

Oregon State University

## PHYSICS NEWSLETTER

April 2000

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### **Welcome to a new millennium!** **Dr. Henri Jansen – Department Chair**

Dear Friends of the OSU Physics Department:

It is my great pleasure to welcome you to a new edition of our Physics Newsletter. We plan to make this a regular item in order to keep you up-to-date with all the exciting new things happening in our Department. We owe many thanks to Jennifer James for designing and producing this newsletter. One of the changes since our last newsletter appeared is that you see my name as the new Department Chair. It is a great pleasure to take over from Ken Krane, who has led the Department so very successfully for the last fifteen years. I thank him very much for leaving such a smoothly operating organization behind! It is a hard act to follow, though.

Our educational and research efforts continue to be recognized nationally. The three-year-old paradigm project focuses on modernizing upper-division physics education, and our new NSF grant for a BS degree in computational physics adds a modern dimension to our instructional menu. New funding for materials science is on its way, for a large project on oxides headed by Janet Tate in the Center for Advanced Materials Science and for the NMR work by Bill Warren.

Even though we are currently temporarily reduced to fifteen faculty members a large amount of work is going on. In addition, we have about forty enthusiastic and eager graduate students. And, of course, it is the five member staff who really keeps the place running. It is a great pleasure to be the head of such an active and inspiring group.

### **Faculty/Staff Changes**

Faculty –

Dr. Clifford Fairchild retired in 1998. He is still working for the department on a temporary basis.

Dr. Victor Madsen retired in 1998.

Office Staff –

Jennifer James joined the department staff as the Secretary to the Chair and Graduate Secretary in September 1999.

Jennifer replaces Elizabeth Holthofer who left us to attend graduate school.

### **In Memory of:**

***David Nicodemus***  
***July 1, 1916 – June 19, 1999***

Oregon State University and the Department of Physics lost one of their most enthusiastic supporters with the death of Dave Nicodemus at the age of 82. Dave's physics career began at Los Alamos where he worked on the development of the atomic bomb from 1943 to 1946, and he was present at the first detonation of a nuclear device at Trinity site in 1945. From 1946 to 1950 he returned to Stanford University to do nuclear physics research on the Stanford cyclotron. He completed his Ph.D. in 1950 and immediately joined the OSU faculty.

After only one year on the faculty, Dave was honored with the Carter Award for excellence in teaching in the College of Science, and in 1956 he won the university's Outstanding Teacher Award. His love of teaching inspired his students and his colleagues, and he took special care to help young faculty members in physics with their teaching. Beginning in 1962 he served as assistant dean and then acting dean in the College of Science, and in 1966 he was appointed OSU's Dean of Faculty, a position he held until his retirement in 1986. In that job he continued to nurture and mentor young faculty throughout the campus, often supporting them at critical stages of their careers with small grants from the Faculty Development Fund that he administered.

In his retirement Dave continued to be a strong presence in the Department and the College, and he regularly attended the monthly meetings of the Faculty Senate, an organization that he helped to establish as Dean of Faculty. Dave's contributions to OSU will be remembered and honored through those whose careers he helped to shape. Contributions in his memory may be made to the Nicodemus Scholarship Fund at the OSU Foundation.

***Larry Schechter***  
***November 21, 1920 – July 26, 1999***

Larry Schechter compiled a distinguished record of teaching, research, and service on the OSU physics faculty for a total of 32 years. Following his service in the U.S. Navy on a destroyer in the Pacific during the Second World War, Larry returned to the University of California at Berkeley, where he earned his A.B. (1948), M.A. (1951), and Ph.D. (1953) degrees. His research in high-energy nuclear physics involved experiments using the Berkeley cyclotron, and following the award of his doctorate he continued in a staff position at the Lawrence Berkeley Laboratory until 1955 when he joined the OSU faculty. He supervised the completion of OSU's cyclotron and led the experimental nuclear physics research program at the cyclotron from 1955 until 1970. He maintained an international research collaboration at the nuclear physics research center in Saclay, France where he spent three sabbatical years (1962-62, 1969-70, 1976-77) as a visiting scientist. Larry was equally recognized for his teaching and research efforts, and his outstanding teaching was honored with the College of Science Carter Award in 1958. His final sabbatical in 1984-85 was spent as a visiting professor at the Open University in England, where he developed ideas for using microcomputers in teaching.

From 1971-1977, Larry served as chairman of the Department of Physics. He provided strong leadership in a very turbulent era, and he was responsible for recruiting many of the faculty who are currently among the senior members of the Department (Professors Gardner, Kocher, Krane, Landau, and Stetz). Through numerous committee assignments as well as a term on the Faculty Senate, Larry established an exemplary record of service to the University. After his retirement in 1987, Larry continued to play an active role as an emeritus professor; he regularly attended the weekly departmental colloquium and enjoyed keeping up with the latest developments in physics.

Larry is survived by his wife Lita, two daughters, and two granddaughters who brought him immense joy in his later years. Donations in memory of Dr. Larry Schechter can be made through the OSU Foundation.

# Thank you!

**By: Henri Jansen – Department Chair**

I would like to give Michael ‘Bohdi’ Rogers a big thank you for his work in astronomy and especially for his efforts in the Adventures in Learning program. Bohdi is a graduate student in the Department, but his strong interest in teaching has made him an active organizer and took him far beyond his normal duties. The Adventures in Learning program is aimed at middle school children and gives them two weeks in the Summer to experience science. Bohdi set up a program for these children to teach them many exciting things about astronomy. Using our astronomy computer laboratory, for the set-up of which Bohdi was also instrumental, he designed a fun and instructive series of activities. Needless to say that the kids loved it. Not only were they able to use our computers which gave them access to the latest pictures from NASA, they also found in Bohdi an inspiring and knowledgeable teacher. Thanks!

## Research Group Activities

### Computational Physics Group

Our Computational Physics group has officially become a partner in NPACI, the National Partnership for Advanced Computational Infrastructure. The partnership is supported by the National Science Foundation, is based at the San Diego Supercomputer Center, and involves active groups from all over the country. We are particularly allied with the Education, Outreach and Training thrust area, and are supported to develop an undergraduate, Computational Science curriculum. A new research grant from the NSF has been obtained by Professor Landau in order to assist in the development of curriculum materials for a B.S. degree in Computational Physics. Professors Stetz, Jansen, and Giebultowicz are also involved in the materials development.

### Science Access Project

The TIGER Tactile Graphics Embosser is now commercially available. It is being manufactured by ViewPlus Technologies, Inc, a company spun out of Prof. John Gardner's Science Access Project where TIGER was developed. TIGER is the world's first and only graphics computer printer for the blind. It prints from Windows applications just like any other printer except that text is changed to Braille and graphics are represented by embossed images. Read about TIGER at <http://www.viewplustech.com>.

The Science Access Project mission is to develop technologies to provide access to science, math, and other information by people with print disabilities. TIGER is their first product to reach market, but it will not be the last. They have a number of software applications in various stages of development from early research to late beta test. Read about this project and its research topics at <http://dots.physics.orst.edu>. The Science Access Project funding comes largely from the National Science Foundation.

### Solid State Physics Group

Prof. Janet Tate and her students have been preparing and studying thin film materials that have potential applications in optical displays. These include transparent oxides exhibiting p-type electrical conductivity, and phosphors in doped sulfides. They recently demonstrated a tunable red shift in the ZnS:Ga system.

In Prof. Bill Warren's laboratory, nuclear magnetic resonance (NMR) is being used to investigate the atomic-scale environment of optically active impurities in semiconductors. He and his students recently observed photo-enhanced nuclear spin relaxation due to bistable impurity complexes in group III-doped CdTe and CdF<sub>2</sub> crystals. These effects are helping to elucidate the doping phenomenon in wide band semiconductors, and the bistability has potential application in optical memory materials.

Impurity complexes are also the focus of Prof. John Gardner's perturbed angular correlation (PAC) studies of group IV oxides. With the PAC technique, he and his group are able to investigate the trapping energies and dynamic properties of oxygen vacancies trapped at radioactive <sup>111</sup>In probe nuclei.

Prof. Giebultowicz is performing neutron diffraction on some new and very interesting ferromagnetic, semiconducting materials.

Theoretical work in Prof. Jansen's group focuses on magnetocrystalline anisotropy and its relation to changes in the atomic environment, which has important applications in magnetic data storage. This is a very challenging project from a computational physics point of view. Prof. Wasserman's group studies heavy Fermion systems in which the electrons show some extremely unusual behavior due to collective effects.

## **Experimental Nuclear Physics Group**

The experimental nuclear physics research program at OSU is led by Professor Ken Krane and currently includes three graduate students (Jeff Loats, Paul Schmelzenbach, and Christopher Stapels) and one undergraduate (Miriam Lambert). Our group is doing nuclear structure experiments using the 88-inch cyclotron at the Lawrence Berkeley Laboratory and the TRIUMF cyclotron in Vancouver, BC. At Berkeley we have been exploring the structure of nuclei around mass 150, where the nuclear shape is undergoing dramatic changes. We produce intense radioactive sources of the nuclei in this mass region and observe their decays using an array of 20 high-resolution gamma-ray detectors. The TRIUMF experiments involve the decays of radioactive nuclei produced with the cyclotron and implanted into a target that is maintained at a temperature of a few millikelvins above absolute zero. The present goals of the experiments are to measure the magnetic dipole moments of these highly unstable nuclei in order to gain an understanding of their structure. This research is supported by the U.S. Department of Energy.

Another experimental program uses OSU's nuclear reactor to determine thermal neutron capture cross sections for radioactive nuclei. Even though the cross sections are well known for neutron capture by stable nuclei, those for radioactive nuclei are often known only imprecisely if at all. We have been using commercial radioactive sources of extremely high-purity to measure cross sections throughout the range of nuclei.

## **AMO Group**

Our Atomic, Molecular, and Optical Physics group (AMO) is involved in a variety of education, research, and outreach activities. During the past 3 summers, undergraduate students from around the country have come to OSU and worked on laser cooling and trapping of rubidium atoms as part of the department's NSF funded Research Experience for Undergraduates (REU) program. Our most recent Ph.D. degree was awarded to Brian Wichner, who worked on diode laser noise spectroscopy with Prof. Fairchild, and is now working for InFocus in the Portland area. We continue to use our M. J. Murdock Optics Instructional Laboratory to periodically offer a special optics course for technicians from the local Hewlett-Packard/Agilent facility.

## Paradigms in Physics Project

The Paradigms in Physics program, sponsored by the National Science Foundation, is beginning to attract national attention for its innovative reconstruction of our upper-division curriculum for both Physics and Engineering Physics majors. By reorganizing content, we have made the curriculum more modern, with an earlier emphasis on quantum ideas, and more flexible for students with interdisciplinary career interests. Now in its third year, the program is retaining more students until they can successfully make the transition through the difficult junior year. Integrated laboratories and computer visualization activities have students actively engaged in their own education.

## Graduate Degrees Conferred

### JUNE 1999

Albus, Alexander (MS) - Is in civilian service in Germany  
Hilger, Derrick (MS) - Continuing to Ph.D.  
Peery, Travis (MS) - Continuing to Ph.D.  
Rios, Maribel (MS) - is working as a technical editor for a scientific publisher in Eugene.

Rogers, Michael (MS) - Continuing to Ph.D.  
Wang, Xinju (MS) - is working in Beaverton, OR  
Wolff, David (Ph.D.) - is teaching computer science at Pacific Lutheran University.

### AUGUST 1999

Baukol, Beau (MS) - Continuing to Ph.D.  
Des Voigne, Matthew (MS) - is working at APEX in Washington.  
Dragowsky, Michael (Ph.D.) - is a postdoc at the Los Alamos National Laboratory working on neutron physics.

Jun, Bongim (MS) - Continuing to Ph.D.  
Moleski, Tobias (MS) - is teaching physics at Nashville State Technical Institute

Perreault, Nicki (MS) - Is employed at the Naval Air Weapons Center in China Lake, CA  
Schlatter, Brian (MS) - Is employed at Microsoft

### DECEMBER 1999

Moret, Eric (Ph.D) - Is working at Intel in Hillsboro, Oregon  
Sahyun, Steven (Ph.D) - Is a postdoc at the OSU Physics Department.

### MARCH 2000

Monte, Francesca (Ph.D) - Is a postdoc at the Naval Air Weapons Center in China Lake, CA  
Shroyer, Mark (Ph.D) - Is a postdoc at Emory University in Georgia  
Wang, Haiyan (MS) - Is employed by J.D. Edwards in Denver, CO

## Undergraduate Degrees Conferred

### June 1999

Steve Berukoff - is taking a year off to work in the Corvallis area before beginning graduate studies in Physics at the State University of New York in Stony Brook next fall.

Nate Bezayiff – is in the Physics graduate program at the University of California at Santa Cruz.

Sean Herring – is now in the graduate program in Oceanography at OSU.

Matt Kapus - is commissioned as an officer in the U.S.Navy.

Elliott Koch - is in the graduate program in Physics at the University of California at Los Angeles.

Ken McGowan - (EP) continues to work in the telecommunications industry in the Corvallis area.

Scott Morris - is employed in Corvallis, OR

Lira Vaughan - (dual degree Physics/EP) is in graduate school in Electrical Engineering at OSU.

### **Fall 1999**

Katt Fretwell – graduated with a dual major in Chemical Engineering.

Zach Hosack – (EP) is a graduate Physics student at OSU.

Tim Steckmann - Will attend graduate school at Ohio State University in Fall 2000.

### **Winter 2000**

Heidi Clark -

Ben Painter - continues to work at Mentor Graphics.

## **1999-2000 Donor List**

(As of April 1, 2000)

**We wish to give our sincere thanks to those that help keep the Physics Department great!**

<b><u>Physics General Fund</u></b>	<b><u>In Memory of Dr. Schecter</u></b>	<b><u>Nicodemus Mem. Scholarship</u></b>
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<p>Allen, D. &amp; J.  Anderson, W. &amp; L.  Balsiger, M. &amp; C.  Brick, R. &amp; H.  Brown, B.  Cannon, T. &amp; G.  Danilson, L.W. &amp; M.  de Curtins, J.  Envall, K. &amp; S.  Flint, R. &amp; S.  Gass, S. &amp; B.  Glasgow, D. &amp; I.  Goldsmith, T.  Gross, M. &amp; D.  Han, W.  Hocken, J. &amp; P.  Lin, J.T. &amp; S.  McMullen, S.  Miedaner, D.  Mulder, P. &amp; C.  Murray, P. &amp; J.</p> <p>Partch, E. &amp; S.  Quinby, G. &amp; A.  Robertson, W. &amp; J.  Schnick, J. &amp; M.  Skinner, J. &amp; E.  Stekel, S.  Sterk, F. &amp; M.  Strayer, R. &amp; L.  Torn, J. &amp; S.  Tynes, A. &amp; M.  Walker, D.  Warren, W. &amp; N.  Yund, R. &amp; K.  Yunker, E.  Zhou, Y.</p>	<p>Bennett, C.V. &amp; M.  Berlowicz, N. &amp; J.  Cowan, R.  Cutler, M.  Davis, A. &amp; N.  Frost, J. &amp; C.  Gardner, J. &amp; C.  Goddard, B.  Harper, J. &amp; M.  Kocher, C. &amp; M.  Krane, K. &amp; P.  Schecter, L..</p> <p>Shaw, F.  Tate, R. &amp; A.  Taylor, T. &amp; J.</p>	<p>Amano, M.  Buck, H.R.  Buck, J. &amp; B.  Burch, D.  Harper, J.  Jimmerson, D.  Kepka, G.  King, R.  Lemar, C.  Lund, B.  Neville, C. &amp; L.  Nicodemus, M.  Parmad, H. &amp; L.  Popovich, M.  Schecter, L.  Skelton, K.  Spuler, E.  Sugihara, Mrs. F.  VanVliet, A.  Walton, M.  Whiteley, E.  Young, R.  Yunker, E.</p>
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## Awards!

**Kerry Browne – 1999 – Frolander Graduate Teaching Award**  
**Rubin Landau – 1999 – OSU Alumni Association Distinguished Professor Award**  
**Emily Townsend – 1999 – Oregon Sports Lottery Scholarship**

## How can you help?

There are several ways you can support the Physics Department

**Donations:** You can make donations of any amount to several different scholarship funds or to the general Physics Department fund.

**Speakers:** The grad students and the SPS are always looking for interesting and fun speakers, preferably OSU Physics graduates. Come and share where you have gone with your degree. It will serve to motivate current students!

Contact Maya Abels (Director of Development, College of Science) (800) 354-7281 for details on contributions or contact Jennifer James (541) 737-1681 to donate your time!