address is: http://www.physics.uconn.edu.

Faculty

Bent, Gary D.-Asst. Head	486-4917	gbent@uconnvm.uconn.edu
Best, Philip E.	486-2942	best@uconnvm.uconn.edu
Brown, Virginia R.		vrbrown@nsf.gov
Budnick, Joseph I.	486-5541	budnick@phys.uconn.edu
Dunne, Gerald V.	486-4978	dunne@hep.phys.uconn.edu
Dutta, Niloy	486-3481	niloy@eng.uconn.edu
Eyler, Edward E.	486-3988	eyler@phys.uconn.edu
Fernando, Gayanath W.	486-0442	fernando@cmtheory.phys.uconn.edu
Gai, Moshe	486-0443	gai@uconnvm.uconn.edu
Gibson, George N.	486-3857	gibson@phys.uconn.edu
Gould, Phillip L.	486-2950	gould@uconnvm.uconn.edu
Hahn, Yukap	486-4469	hahn3@uconnvm.uconn.edu
Haller, Kurt	486-4468	khaller@uconnvm.uconn.edu
Hamilton, Douglas S.	486-4914	hamilton@phys.uconn.edu
Hayden, Howard C.	486-0444	hayden@uconnvm.uconn.edu
Hines, William A.	486-4362	hines@uconnvm.uconn.edu
Islam, Muhammad M.	486-5368	islam@phys.uconn.edu
Javanainen, Juha M.	486-3458	jj@phys.uconn.edu
Jones, Richard T.	486-3512	jonesrt@uconnvm.uconn.edu
Kappers, Lawrence A.	486-4782	kappers@uconnvm.uconn.edu
Kessel, Quentin C.	486-4118	kessel@uconnvm.uconn.edu

Mallett, Ronald L.	486-4693	rlmallett@aol.com
Mannheim, Philip D.	486-3691	mannheim@uconnvm.uconn.edu
Pease, Douglas M.	486-4715	pease@phys.uconn.edu
Peterson, Cynthia W.	486-6310	cynthia@uconnvm.uconn.edu
Pollack, Edward	486-3670	pollack@uconnvm.uconn.edu
Ramsey-Musolf, Michael J.	486-3547	musolf@phys.washington.edu
Rawitscher, George H.	486-4377	rawitsch@uconnvm.uconn.edu
Schweitzer, Jeffrey S.	486-5827	schweitz@artemis.phys.uconn.edu
Sinkovic, Boris	486-6344	sinkovic@uconnvm.uconn.edu
Smith, Winthrop W.	486-3573	winthrop@uconnvm.uconn.edu
Stwalley, William C., Department Head	486-4924	stwalley@uconnvm.uconn.edu
Wells, Barrett	516-344-3817	wells@solids.phy.bnl.gov
Emeritus Faculty		
Bartram, Ralph H.	486-4674	rbartram@neca.com
Damon, Dwight H.	486-4912	
Gilliam, Otis R.	486-3259	gilliam@uconnvm.uconn.edu
Klemens, Paul G.	486-3134	klemens@uconnvm.uconn.edu
Markowitz, David	486-4286	hayden@uconnvm.uconn.edu
Otter, Fred A.	486-3259	otter@neca.com
Schor, Robert	486-4090	schor@uconnvm.uconn.edu
Avery Point Campus		
Madasci, David P.	860-405-9052	madasci@uconnvm.uconn.edu
Hartford Campus		
Brooks, G. Lantry	860-570-9280	brooks@uconnvm.uconn.edu
Snyder, Ralph	860-570-9218	rbs@uconnvm.uconn.edu
Stamford Campus		
Swanson, Mark S.	203-251-8538	swanson@uconnvm.uconn.edu
Torrington Campus		
Foster, Gershom	860-626-6800	foster@uconnvm.uconn.edu
Waterbury Campus		
Bedding, David R.	203-575-8183	
Research Staff		
Bahns, John T.	486-4187	bahns@uconnvm.uconn.edu
Cheng, Chen-Hsiung	486-4913	cheng@phys.uconn.edu
France III, Ralph H.	486-5827	france@ajax.phys.uconn.edu
Laine, Alan D.	486-2903	laine@phys.uconn.edu
McLaughlin, Daniel J.	486-5827	daniel@uconnvm.uconn.edu
Wang, He	486-3498	wang@phys.uconn.edu
Zhang, Yide	486-4362	yzhang@uconnvm.uconn.edu
Technical Staff		
Chasse, Alan	486-4923	
Erickson, Robert V.	486-4920	phyadm1@uconnvm.uconn.edu
Generous, Paul F.	486-5229	generous@cryo.phys.uconn.edu
Kennedy, Terrence F.	486-4923	
Rapposch, Michael	486-4920	
Vartenigian, George	486-3508	phyadm06@uconnvm.uconn.edu
Office Staff		
Giard, Kim	486-3701	physadm2@uconnvm.uconn.edu
Kruse, Linda C.	486-0798	phyadm02@uconnvm.uconn.edu
Roberts, Deb M.	486-0449	physadm@uconnvm.uconn.edu
White, Denise B.	486-4916	physadm5@uconnvm.uconn.edu

Any news about yourself that you are interested in sharing? We have enjoyed (most of) the unsolicited mail we received as a result of our last newsletter.

From:

Professor Quentin Kessel
University of Connecticut
Department of Physics
2152 Hillside Road
Storrs, CT 06269-3046

Please, if this newsletter had difficulty in finding you, take a moment to provide the department with the following information. If our newsletter effort is to be successful, it is imperative that we develop an accurate mailing list.

Name:

Preferred Address (if other than what we have used for this letter):

Phone number:

MARK YOUR CALENDAR: On October 23, 1998, at 4:00 p.m. Nobel Laureate, Bill Phillips will present the second annual Henry Katzenstein Distinguished Lecture in Physics. This will take place in the Physics Building of the University of Connecticut in Storrs and be followed by dinner at the Benton Art Gallery. If you would like further information on this, or any of the following, please let us know.

- ❒ I am interested in attending the October 23, Henry Katzenstein Distinguished Lecture.
- ❒ I would like to be on the mailing list for the Atlanta APS get-together.
- ❒ I would not mind being asked to contribute to the Katzenstein Endowment Fund to aid the Physics Department in its quest for excellence.

Please return this form to:

Professor Quentin Kessel, Ph. D. UConn '66
University of Connecticut
Department of Physics
2152 Hillside Road
Storrs, CT 06269-3046

Any news or suggestions for our next newsletter?

To: David Markowitz, Editor
at Department address

(Folding both ends of this sheet in will turn the response form into a mailer.)

253700
University of Connecticut
Department of Physics
2152 Hillside Road
Storrs, CT 06269-3046

Return Services Requested

Label