

# The Wisconsin Physicist

A Newsletter for University of Wisconsin Physics Alumni



## Inside this Issue

Plasma Dynamo  
Facility

The Large  
Hadron  
Collider

The Precision  
Frontier & the  
New Standard  
Model



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*of*  
**WISCONSIN**  
MADISON

**University of Wisconsin**

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## A. Baha Balantekin

Eugene P. Wigner Professor and  
Chair, Department of Physics

## View from the Chair

# Greetings

There has been a great number of exciting developments in the Physics Department over the past 18 months:

- Our previous Chair, Prof. Susan Coppersmith, has been elected to the prestigious National Academy of Sciences in 2009 in "recognition of her distinguished and continuing achievements in original research."
- Prof. Karsten Heeger received a 2009 Sloan Research Fellowship.
- Prof. Pupa Gilbert received an NSF American Competitiveness and Innovation Fellowship in 2008 "for her application of novel methodology to the determination of the structures and synthetic pathways of mineralized biological tissues and for exceptional skill in bringing the fascination of science to a wide audience involving non-science students and the general public."
- Prof. Gary Shiu received one of the 2008 Guggenheim Fellowship Awards, which recognize artists, scholars and scientists based on distinguished past achievement and exceptional future promise.
- In 2008 Prof. Heeger also received not one, but two Outstanding Junior Investigator awards from Department of Energy, one in High-Energy Physics and one in Nuclear Physics.

Our faculty also successfully competed for the campus-wide awards:

- Professor Ellen Zweibel was awarded a William Kraushaar Professorship in 2009.
- Prof. Michael Ramsey-Musolf received a 2009 Vilas Associate Award.
- Thomas Wise, Researcher in the Department of Physics, received 2009 Chancellor's Award for Excellence in Research for Critical Research Support.

## Academic Ranking of World Universities

Ranking for UW Departments in the College of Letters & Science

- 1 Mathematics**  
No. 13 in the world
- 2 Physics**  
No. 22 in the world
- 3 Economics/Business**  
No. 30 in the world
- 4 Chemistry**  
No. 40 in the world
- 5 Computer Science**  
No. 44 in the world

University of Wisconsin is ranked No. 17 overall in Natural Sciences and Mathematics.

Methodology and more information is available at [www.arwu.org](http://www.arwu.org).

The Department congratulates these colleagues for their outstanding accomplishments.

Plasma physicist and the director of Madison Symmetric Torus (MST) experiment, Stewart Prager retired from the University of Wisconsin in 2009 to lead U.S. Department of Energy's Princeton Plasma Physics Laboratory. John Sarff was appointed as a professor of physics and the new director of MST.

During the academic year 2007-2008 particle astrophysicist Asst. Prof. Stefan Westerhoff was promoted to associate professor with tenure. During the academic year 2008-2009 an exceptionally large number of our assistant professors were promoted to associate professor with tenure: cosmologist Daniel Chung, string theorist Aki Hashimoto, neutrino experimentalist Karsten Heeger, high-energy experimentalist Matt Herndon, and particle theorist Frank Petriello.

We were delighted to hear that University of Wisconsin-Madison Physics alumna, Fay Ajzenberg-Selove, who received a Ph.D. in experimental nuclear physics with Hugh Richards, received the National Medal of Science in 2008 for her scientific achievements. You may recall that some years ago Fay had generously established a scholarship fund for undergraduate women majoring in Physics, Astrophysics, or Astronomy. I recently noticed that alumnus Theodore Cohen wrote a very interesting book named Full Circle (Authorhouse, Indiana, 2009), in which he detailed his graduate school

years at Wisconsin and his recollections of the Dillinger laboratory.

The eighth and ninth Annual Awards Banquets were held in the springs 2008 and 2009 respectively. In addition to awards to outstanding students, several Distinguished Alumni Fellow and Service Awards were presented. Distinguished Alumni Fellows were William Jury, Paul Kaesberg, and Wes Traub in 2008 and the honorable Bill Foster, John Wiley and Phyllis Fleming in 2009. William Jury is a Distinguished Professor of Soil Physics at the University of California-Riverside. Paul Kaesberg was a pioneer in physical studies of viruses. Wes Traub is the Chief Scientist for NASA's Navigator Program, Bill Foster, a high-energy physicist, is currently the U.S. Congressman Representing the 14th District of Illinois. John Wiley has just stepped down from his post as the Chancellor of the University of Wisconsin-Madison to become the Interim Director of our brand-new Wisconsin Institutes for Discovery. Phyllis was unfortunately too ill to attend the ceremony herself, but her partner, Linda B. Miller joined us to present the inaugural Phyllis Jane Fleming Graduate Student Support Award she established in honor of Phyllis. Dr. Fleming passed away not much after the award ceremony. She will live in our thoughts and successful careers of the women who receive Phyllis Jane Fleming Award. Sam Aronson, Director of the Brookhaven National Laboratory, and Marjorie Cocoran, Professor at Rice University, received the Distinguished Scientist Award in 2008 and JoAnne Hewett,

Professor at SLAC, and Wai-Yim Ching, Curator's Professor of Physics at University of Missouri-Kansas City, in 2009. Distinguished service award went to Wayne Niemuth in 2008 for his loyalty and exceptional philanthropy to our department and to Peter L. and Cheryle L. Jolivet in 2009 for their interest in, caring for, and philanthropy to students of the Physics Department.

Whether you are an alumnus, friend, employee, or student, we appreciate your interest in and loyalty to the University of Wisconsin Physics Department. You can donate to the Physics Department online by going to [www.physics.wisc.edu/giving/index.html](http://www.physics.wisc.edu/giving/index.html).

If you wish to consult with a UW Foundation development officer on future gifts or other options, including estates, trusts, gifts-in-kind, or planned giving please contact Chris Glueck, UW Foundation at 608/265-9952 or [chris.glueck@uwfoundation.wisc.edu](mailto:chris.glueck@uwfoundation.wisc.edu).

On behalf of the Department, I sincerely thank you, our alumni and friends, who have provided generous support to the Department. In these tough economic times you help us enormously to carry out our research, education, and outreach efforts.





## Laboratory Plasma Astrophysics Experiment

# Plasma Dynamo Facility

All astronomical systems—planets, stars, galaxies, and clusters of galaxies—contain magnetic fields, but the origin of magnetic fields in the Universe is an unsolved problem in cosmology. It is generally thought that the Universe was magnetized in two stages: first a “spark” that created tiny fields, and then plasma physics processes that amplified and shaped them. The latter stage is called the dynamo. Dynamos operate continuously in the Universe, including in the Earth, where a dynamo is responsible for geomagnetic reversals, and on the Sun, where a dynamo is manifest in the sunspot cycle. Magnetic fields generated by dynamos are responsible for launching powerful jets from black hole accretion disks, accelerating particles to ultrarelativistic energies, and powering spectacular  $\gamma$ -ray flares.

The National Science Foundation has recently awarded a \$2.4M grant to Profs. Cary Forest and Ellen Zweibel to construct a next generation plasma astrophysics experiment at the UW. The Plasma Dynamo Facility will be used for investigating self-generation of magnetic fields and related processes in a large, weakly magnetized, fast flowing, and hot (conducting) plasma. The project will take approximately three years to construct and will provide a major new, flexible plasma device and associated infrastructure for a new generation of graduate students and postdoctoral researchers to

carry out experiments in a previously uninvestigated plasma regime—a regime asymptotically similar to many astrophysical plasmas. The device will be located in Sterling Hall, and will be operated as a multi-investigator, multi-institutional facility. In addition to the large impact on the UW physics program, experimental investigations in this facility are likely to have strong national impact through connections to new astrophysics initiatives such as the Square Kilometer Array, where cosmic magnetism is one of four key science issues, the IceCube project, which will detect neutrinos generated by electromagnetically accelerated particles, and the Auger project, which detects the particles directly.

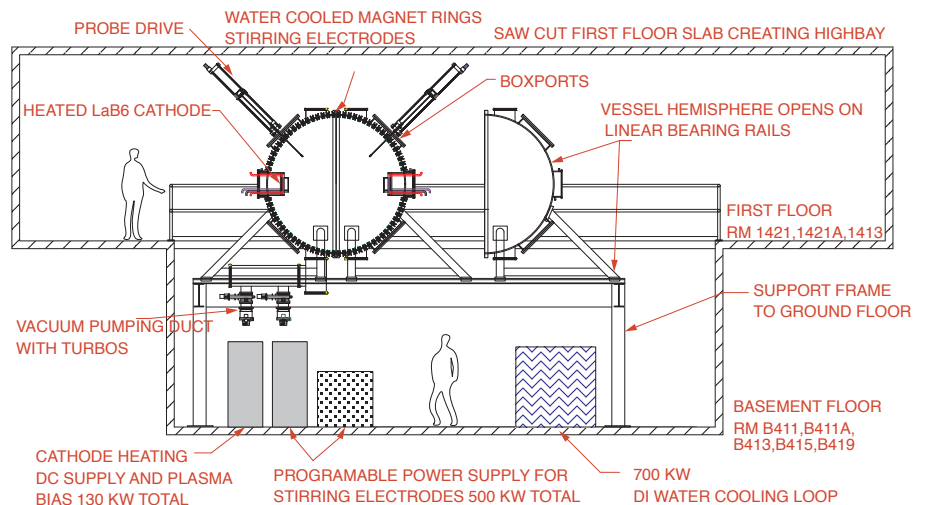
The concept proposed here builds upon excitement in recent years of using liquid metals to study dynamos; unmagnetized liquid metals have been mechanically stirred and magnetic fields spontaneously created and observed. A plasma experiment has the potential to extend these studies to more astrophysically relevant parameters. Beyond the obvious fact, that most naturally occurring dynamos are plasmas, the use of plasma, rather than liquid metals to study magnetic field generation will allow the magnetic Reynolds number (the dimensionless product of size $\times$ conductivity $\times$ speed that governs self-excitation of magnetic fields) to be more than a factor of 10 larger than in liquid metal

experiments. It will also allow the viscosity to be varied independently of the conductivity, an important knob that governs the nature of the turbulence; the new experiment will be in the parameter regime of many astrophysical objects. Finally, advanced plasma diagnostics will be applied, for the first time, to dynamo studies.

Such laboratory plasmas have never before been studied (most hot, fast flowing plasma experiments have been magnetized), but recent advances in permanent magnet technology, plasma source development and new scheme for driving flow now make it possible. The device at the core of the facility will be a 3 meter diameter spherical vacuum vessel that uses an array of powerful permanent magnets on the vessel wall to provide plasma confinement. The magnets will be arranged in a configuration that has a magnetic field localized to the plasma edge and provides a spherical, 1.3 m radius, field-free plasma volume. Recently developed large area Lanthanum Hexaboride plasma sources (provided by UCLA) will be used for ionizing and heating the plasma; this will generate a steady-state, hot (10-30 eV) plasma. To stir the plasma, electrostatic electrodes, together with the permanent magnet array will be used to impart torque on the plasma in the magnetized edge region and viscously couple momentum from the edge plasma to the unmagnetized core.

The experimental program that follows after the development will be organized into campaigns, each designed to study a different fundamental plasma process important to astrophysics. As a start, separate campaigns are planned to investigate: (1) large and small scale dynamos, (2) plasma instabilities and turbulence at high  $\beta$ , (3) thermal, compositional, and magnetic buoyancy driven convection in a rapidly rotating spherical plasma, (4) magnetorotational instabilities in plasmas, and (5) flow-driven MHD instabilities in partially ionized plasmas. The connection to astrophysics will be facilitated initially by strong connections to the Center for Magnetic Self-Organization in Laboratory and Astrophysical Plasmas, which will assist in planning for physics campaigns to take place after the experiment is constructed.

The experiment itself will be constructed from a 3 m diameter, 5/8" thick stainless steel vessel, split into two halves as shown in Fig. 1. Each half will be mounted on a track such that the two halves join in a vertical plane and the axis of symmetry for the magnet rings will be horizontal. The vacuum vessel itself exists (from surplus acquisitions) and is shown in Fig. 1. The vessel will be substantially modified to include a large midplane flange and support frame that rides on the rails. The track will allow the two hemispheres to be separated and allow the internal structure of the experiment to be



**Figure 1**

A layout of the lab showing how the vacuum vessel separates into two hemispheres, the new two story lab to be remodelled with UW funds, vacuum systems, water cooling and power supplies.

modified easily. The University of Wisconsin will be remodeling a laboratory to accommodate the new experiment. The lab will be two stories tall, with the experiment at approximately floor level. Vacuum

pumps, power supplies, and water cooling will be supplied from the lower level, and the upper level will be reserved for the plasma source hardware, probe ports and future diagnostics.

# UW Physics Undergraduate Students Degrees & Awards

## Bachelor Degrees Awarded

### Applied Mathematics, Engineering, and Physics

#### Spring 2008

Butzlaff, Erick Andrew (BS)  
Sczygelski, Erik David (BS)

#### Fall 2008

Ballering, Nicholas Paul (BS)

#### Spring 2009

Anderson, Eric James (BS)  
Jahnke, Keith Michael (BS)  
Jiang, Li (BS)

### Astronomy–Physics

#### Spring 2008

Angeli, Steven John (BS)  
Bruess, Richard David (BS)  
Cariker, Kaitlyn Abigail (BS)  
Christie, Kevin Daniel (BS)  
Cornelius, Sean Paul (BS)  
Dirienzo, William Joseph (BS)  
Haka, Andrew David (BA)  
Hoffman, Samantha Marie (BS)  
Jaehnig, Gregory Carter (BS)  
Line, Michael Robert (BS)  
Luell, Patrick Ryan (BS)  
Schafer, Nicholas Peter (BS)  
Yeck, William Luther (BS)

#### Fall 2008

Cychosz, Jacob (BS)

#### Spring 2009

Beardsley, Adam Peter (BS)  
Brown, Jonathan Maas (BS)  
Hartzman, Alex (BS)  
Hunt, Lucas Robert (BS)  
Jacquart, Melissa Leah (BS)  
Larsen, Timothy Ralph (BS)  
Parker, Angela Grace (BS)  
Rotter, Benjamin Joseph (BS)  
Sperka, David Michael (BS)  
Streiff, Carolyn Marta (BS)  
Tai, Yue Cheng (BS)  
Teply, Grant Paul (BA)  
Toebe, Tyler Gene (BS)  
Wood, Michael Patrick (BS)  
Worth, Rachel Jane (BS)

### Physics

#### Spring 2008

Angeli, Steven John (BS)  
Bruess, Richard David (BS)  
Christie, Kevin Daniel (BS)  
Cohen, Alexander David (BS)  
Cornelius, Sean Paul (BS)  
Dirienzo, William Joseph (BS)  
Gorst, Nathanielle James (BS)

Haka, Andrew David (BA)  
Handara, Vincent Adhi (BS)  
Harris, Brandon Joseph (BS)  
Hoffman, Samantha Marie (BS)  
Hurley, Samuel Anthony (BS)  
Jaehnig, Gregory Carter (BS)  
Krcro, Christopher Michael (BS)  
Laud, Sanjiv P. (BA)  
Leaf, Nicholas John (BS)  
Line, Michael Robert (BS)  
Miller, Jason Robert (BS)  
Neal, Stephen Anthony (BS)  
Nelms, Bradlee David (BS)  
Pikorz, Jessica Anne (BS)  
Schafer, Nicholas Peter (BS)  
Yeck, William Luther (BS)  
Yogerst Jr, Daniel Richard (BA)  
Zhang, Raymond Ruomeng (BS)

#### Summer 2008

Keith, Lauren Ashley (BS)  
Michalowicz, Andrew Joseph (BA)  
Steinpreis, Matthew Donald (BS)

#### Fall 2008

Alexander, Damon Spiegel (BA)  
Corby, Sebastian Chenoweth (BS)  
Ford, Allen Nathan (BS)  
Gallo, John Joseph (BS)  
Richetta, Alex M (BS)  
Stott, Andrew Rowland (BS)  
Straight, David Benjamin (BA)  
Vaklyes, Erik Jason (BS)

#### Spring 2009

Beardsley, Adam Peter (BS)  
Brady, Elizabeth Jane (BS)  
Brummitt, Charles David (BS)  
Bucklew, Victor Gauss (BS)  
Conrad, Erin Caitlin (BS)  
Freiberg, Lisa Marie (BS)  
Gisselquist, Graham Gilbert (BS)  
Hartzman, Alex (BS)  
Houston, Jacqueline Marie (BS)  
Hovey, George Edward (BA)  
Jacquart, Melissa Leah (BS)  
Kiefer, Brian Daniel (BS)  
Kirley, Matthew Patrick (BS)  
Kufalk, Bradley Edward (BS)  
Li, Ho Ling (BS)  
Lombardo, Gregory Jerome (BS)  
Mende, Patrick Craig (BS)  
Mucklow, Dominik H Wolfmueller (BS)  
Noel, Thomas William (BS)  
Parker, Angela Grace (BS)  
Rotter, Benjamin Joseph (BS)  
Sedlacek, Jonathon Alton (BS)  
Sender, Max (BS)  
Sperka, David Michael (BS)  
Streiff, Carolyn Marta (BS)  
Tai, Yue Cheng (BS)  
Teply, Grant Paul (BA)  
Toebe, Tyler Gene (BS)  
Wood, Michael Patrick (BS)  
Worth, Rachel Jane (BS)  
Zou, Dan (BS)

## Physics Undergraduate Awards

### 2008 Awards Banquet

**Fay Ajzenberg-Selove Award**  
Kaitlyn Cariker (Astronomy)  
Ho Ling Li (Physics)

**L&S Hedstrom Award**  
Ho Ling Li

**Dr. Maritza Irene Stapanian Crabtree Award**  
Adam Beardsley  
Rogerio Fernando Cardoso  
Alex Lang

**Bernice Durand Undergraduate Research Scholarship**  
Emily Lewis

**Henry and Eleanor Firminhac Physics Undergraduate Scholarship**  
Kristen M. Jones

**L. R. Ingersoll Prize Spring 2006–07**  
Adam R. Prinsen (Phy 103)  
Michael A Bohl II (Phy 104)  
Thomas J. Reigle, Jr. (Phy 201)  
Angwei Law (Phy 202)  
Elizabeth Poli (Phy 207)  
Andrew Bolanowski (Phy 208)  
Alex Robinson (Phy 248)

**Fall 2007–08**  
Xin Yang Zhang (Phy 103)  
Joseph Burdowski (Phy 104)  
Jie Wei (Phy 201)  
Kaiqi Hu (Phy 202)  
Nicholas Coorrough (Phy 207)  
Wee Teck Ho (Phy 208)  
Dylan Colon (Phy 247)

**Liebenberg Family Research Scholarship**  
Patrick Mende

**Albert Augustus Radtke Scholarship Award**  
Damon Alexander  
Charles Brummitt  
Erin Conrad  
Li Jiang  
Thomas Noel  
Erik Sczygelski

### 2009 Awards Banquet

**Fay Ajzenberg-Selove Award**  
Rachel Worth (Astronomy)  
Li Zhan (Physics)

**Dr. Maritza Irene Stapanian Crabtree Award**  
Alex Lang  
Jacob Miller  
Daniel Reese  
Dominick Rocco

**Bernice Durand Undergraduate Research Scholarship**  
Hanna Herbst  
Ali Bramson

**Henry and Eleanor Firminhac Physics Undergraduate Scholarship**  
William Larry

**L. R. Ingersoll Prize Spring 2007–08**  
Brett Van Rossum (103)  
Lu Lu (104)  
John Leonard (201)  
Daniel Rynearson (202)  
Tan Xu (207)  
David Ziehr (208)  
Karl Goebel (248)

**Fall 2008–09**  
Hao Yu & Xiong Xiong (103)  
Wenrui Chen (104)  
Jingwan Wang (201)  
Alex Gooding (202)  
David G. Sterken (207)  
Zhi Xu Tan (208)  
Ruxiu Zhao (247)

**Liebenberg Family Research Scholarship**  
Bradley Dober

**Albert Augustus Radtke Scholarship Award**  
Adam Beardsley  
Daniel Lecoanet  
Grant Teply



# UW Physics Graduate Students Degrees & Awards

## Master Degrees Awarded

### Physics

#### Spring 2008

Ganugapati, Raghunath Mydhili (MS)  
Day, Jason Owen (MS)  
Buettner, Kevin Paul (MA)  
Cotter, Sean Lawrence (MS)  
Cox, William Andrew (MS)  
Kato, Masaki (MS)  
King, Jacob Robert (MA)  
Peng, Weina (MS)  
Pfendner, Carl Gilbert (MA)  
Phillips, Michael Allen (MA)  
Stone, Jennifer Mary (MS)  
Taylor, Nicholas Zane (MA)  
Yip, Stephen Shingfan (MA)

#### Summer 2008

Eisch, Jonathan Daniel (MS)  
Passmore, Daniel Ryan (MS)

#### Fall 2008

Long, Andrew Jonathan (MS)  
Rao, Yongyan (MA)  
Strahler, Erik Albert (MA)

#### Spring 2009

Bachtis, Michail (MS)  
Falkowski, Adam Franklin (MS)  
Gonderinger, Matthew Charles (MS)  
Kane, Joseph Nolan (MS)  
Stuart, Alexander James (MS)  
Takasaki, Koki (MS)

## PhDs Awarded

### Physics

#### Spring 2008

Bergerson, William Frederick (PhD)  
Ennis, David Andrew (PhD)  
Hyland, Peter Owen (PhD)  
Rocks, Lindsay Erin (PhD)  
Stradling, Alden Reid (PhD)  
Zheng, Fan (PhD)

#### Summer 2008

Brownson, Eric Charles (PhD)  
Daniels, Matthew Joseph (PhD)  
Day, Jason Owen (PhD)  
Dellenbusch, Kate Erika (PhD)  
Fang, Yaquan (PhD)  
Huang, Guiyu (PhD)  
Quayle, William B. (PhD)  
Underwood, Bret James (PhD)  
Wang, Kai (PhD)

#### Fall 2008

Ganugapati, Raghunath Mydhili (PhD)  
Ha, Sangkeun (PhD)  
Johnson, Todd Andrew (PhD)  
Kelley, John Lawrence (PhD)  
McGuire, Lisa Marie (PhD)  
Wolfe, Homer Frederick (PhD)

#### Spring 2009

Chen, Xin (PhD)  
Hole, Karen Tabetha (PhD)  
Liu, Xiaosong (PhD)  
Quackenbush, Seth David (PhD)  
Westfall, Kyle Brian (PhD)  
Williams, William Douglas (PhD)

## Physics Graduate Awards

### 2008 Awards Banquet

**Jeff & Lily Chen Wisconsin  
Distinguished Graduate  
Fellowship**  
Larissa Ejzak (2nd year)

**Joseph R. Dillinger Award for  
Teaching Excellence**  
Peter Hyland

**Henry and Eleanor Firminhac  
Physics Graduate Scholarship**  
Laura Gladstone  
Lisa Hardy

**Elizabeth Hirschfelder Award**  
Amanda Gault  
Meghan McGarry  
Varsha Ramakrishnan

**Karl Guthe Jansky and Alice  
Knapp Jansky Family Graduate  
Award**  
Matt Povich (Astronomy)

**Emanuel R. Piore Award**  
Kiritkumar Makwana (Fall)  
Haichen Wang (Spring)

### 2009 Awards Banquet

**Joseph R. Dillinger Award for  
Teaching Excellence**  
Andrew Long

**Phyllis Jane Fleming Award**  
Annelise Malkus

**Elizabeth Hirschfelder Award**  
Lisa Hardy  
Laura Gladstone

**Karl Guthe Jansky and Alice  
Knapp Jansky Family Graduate  
Award**  
Sarah Gwynne Crowder  
(Astronomy)

**Emanuel R. Piore Award**  
Hojin Yoo (Fall)  
Dushko Kuzmanovski (Spring)

## Departmental Awards

### 2008 Awards Banquet

**Best TA, Spring 2007**  
Matt Gonderinger  
Adam Tregre

**Best TA, Fall 2008**  
Will Williams

**Rookie of the Year**  
Yuanfeng Gao

### 2009 Awards Banquet

**Best TA, Spring 2008**  
Eva Tsoncheva

**Best TA, Fall 2009**  
Yuanfeng Gao

**Best TA, Fall 2009**  
Yuanfeng Gao

## Campus-Wide Teaching Assistant Awards

### 2008 Awards Banquet

**Capstone PhD**  
Eva Tsoncheva

**Innovation in Teaching**  
Shusaku Horibe

# Thank You

The Physics Department greatly appreciates the support it has received from alumni and friends over the years. Private gifts provide us with the resources necessary for meaningful enhancements to our programs. If you are interested in making a contribution, please make your check payable to:

The UW Foundation  
U.S. Bank Lockbox  
P.O. Box 78807  
Milwaukee, WI 53278-0807

If you have questions about making a contribution, please contact: Professor Baha Balantekin, Chair, at 608-263-3279.

## UW High Energy Physics

# The Large Hadron Collider

University of Wisconsin High Energy Physics group members got their first experience with protons in September at the Large Hadron Collider (LHC) at CERN in Geneva Switzerland. Eventually, the LHC will operate at seven times the energy and 100 times the luminosity of the present world's highest energy collider, the Fermilab Tevatron, and will permit physicists to search for the mechanism of particle mass generation, for supersymmetry (SUSY) which introduces a partner for each known particle, stabilizes the higgs mass and provides a candidate for the dark matter making up most of the universe, for extra dimensions and for other exciting new physics possibilities.

Prof. Duncan Carlsmith, Sridhara Dasu, Matt Herndon, Wesley Smith, and Distinguished Scientist Dr. Richard Loveless operated major parts of CMS they had worked on during these initial beam tests: the trigger system including the calorimeter level-1 trigger and higher level triggers, the endcap muon system including its infrastructure and alignment, tracking system infrastructure, software for simulation and event processing and a leading Tier-2 US CMS computing facility.

Prof. Bruce Mellado, Yibin Pan, Sau Lan Wu, and Senior Scientist Dr. Haimo Zobernig were involved in readying the ATLAS experiment for first beam. They have leading

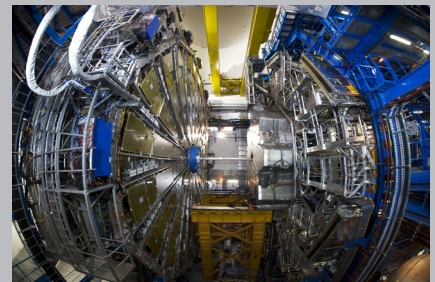
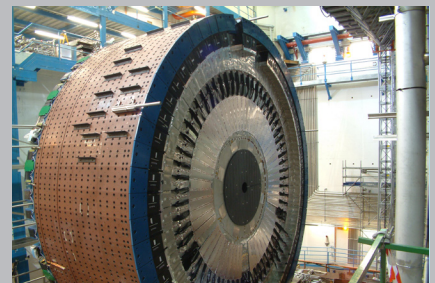
roles in the silicon and pixel readout driver, high level trigger, detector performance studies, software, and computing.

Prof. Vernon Barger, Dan Chung, Lisa Everett, Francis Halzen, Tao Han, Frank Petriello, Michael Ramsey-Musolf and Gary Shiu continue to hone their calculations of new physics models and backgrounds to interpret the new data from the LHC and to connect the results of the LHC to other exciting physics phenomena such as astronomical observations of cold dark matter and studies of the cosmological origins of the Universe.

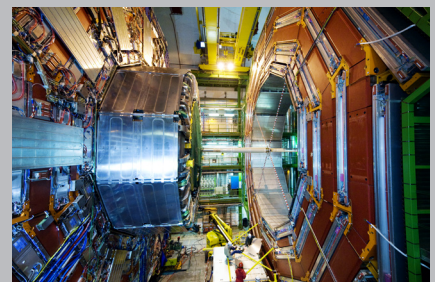
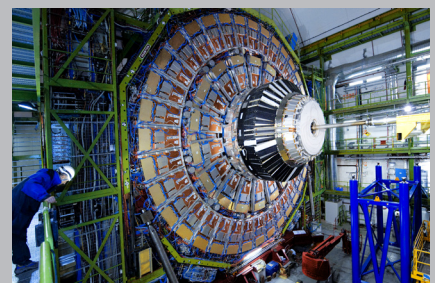
On September 10 the first beam in the LHC was successfully steered around the full 27 kilometers of the ring. Subsequently the beam was captured by the RF and showed very promising performance in terms of alignment and optics. On September 19, during powering tests of a main dipole circuit, an electrical fault resulting in mechanical damage to some of the magnets. The repair of these magnets will be done over the CERN winter shutdown and it is now planned to have the LHC start collisions at an initial center of mass energy of 10 TeV in 2009.

The Wisconsin teams on ATLAS and CMS have been working on these projects since 1993 and with first collisions are now scheduled for 2009, are eagerly awaiting the opening of this new energy frontier.

## ATLAS



## CMS



## UW Physics Graduate Students

# Graduate Recruiting

The quality of the graduate applicant pool has continued to improve in recent years.

The applicant pool for Fall 2009 admission was extremely competitive and we made offers to over 100 well qualified applicants. In 2008 we had an incoming class of 26 new graduate students, in 2009 we had 46 new graduate students enroll in the Ph.D. program! We expect a number closer to our usual incoming class of about 25 students for next year.

## Fall 2008 Admissions

Total of 25 students

### Fellows

Eilerman, Scott (GAANN)  
Wright State University (Pheno)  
Gill, Alexander (GAANN)  
Colby College (Atomic)  
Henry, Joshua (GAANN)  
Austin Peay State University (ECE/Plasma)  
Koliner, Jon (GAANN)  
Arizona State (Plasma)  
Yu, Chiu-Tien (GAANN)  
Univ of Chicago (Astrophysics)

### TAs—Domestic

Hart, Steven  
Utah State (Cond Matter ex)  
Hartman, Timothy  
Uof Illinois-Champaign (Cond Matter ex)  
Johnson, Phillip  
Butler University (High Energy/Astro)  
Maurer, Leon  
Dartmouth (Quantum/Cond Matter)  
Ross, Ian  
Rose-Hulman Inst of Tech (Pheno)  
Swanson, Joshua  
St Cloud State University (HEP/Nuclear)

### TAs—International

Dong, Zhe  
NYU transfer; Beijing Univ. (Pheno)  
Garcia, Camilo  
Univ del Valle del Cauca, Col (HEP/Pheno)  
Hernandez, Tomas  
UWashington transfer; U Texas (Cond matter/Quantum)  
Koh, Teck Seng  
Nat'l Univ of Singapore (Quantum)  
Miao, Jinlu  
Nankai University (Nuclear/HEP)  
Shi, Zhan  
Fudan University (Cosmology/HEP)  
Yoo, Hojin  
Korea Inst. of Science & Tech  
(Cosmology/Quantum)

Yu, Jialu  
Wuhan University (AMO/Cond Matter)  
Zhen, Heming  
USTC (Quantum/Cond Matter/HEP)

### RAs

Ji, Haoshuang  
Peking University (HEP)  
Poudel, Amrit  
Hanover College (Cond Matter)  
Seltzman, Andrew  
Georgia Inst. of Technology (Plasma)  
Weaver, Christopher  
Washington University (IceCube/Plasma)

### Outside Aid

Gamble, John (NSF)  
College of Wooster (Cond Matter Th)

## Fall 2009 Admissions

Total of 46 students

### Fellows

Brookhart, Matthew (GAANN)  
University of Idaho (Plasma/CM)  
Cosgriff, Margaret (GAANN)  
Swarthmore College (Cond Matter Ex)  
Peterson, Andrea (GAANN)  
Harvard University (HEP/Pheno)  
Reilly, Bethany (GAANN)  
Taylor University (HEP Ex)  
Sauppe, Joshua (GAANN)  
Rensselaer Polytechnic Institute (Plasma Ex)  
Triana, Joseph (AOF)  
Florida Atlantic University (Plasma Ex)

### TAs—Domestic

Capechi, William  
St Johns University (Plasma)  
Carmody, Daniel  
Carnegie-Mellon Univ (Plasma)  
Carr, Alexander  
University Of Nevada, Reno (Cond Matter)  
DeLand, Zachary  
Michigan State (Cond Matter/Plasma)  
Fiorino, Daniel  
DePaul University (HEP Ex)  
Hinrichs, Paul  
Univ of Minnesota-Twin Cities (Neutrinos)  
Kruse, Amanda  
Univ Nebraska-Lincoln (Astrophysics/HEP)  
Maller, Kara  
U of Texas at Austin (AMO/ Cond Matter)  
Ojalvo, Isobel  
Rensselaer Polytech Inst. (HEP Ex)  
Parker, William  
Univ of Arizona (HEP Ex)  
Pettus, Walter  
Hillsdale College (Cond Matter/AMO)  
Ribeill, Guilhem  
N Carolina State Univ.(Cond. Matter/AMO)  
Rudinger, Kenneth  
University of Chicago (Quantum/Pheno)  
Schroeder, Daniel  
Macalester College (HEP/String)

Simmons, Zachary  
University of St Thomas (AMO/Quantum)  
van Santen, Jakob  
Univ of Chicago (Astrophysics/HEP)  
Weber, Joshua  
Grinnell College (Cond Matter Ex/AMO)  
Weisberg, David  
Duke University (Cond Matter/AMO)  
Wood, Michael  
UW Madison (AMO/Astrophysics)

### TAs—International

Cho, Junghun  
U of Michigan-Ann Arbor (HEP Ex)  
Choi, Eunsong  
Yonsei University (Cond Matter Th)  
Kiewe, Michael  
Tel Aviv University (Pheno/String)  
Lim, Hyungjun  
Korea Adv. Inst Sci &Tech (HEP/Pheno)  
Liu, Zhen  
Zhejiang University (HEP/String)  
Santander, Marcos  
Univ Tech Nacional (Astrophysics/HEP)  
Schick, Christoph  
Ruprecht Karls Univ (Astrophysics/HEP)  
Wang, Yuxuan  
Peking University (Cond Matter Th)  
Wu, Xian  
Nanjing University (Cond Matter Ex)  
Xu, Canran  
Harbin Institute of Tech (Cond Matter Th)

### RAs

Churchill, Tyler  
US Naval Academy (Biophysics)  
Gong, Yutao  
Wuhan University (Biophysics)  
Lee, J. David  
UW Madison (Plasma)  
Mohr, Robert  
Swarthmore College (Cond Matter Ex)  
Morgan, Kelsey  
University of Chicago (Astrophysics/HEP)  
Riedel, Benedikt  
USC (Astrophysics/HEP)  
Sabbatini, Luca  
Rice University (HEP Ex)  
Yang, Suli  
Peking University (HEP Ex)  
Yeast-Hull, Tova  
Kenyon College (Astrophysics/HEP)

### Outside/Other Aid

Lichtman, Martin  
Brown University (AMO/Astrophysics)  
Saenrang, Wittawat  
Khon Kaen University (Cond Matter Ex)

## UW Theorists

# The Precision Frontier & the New Standard Model

**W**hy is there more matter than anti-matter in the present universe? What is dark matter? Were all of the forces of nature unified into a common “superforce” at the birth of the cosmos? If so, are there additional forces that were part of that superforce but that disappeared from view as the universe evolved?

The Standard Model (SM) of particle physics has been enormously successful in explaining much of the microphysics of the cosmos, yet the model provides no answers to these any other basic questions about the origin and evolution of our universe.

The search for a “New Standard Model” (NSM) that will address these puzzles is being pursued at a number of experimental frontiers: the high energy frontier, where experiments at the Tevatron and Large Hadron Collider (LHC) hope to discover new particles; the cosmological frontier involving probes on large distance scales that hope to discern the imprints of new physics in the cosmic microwave background and various astrophysical phenomena; and the precision frontier, where exquisitely precise low-energy experiments hope to see behavior of elementary particles, nuclei, and atoms that is forbidden in the SM or that deviates strongly from SM expectations.

Chief among these precision frontier experiments are searches for a permanent electric dipole moment (EDM) of the electron, neutron and neutral atoms. EDMs are highly suppressed in the SM and are expressly forbidden if nature respects both CP and CPT invariance. Their discovery in highly-sensitive, “table top” experiments would provide “smoking gun” evidence for CP-violation beyond that of the SM—a key ingredient in explaining the origin of the visible matter in the cosmos. So far, no one has observed a non-zero EDM, and the experimental limits are impressively stringent. The EDM of the neutron, for example, must be smaller in magnitude than  $2.9 \times 10^{-26}$  e-cm, corresponding to a length scale roughly thirteen orders of magnitude smaller than the radius of a nucleon.

The next generation of EDM searches expects to improve the sensitivity by two or more orders of magnitude. If a non-vanishing EDM is observed, it could signal the CP-violation needed to explain the creation of the visible matter, or “baryogenesis”, during the electroweak symmetry-breaking era when the universe was  $10^{-11}$ s old. In order to investigate these prospective implications, Prof. Michael Ramsey-Musolf and colleagues are busy computing EDMs in a variety of scenarios for the NSM and refining the theoretical methods for carrying

out these computations. Along with Prof. Daniel Chung, they are also inventing tools needed to carry out reliable electroweak baryogenesis calculations and applying these tools to various scenarios for new CP-violation.

The prospective cosmological implications of EDM searches are intimately connected with searches for the Higgs boson (or its cousins) at the Tevatron and LHC, since successful electroweak baryogenesis requires not only new CP-violation but also a cosmic phase transition whose character is determined by the scalar sector of the NSM. Ramsey-Musolf is investigating various Higgs mechanisms that could lead to this phase transition, identifying their possible LHC signatures, and investigating their prospects for making up the cosmic dark matter as well.

Ramsey-Musolf, Prof. A. Baha Balantekin, and their collaborators and students are also studying another process at the precision frontier that is forbidden by the SM, the neutrinoless double  $\beta$ -decay of atomic nuclei. Observation of this decay would mean that the neutrino is its own antiparticle. If so, then the matter-antimatter asymmetry may have been produced by heavy neutrinos in the early universe through the process of “leptogenesis”. Prof. Karsten



Heeger and his group are playing a key role in the CUORE experiment that is designed to search for the neutrinoless double  $\beta$ -decay of tellurium nuclei at the Gran Sasso underground laboratory in Italy. The theoretical interpretation of these experiments in terms of the NSM require complicated computations of nuclear matrix elements as well as careful analyses of the underlying particle physics mechanisms that could give rise to these decays.

The UW-Madison theorists are also analyzing the implications of table-top tests of gravity that look for violations of Einstein's weak equivalence principle and that could reveal signatures of new long-range forces between ordinary matter and dark matter. Other precision experiments under scrutiny include measurements of parity-violating asymmetries in electron-nucleus and electron-electron scattering at the Jefferson Laboratory in Virginia and in neutron and nuclear  $\beta$ -decay being carried with part-per-mil precision at various nuclear physics laboratories around the world. Deviations of these asymmetries from SM predictions could reveal footprints of various candidates for the NSM, such as supersymmetry, additional gauge bosons, or extra spacetime dimensions.

The U.S. nuclear physics community is vigorously pursuing the search for the NSM at the precision frontier, as the DOE-NSF Nuclear Science Advisory Committee has made this program one of the top priorities for the field for the next decade in its 2007 Long Range Plan. Piecing together the clues about the NSM provided by experiments at the precision, energy, and cosmological frontiers is an exciting theoretical challenge, and one for which UW-Madison Physics is leading the way during the coming decade of discovery.

## UW Physics Outreach Reaching Out...

### This Week at Physics

Each year the Physics Department hosts a large number of colloquia and seminars exploring a wide range of research topics. We have implemented an on-line calendar for people to read about upcoming events.

To enter the "This Week at Physics" Automated Event Viewing System use the following web-links:

#### Weekly Calendar

[www.physics.wisc.edu/twap/](http://www.physics.wisc.edu/twap/)

#### Colloquium Schedule

[www.physics.wisc.edu/twap/view.php?&name=PDC](http://www.physics.wisc.edu/twap/view.php?&name=PDC)

### We are now on Facebook

We are on Facebook under "UW-Madison Department of Physics." Facebook is a powerful social media tool that allows us to connect with faculty, staff, students, alumni, and friends. Find us on Facebook, become a fan.

### L.R. Ingersoll Museum

The L.R. Ingersoll Museum is a free, public, hands-on, physics museum located in room 2130 Chamberlin Hall. We also give guided tours upon request. The Museum is open to visitors from 8 am to 4:15 pm Monday through Friday. If you would like to schedule a tour, please contact Steve Narf at 608.262.3898 or [srnarf@wisc.edu](mailto:srnarf@wisc.edu) at least one week before desired date(s).

### Physics Fair 2010

The annual Physics Fair will be held Saturday, February 20, 2010 from 11 am–4 pm in Chamberlin Hall on the UW-Madison campus. Check our website for more information.

### Welcome!

- On August 24, 2009, Ella Braden joined the Department as an outreach specialist. She is the new Physics Education Outreach Coordinator for the Wonders of Physics Program.

### Wonders of Physics

- The next public presentations of The Wonders of Physics are scheduled:

- February 13, 2010
- 1:00 pm
- 4:00 pm
- 7:00 pm
- February 14, 2010
- 1:00 pm
- 4:00 pm
- February 20, 2010
- 1:00 pm
- 4:00 pm
- 7:00 pm
- February 21, 2010
- 1:00 pm
- 4:00 pm

These presentations will be held in 2103 Chamberlin Hall, 1150 University Ave, Madison, WI. The presentation last a bit over an hour and is suitable for all ages. It is recommended that you have tickets for the show. Tickets are free and are available after January 1<sup>st</sup> using the On-Line Ticket Form (<http://sprott.physics.wisc.edu/cgi-bin/tickleft.exe>). Alternately, you may call 608.262.2927 or e-mail [wonders@physics.wisc.edu](mailto:wonders@physics.wisc.edu).

## US News & World Report Physics Department Rankings

(Ranked in 2008)

- 1** Massachusetts Institute of Technology  
Stanford University
- 3** California Institute of Technology  
Harvard University  
Princeton University  
University of California–Berkeley
- 7** Cornell University
- 8** University of Chicago  
University of Illinois–Urbana-Champaign
- 10** University of California–Santa Barbara
- 11** Columbia University  
Yale University
- 13** University of Maryland–College Park  
University of Michigan–Ann Arbor  
University of Pennsylvania
- 16** University of California–Los Angeles  
University of California–San Diego  
University of Texas–Austin  
**University of Wisconsin–Madison**
- 20** Johns Hopkins University  
University of Colorado–Boulder  
University of Washington

\* In the specialty rankings for Physics, UW Plasma is ranked 3<sup>rd</sup>.

## UW Physics Faculty

# Updates & Awards

### New Faculty

#### 2009

Prof. John Sarff (Plasma)

### Promotions

#### Fall 2008

Particle Astrophysicist Stefan Westerhoff was promoted to Associate Professor.

#### Fall 2009

Cosmologist Daniel Chung was promoted to Associate Professor. String theorist Aki Hashimoto was promoted to Associate Professor. Neutrino Experimentalist Karsten Heeger was promoted to Associate Professor. High-Energy Experimentalist Matt Herndon was promoted to Associate Professor.

Particle Theorist Frank Petriello was promoted to Associate Professor.

### Sabbaticals

#### 2007

Prof. Shirdhara Dasu  
Prof. Pupa Gilbert  
Assoc. Prof. Yibin Pan

#### 2008

Prof. Vernon Barger  
Prof. Duncan Carlsmith  
Prof. Sue Coppersmith  
Prof. Mark Eriksson  
Prof. Gary Shiu  
Prof. Wesley Smith

#### 2009

Prof. Andrey Chubukov  
Prof. Marshall Onellion

### Retirements

#### 2008

## David Huber

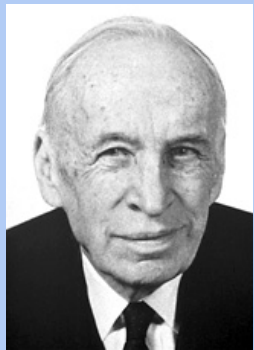
**D**ave received his BA from Princeton in 1959 and his Ph.D. in Physics from Harvard in 1964, where he was a student of Nobelist J. H. Van Vleck. He came to Wisconsin as an Instructor in 1964 and was promoted rapidly through the ranks, becoming Professor of Physics in 1969. He has served as major professor for 16 graduate students, many of whom have gone on to distinguished careers. In his teaching, he developed the 2-semester graduate sequence Physics 751-752 in condensed matter physics and taught several of the graduate specialty courses. He is the author of more than 400 scientific papers, especially on radiation phenomena and the optical properties of solids.

In his research he has made highly significant contributions to the understanding of the magnetic and optical properties of condensed matter and has made occasional forays into statistical mechanics and atomic physics. He has continuing scientific collaborations with students, postdocs, physics faculty and visiting international scientists. Recent work includes analysis of geometrically frustrated magnets, investigations of manganite compounds, studies of the optical properties of polymers, and collaboration in photoemission measurements of pentacene on bismuth.

He has served the university with distinction in many administrative posts. He served twice as Department Chair for a total of three years. From

1985 to 1997 he was Director of the Synchrotron Radiation Center (SRC) and was instrumental in the recovery of the Aladdin ring from a threat of closure. From 1989 to 2008 he also served as the Director of the Physical Sciences Laboratory (PSL). Since 2006 he has helped with the administration of the IceCube project.

His honors include: Fellow of the American Physical Society; A. P. Sloan Fellow, 1965-1967; J. S. Guggenheim Fellow, 1972-1973; Fellow of the National Association of State Universities and Land Grant Colleges, U S Office of Science and Technology Policy, 1990-1991. His external services include: organizer of the International Conference on Magnetism, organizer of the International Conference on Luminescence, and Associate Editor, Journal of Luminescence.



## John H. Van Vleck Exhibit

Friday, September 18 will marked the opening of a new, permanent

exhibit in the Physics Library, Room 4220 Chamberlin Hall. This new three-part exhibit features the life story of John H. Van Vleck, who is known as the "founder of the modern theory of magnetism." From the development of the laser beam to the tape recorder, from the creation of exotic gadgetry in modern electronics to new industrial uses of glass, much credit rests in Van Vleck's theory of solid-state physics. This exhibit covers his childhood years in Madison, his research achievements, and his Nobel Prize and other awards.

For more information: <http://physics.library.wisc.edu/archives/index.html>

## Clint Sprott

Clint began his association with the University of Wisconsin as a graduate student in physics in September, 1964 after receiving a bachelor's degree in physics from MIT. His Ph.D. thesis was on Behavior of RF Heated Plasmas in a Toroidal Octupole Magnetic Field under the supervision of Donald W. Kerst. After graduating in 1969, he spent a year as a postdoc jointly in Physics and Electrical Engineering before taking a position at Oak Ridge National Laboratory. In 1973 he returned to the University. He was promoted to Associate Professor in 1977 and to full professor in 1979.

His early research was on heating and confinement of plasmas in the Toroidal Octupole and in the Levitated Octupole. He proposed, designed, and supervised the construction and operation of the Tokapole II poloidal divertor tokamak. After the retirement of Prof. Kerst in 1980, he served as principal investigator of the plasma physics program for the following six years, during which time the Madison Symmetric Torus was proposed, designed, and constructed. He oversaw its initial operation and achieved the first reversed field pinch plasmas in the device. He has consulted with a dozen different organizations including ORNL, McDonnell-Douglas, Argonne National Lab, TRW, Honeywell, and the Chicago Museum of Science and Industry. In 1989, his interests turned to computational nonlinear dynamics, and he has lectured, collaborated, and published widely in that area over the past two decades. He has developed a number of new chaotic systems and electronic circuits, one of which is marketed by PASCO Scientific. In 1994 he initiated and continues to organize a weekly campus-wide seminar on Chaos and Complex Systems.

In 1984 Prof. Sprott began a popular lecture-demonstration program for the general public called The Wonders of Physics. He has made 212 presentations over the past 25 years to an estimated 60,000 people. For the past 20 years, he has also supervised a traveling version of the show that has been given by others over 1,300 times in schools and other settings in all 72 Wisconsin counties, 32 states, and three countries. He has produced a Lecture Kit, 26 hours of videos, two educational software programs, one of which won the first annual Computers in Physics contest for innovative educational software, and a book on Physics Demonstrations. He maintains a very popular web site with much educational material.

He has published over 300 technical papers and abstracts and has written six books, including two textbooks, Introduction to Modern Electronics (still used in Physics 321) and Chaos and Time-Series Analysis; two popularizations, Strange Attractors and Images of a Complex World; and a translation of Numerical Recipes into BASIC. He has produced commercial software for the analysis of chaotic data. He supervised 18 Ph.D. students, some of whom went on to win awards.

He has taught twelve different courses in the Department including electronics, plasma, modern physics, chaos, and all the general physics courses. He has served on most departmental committees, was a faculty senator for eleven years, and was chair of an L&S committee on Science and Math Education.

Prof. Sprott was elected a fellow of the American Physical Society in 1980, received the John Glover award from Dickinson College in 1994, the Van Hise Outreach Teaching award from UW in 1997, and a Lifetime Achievement Award from the Wisconsin Association of Physics Teachers in 1999.

2009

## Stewart Prager

Stewart received his Ph.D. in plasma physics from Columbia University in 1975. Following two years of research at General Atomics, he joined the UW faculty as an assistant professor, and remained at UW for 31 years.

Upon arriving at UW, he began work on two experiments: the levitated octupole and the Tokapole. On the levitated octupole (built by Don Kerst), Prager and students investigated physics at high plasma pressure (high beta) and identified the neoclassical bootstrap current (a pressure-driven current predicted to flow in toroidal plasmas). Construction of the tokapole experiment around 1978 was led by Clint Sprott. Prager participated in experiments from the outset. Notable results include identification of partial reconnection (in opposition of the standard reconnection model of the time), identification of the shear Alfvén resonance, and careful study of the axisymmetric instability.

In 1985 construction of the MST reversed field pinch began, following a design by a five person team (Dexter, Lovell, Prager, Sprott, Kerst). First plasmas were produced in 1988, with physics studies essentially beginning around 1990. MST occupied the bulk of Prager's research thereafter, as he became principal investigator for the project. His research focused on basic plasma physics relevant to fusion energy, development of the reversed field pinch fusion concept and, recently, connections to astrophysics. Prager's work on MST addressed a broad array of plasma physics problems under the umbrella of magnetic self-organization (reconnection, turbulence, dynamo, transport) and the control of turbulent transport.

In 2003, the Center for Magnetic Self-Organization in Laboratory and Astrophysical Plasmas (CMSO) was founded, with Prager as its director. CMSO is an NSF physics frontier center, which unites lab plasma physicists with plasma astrophysicists to advance progress on plasma physics problems in common. Prager's work has focused on understanding dynamo, ion heating, reconnection, and momentum transport, and uncovering links between these processes in the lab and astrophysics.

Prager has also contributed to many plasma physics policy planning activities. For example, he has served as chair of the APS Division of Plasma Physics, chair of the DOE Fusion Energy Sciences Advisory Committee, and president of the University Fusion Association. He became an APS fellow in 1985 and was a co-recipient of the APS Dawson Prize for Excellence in Plasma Physics for work on the bootstrap current.

## Richard Prepost

Richard joined the faculty at the University of Wisconsin as an Associate Professor in 1967 after an appointment as an Assistant Professor at Stanford University from 1963 to 1966. He was promoted to Full Professor in 1973. Prepost received his PhD from Columbia University in 1963 under Leon Lederman and Vernon Hughes.

Prepost's research has been in the field of experimental high energy particle physics and accelerator related research. Upon coming to Wisconsin, Prepost started a small Wisconsin group and formed a collaboration with two other universities to work at the Argonne Laboratory Zero Gradient Synchrotron (ZGS) using the technique of optical spark chambers. The major experiment carried out at this laboratory was to disprove the existence of split

resonances, a major issue at the time. After the completion of the Argonne program in 1972, Prepost started a Wisconsin research group to work at the Stanford Linear Accelerator center (SLAC). He collaborated with the Stanford Ritson group and together with Ritson designed and implemented a 1.6 GeV magnetic spectrometer which was installed in end station A. A collaboration, with Prepost as spokesman, was formed with a number of University groups and a very successful program followed.

Prepost has served as advisor to fifteen graduate students at Wisconsin and three at Stanford. Several have had very distinguished careers, perhaps the most visible has been Michael Witherell, who served as Director of Fermilab before becoming Graduate Dean of Research at the University of California at Santa Barbara.

Prepost was elected as a Fellow of the American Physical Society in 1985. He has served on numerous national committees for the DOE and NSF as well as the SLAC and Fermilab Program Advisory committees and the SLAC Scientific Policy committee. Prepost has served on and chaired numerous department committees and has taught a broad range of undergraduate and graduate courses. He has contributed significantly to the development and documentation of the intermediate and advanced laboratories in the courses Physics 623, 321 and 407.



## Faculty Awards Banquet

### 2008 Distinguished Faculty Fellows

Emeritus Professor Loyal Durand  
Emeritus Professor Charlie Goebel

### 2009 Distinguished Faculty Fellows

In 2009, the Distinguished Faculty Fellows Award was discontinued.

## Campus-Wide Awards

### 2009

Prof. Ellen Zweibel was awarded a William Kraushaar Professorship.

Prof. Michael Ramsey-Musolf received a Vilas Associate Award.

## Other Awards

### 2008

Prof. Pupa Gilbert received an NSF American Competitiveness and Innovation Fellowship "for her application of novel methodology to the determination of the structures and synthetic pathways of mineralized biological tissues and for exceptional skill in bringing the fascination of science to a wide audience involving non-science students and the general public."

Prof. Gary Shiu received a Guggenheim Fellowship Awards, which recognize artists, scholars and scientists based on distinguished past achievement and exceptional future promise.

Prof. Karsten Heeger received not one, but two Outstanding Junior Investigator awards from Department of Energy, one in High-Energy Physics and one in Nuclear Physics.

### 2009

Prof. Susan Coppersmith, has been elected to the prestigious National Academy of Sciences in "recognition of her distinguished and continuing achievements in original research."

Prof. Karsten Heeger received a Sloan Research Fellowship.

Emeritus Profs. Ugo Camerini and Jack Fry were members of the Gargamelle collaboration that won the prestigious EPS High Energy and Particle Physics Prize. The Gargamelle Collaboration was awarded the prize for the "observation of the weak neutral current interaction" in 1973.

Emeritus Prof. Stewart Prager and graduate student Michael Zarnstorff received the American Physical Society's Dawson Prize for Excellence in Plasma Physics on the Wisconsin "Levitated Octupole" experiment, detecting for the first time the so-called bootstrap current, named because the electrical current, named because the plasma itself generates the electrical current. Zarnstorff is now a principal research physicist at PPPL.

## UW Physics Faculty NEWS...

### Stewart Prager Named Director of PPPL

Each year the Physics Department hosts a large number of colloquium and seminars exploring a wide range of research topics. We have implemented an on-line calendar for people to read about upcoming events.

Prof. Emeritus Stewart Prager has been named director of the U.S. Department of Energy's (DOE) Princeton Plasma Physics Laboratory (PPPL). Prager is also currently the chair of the DOE's Fusion Energy Sciences Advisory Committee (FESAC).

Prager will become the sixth director of the laboratory, which is funded by the DOE and managed by Princeton University. He has also been appointed as a professor of astrophysical sciences at Princeton.

"We believe that there is no better person than Stewart Prager to lead the Plasma Physics Laboratory as it moves into the next phase in its distinguished history," said Princeton President Shirley M. Tilghman. "The need for safe, abundant and environmentally benign sources of energy has never been greater, and we are confident that under his leadership PPPL will continue to make exceptional contributions to the field of fusion energy."

### Chinese Premier commends US-China collaboration

The University of Wisconsin is making the single largest university contribution to the Daya Bay project in a collaboration of some dozen US institutions and two national labs. It involves Professor Heeger and Chair Balantekin and a group of scientists from the Physics Department. As US manager for the Daya Bay antineutrino detectors, Associate Professor Heeger is responsible for the design, construction, and commissioning of the eight 100-ton antineutrino detectors. Much of the design of the antineutrino detectors is done at the UW Physical Sciences Laboratory. Heeger is coordinating a team of scientists and engineers in Madison and collaborating with colleagues in China, Taiwan, and Europe for this international neutrino project. The Daya Bay experiment is a joint effort between the US and China funded in the US by the Department of Energy. It has received support from the University of Wisconsin Graduate School and the University of Wisconsin Foundation.

## UW Physics Alumni

## Updates &amp; Awards

**Physics Department  
Alumni Awards****2008 Awards Banquet****Distinguished Scientist Awards**

Dr. Samuel Aronson  
Director, Brookhaven National Lab

Dr. Marjorie Cocoran  
Professor, Rice University

**Distinguished Alumni Awards**

Dr. William Jury  
Distinguished Professor of Soil Physics  
UC-Riverside

Dr. Paul Kaesberg  
Emeritus  
UW Biochemistry Department

Dr. Wes Traub  
Chief Scientist,  
NASA's Navigator Program, JPL  
Pasadena, CA

**Distinguished Service Awards**  
Wayne Niemuth

**2009 Awards Banquet****Distinguished Scientist Awards**

JoAnne Hewett  
SLAC

Wai-Yim Ching  
University of Missouri-Kansas City

**Distinguished Alumni Awards**

The Honorable Bill Foster  
U.S. Congressman Representing the  
14<sup>th</sup> District of Illinois

John Wiley  
Interim Director,  
UW Wisconsin Institutes for Discovery

Phyllis J. Fleming  
Professor Emerita  
Wellesley College

**Distinguished Service Awards**

Dr. Peter L. Jolivet & Mrs. Cheryle L.  
Jolivet

**Fay Ajzenberg-Selove  
Receives National Medal  
of Science**

We were delighted to hear that University of Wisconsin-Madison Physics alumna, Fay Ajzenberg-Selove, who received a Ph.D. in experimental nuclear physics with Hugh Richards, received the National Medal of Science for her scientific achievements. You may recall that some years ago Fay had generously established a scholarship fund for undergraduate women majoring in Physics, Astrophysics, or Astronomy.

**The Honorable Gregory  
B. Jaczko was designated  
Chairman of the U.S.  
Nuclear Regulatory  
Commission by President  
Barack Obama**

As Chairman, Dr. Jaczko is the principal executive officer of the NRC and its official spokesperson. He is responsible for conducting administrative, organizational, long-range planning, budgetary, and certain personnel functions of the agency. He also has authority for all NRC functions pertaining to a potential emergency involving an NRC licensee. Dr. Jaczko earned a doctorate in physics from the University of Wisconsin-Madison under Prof. Emeritus Randy Durand.

**Jay Davis Named President  
of the Hertz Foundation**

The Board of the Hertz Foundation picked Jay Davis as their new president, replacing John Holzrichter who successfully lead the Foundation for ten years. One of the long term goals for Jay is to support 30 new Fellows every year in the applied physical sciences, reaching the top one percent of those in graduate school.

**Announcing the New  
Badger Career Network**

UW-Madison graduates looking for career edge can now be the first to know about job opportunities, networking events and online tools through the expanded Badger Career Network, provided by the Wisconsin Alumni Association.

For many years, UW-Madison alumni have volunteered their time to offer career advice and mentorship to fellow Badgers through the network. Today, alumni who sign up to participate in the Badger Career Network will also enjoy access to a virtual career center; BuckyNet, the university's job online board; a monthly 3-newsletter; and invitations to career-related events and teleclasses. More information can be found at [www.uwalumni.com/careers](http://www.uwalumni.com/careers).

**Keep Current**

To update your alumni profile information (address, phone number, email address), please go to:

[www.uwalumni.com/home/onlinetools/updateyourprofile.aspx](http://www.uwalumni.com/home/onlinetools/updateyourprofile.aspx)

## Full Circle A Debut Novel

Scientist Theodore J. (Teddy) Cohen never expected to return to the violin when he abandoned the instrument after his high school graduation in 1956 and began pursuing a career in engineering and science. For the next 40 years, Cohen worked in the defense industry, serving as an engineer, scientist, and officer in several Washington, D.C.-based corporations before moving to Pennsylvania, where he continues to work as a consultant. There, to prepare for the day when he would leave the work-a-day world for good, he once again took up the violin, ironically fulfilling his father's vision that he become a violinist. The story is told in *Full Circle: A Dream Denied, A Vision Fulfilled*, Cohen's new novel from AuthorHouse.

The story is a work of fiction based on real events. "It takes the reader from my early days as a violin student in grade and high school, through my discovery of communications in general and ham radio in particular, to my return to the violin." In the process, the reader is introduced to a variety of interesting and colorful people who played major roles in Cohen's life, including his mother, Myrtle, and father, Solly; his immigrant maternal grandfather, "Grandpa Joe" (who used to take him for his piano lessons after dinner on Monday evenings by bus and streetcar); Herman Miroff (his violin teacher); Dr. Leonardo Cavaleri (his high school orchestra teacher, who reappears later in Teddy's life); J. Harvey McCoy (a ham radio operator (W2IYX) and friend of Teddy's who played a major role in curbing the German submarine menace in the Atlantic during WW II); and of course, his wife, Susan.

"There is something here for everyone from 10 to 100 years of age," said Cohen. "The more research I did in preparing to write the book, the more I learned."

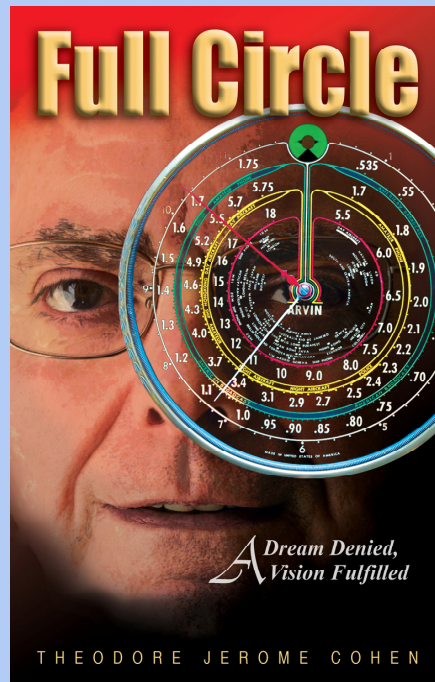
Theodore Jerome Cohen's *Full Circle* is available for purchase at Web sites such as AuthorHouse.com, BarnesandNoble.com, Amazon.com, Borders.com, Target.com, Books-a-million.com as well as over 25,000 retailers who use book wholesalers such as Ingram Book Company, Baker & Taylor, and Bowkers Books in Print.

The author may be contacted at:

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Amateur Radio N4XX

122 Shady Brook Drive  
Langhorne, PA 19047

215-968-0617



## UW Physics Staff Updates

### Scientists Daniel Den Hartog and Gennady Fiksel named Research Professors

Drs. Den Hartog and Fiksel, Senior Scientists in the plasma physics group, have been named Research Professors, the first such appointments in the Physics Department. While the Research Professor title is honorary, this is an important achievement that recognizes their outstanding scientific accomplishment and leadership. Den Hartog and Fiksel are co-principal investigators on the Madison Symmetric Torus project and are known internationally for their work on magnetic confinement, laboratory plasma physics connections to astrophysics, and the creative development of diagnostics for high temperature plasmas.

### Thomas Wise, Researcher, Department of Physics Wins Chancellor's Award for Excellence in Research, Critical Research Support

The 2009 Academic Staff Excellence Awards recognize nine dedicated university professionals for their exemplary achievements in leadership, public service, research, teaching and career service. During the past 30 years, Wise has compiled a record of excellence in research and service, having been recognized nationally and internationally.

## UW Physics

## In Memoriam

## William L. Kraushaar

March 21, 2008

Professor William L. Kraushaar, a former MIT physics professor and a pioneer in the field of high-energy astronomy, died March 21 of complications from Parkinson's disease. He was 87.

Kraushaar received his bachelor degree from Lafayette College in 1942. During World War II he worked at the National Bureau of Standards on projects that included development of the proximity fuse for artillery shells. After the war he earned his doctorate at Cornell University. In 1949 he was appointed research associate at MIT where he made the first measurements of the mean life of the pi meson at the MIT electron synchrotron. Over the next 15 years he rose through the faculty ranks, becoming a full professor before leaving MIT for the University of Wisconsin at Madison in 1965.

In 1957 Kraushaar began a decade-long effort to map the sky in the "light" of cosmic gamma rays. Their detection promised to open new ways to investigate high-energy processes in the universe. Initial balloon-borne experiments failed due to background gamma rays generated in the residual atmosphere above the highest attainable altitudes.

In 1958, Kraushaar seized the new opportunity for experiments above the atmosphere. Working with Professor George Clark, he directed the development in the MIT Laboratory for Nuclear Science of a gamma-ray detector for a satellite experiment that was launched in April 1961 as Explorer 11. It registered 31 events with the electronic signatures of cosmic gamma rays with energies greater than 50 MeV. Kraushaar then initiated a second and more refined experiment to be carried on OSO 3. In this project Kraushaar and Clark were joined by Gordon Garmire,

a former student of Kraushaar. The OSO 3 experiment, launched in March of 1967, registered 621 cosmic gamma ray events. It yielded the first all-sky map of high-energy cosmic gamma rays showing a concentration of gamma rays from directions in the Milky Way where gamma-ray producing interactions of charged cosmic rays with interstellar matter are most abundant. It also demonstrated the existence of extragalactic gamma ray sources that have since been identified as giant black holes at the centers of distant galaxies. The OSO 3 experiment opened the field of high-energy gamma-ray astronomy, which has become one of the most active areas of space research.

Upon his move to Wisconsin, Kraushaar established a research group in the new area of X-ray astronomy. Using instruments flown on "sounding" rockets, he and his colleagues produced the first all-sky map of low-energy X rays that revealed the spatial distribution of million-degree interstellar gas. They extended these results in several satellite experiments. Kraushaar was appointed the Max Mason Professor of Physics in 1980.

Kraushaar was a fellow of the American Physical Society, and a member of the American Astronomical Society, the International Astronomical Union, the National Academy of Sciences, and the American Academy of Arts and Sciences. He received Fulbright and Guggenheim fellowships and the Senior Scientist Award of the Humboldt Foundation. He served on numerous advisory committees of the National Academy of Sciences and NASA. He co-authored with Professor Uno Ingard a college text, "Introduction to Mechanics, Matter, and Waves."

After his retirement, Kraushaar moved to Maine where he resided in Scarborough with summers at

his cabin in Denmark, Maine. He is survived by his wife, the former Elizabeth Rodgers, and by three children.

## Roger Bruce Perkin

July 11, 2008

Dr. Roger Bruce Perkins died at home in Los Alamos, New Mexico on July 11, 2008 after a courageous battle with cancer. Roger was born in Hammond, Indiana on November 8, 1935 to Philip and Lydia Perkins. Roger was awarded a Ford Foundation scholarship while a sophomore in high school, which sent him to college early at the University of Wisconsin. He graduated with a B. S. from Wisconsin in 1955, and received his Ph.D. in physics from Princeton University in 1959. He was a Fellow of the American Physical Society.

During his college years, Roger worked as a summer student at the Los Alamos Scientific Laboratory, where he met his future wife Betty, and upon graduation in 1959 became a staff member in the Physics Division. During 1964-1965, he took leave to work at the Division of Research at the US Atomic Energy Division in Washington, D.C. From 1970-1971, he again took a year's leave to serve as a visiting professor of Physics and Astrophysics at the University of Colorado in Boulder. Roger held a number of different positions in upper management at the Los Alamos National Laboratory, including Leader of the Laser Research and Technology Division (1976-1979), Assistant Laboratory Director of Facilities and Fabrication (1986-1988), and Deputy Associate Director of Physics and Life Sciences (1989-1993). After retirement in 1997 as Deputy Director for Facilities, Safeguards and Security, Roger traveled extensively and also worked part-time as a consultant for various laboratory contractors.



Roger will be deeply missed by his wife of more than 50 years Betty Lindsey Perkins, daughters Martha Perkins, Ann Perkins, and Elaine Perkins Jacobs, son-in-law Brian Jacobs, grandchildren Lindsey (Lindy) and John (Johnny) Jacobs and James Coburn, his sister Priscilla Bath, and nephew David Bath and wife Dreana and son Steven, and nephew Dale Bath and wife Lynn, as well as numerous friends.

## Victor Vacquier Sr.

January 11, 2009

**V**ictor Vacquier Sr., professor emeritus of geophysics at Scripps Institution of Oceanography, UC San Diego, died Jan. 11, 2009, in La Jolla, Calif., from pneumonia. He was 101 years old. Vacquier's distinguished science career included the invention of the fluxgate magnetometer and airborne and marine magnetic surveying, which led to the discovery of magnetic field patterns preserved in the seafloor.

In 1957, Vacquier joined Scripps as a research physicist to direct the geomagnetics program in the Marine Physical Laboratory (MPL). In 1962 became a professor of geophysics at Scripps. During his oceanographic career, Vacquier led numerous ocean-going expeditions to obtain records of Earth's magnetic field in the three major oceans and to measure and map the flow of heat outward from the seafloor.

His pioneering research to map magnetic field patterns along the seafloor established that vast tracks of the oceanic crust in the eastern Pacific were offset at long linear fracture zones. His work in the western Pacific revealed that marine magnetic anomalies were offset by 1,250 kilometers (776 miles) across a fracture zone and was a key factor for the rapid acceptance of the theory of plate tectonics in the mid 1960s.

In the early 1960s Vacquier took over the shipboard measurement program for oceanic heat flow at Scripps. He and colleagues found evidence for elevated heat flow through the seafloor at the crest of the Mid-Atlantic Ridge and the Central Indian Ridge. In the extensive deep basins of the western Pacific and the eastern Indian Ocean he confirmed that the heat flow was nearly uniform and much lower than that at the mid-ocean ridges. Such measurements reinforced the principles of seafloor spreading and led to the now widely-accepted thermal models of the oceanic lithosphere.

Vacquier was born in St. Petersburg, Russia, on Oct. 13, 1907. In 1920, following the Russian Revolution, he and his family escaped across the frozen Gulf of Finland to Helsinki on a one-horse sleigh. He and his mother immigrated to the United States in 1923.

Vacquier received a bachelor's degree in electrical engineering from the University of Wisconsin in 1927 and a master's degree in physics in 1929. He worked for Gulf Research in Pittsburgh, where in 1940 he invented the fluxgate magnetometer. The instrument was used on a blimp and then on an airplane to detect submarines during World War II. The method was later applied to airborne exploration for oil and minerals.

From 1944 to 1953 he worked for Sperry Gyroscope, Inc., where he developed the Mark 19 and Mark 23 gyrocompasses, standard equipment on all Navy ships for at least 30 years to measure the direction of true north. From 1953 to 1957 he worked at the New Mexico Institute of Mining and Technology where he developed an electrical conductivity method to prospect for groundwater.

Vacquier's active research career spanned more than seven decades and included more than 50 scientific publications and 18 patents. He

received numerous honors for his pioneering work in geophysics. In 1960, he was awarded the Wetherill Medal of the Franklin Institute for his development of the magnetic-airborne detector and its application to geophysical prospecting for oil and minerals. He received the 1963 Albatross Award of the American Miscellaneous Society for "having displaced the seafloor by 700 kilometers," the John Adam Fleming Medal from the American Geophysical Union in 1973 for "original research and technical leadership in geomagnetism." In 1976, he received the Society of Exploration Geophysicists' Fessenden Award in recognition of his invention of the airborne magnetometer and in 1995 received the Alexander Agassiz Medal from the U.S. National Academy of Science for his contributions to geomagnetism and tectonics.

He is survived by his wife Mihoko Vacquier of La Jolla, Calif., his son Victor D. Vacquier, a Scripps professor, and daughter-in-law Judith Vacquier of La Jolla, Calif., four grandchildren and four great grandchildren.

## Frank Shoemaker

February 11, 2009

**F**rank Shoemaker, a leader in the development of high-energy particle accelerators during a highly revelatory era for physics and a founding member of the experimental particle physics group at Princeton, has died at age 86.

Shoemaker, a professor emeritus of physics, a mentor to generations of junior faculty and graduate students, and a dedicated teacher who designed many of the University's freshman physics class demonstrations, died at Meadow Lakes in Hightstown, N.J., on Feb. 11.

The epitome of a hands-on scientist, Shoemaker, who served on the Princeton physics faculty from 1952 until his retirement in 1989, was always building something. He led the reconstruction of the University's Palmer Cyclotron after a fire in 1952 and, in the course of his research, performed pioneering experiments on the strong focusing of particle beams. He then went on to lead the design and construction of the 3-billion-volt Princeton-Pennsylvania Accelerator, and served as associate director of the accelerator program from 1962 to 1966.

He took a year-long leave of absence from Princeton in 1968 to become the first head of the main-ring group at what would become the Fermi National Accelerator Laboratory or Fermilab in Batavia, Ill., and led the design and construction of that facility's 1 kilometer radius main accelerator ring.

Returning to Princeton in 1969, Shoemaker played critical roles in Princeton experiments conducted at Brookhaven National Laboratory in Upton, N.Y., and Fermilab that provided confirmation of the new quantum chromodynamics theory of strong interactions and the unified theory of weak and electromagnetic interactions. He served as principal investigator of the Princeton high-energy physics group from 1972 to 1985. Following his retirement from teaching in 1989, he played a major role in the Booster Neutrino Experiment, known as MiniBooNE, at Fermilab.

Shoemaker was known as a dedicated teacher and served as director of undergraduate physics studies from 1981 to 1989. In that role, he transformed the teaching of introductory physics at Princeton, developing demonstrations to show students the actual processes they were studying in the classroom. He also conducted a popular annual

demonstration for faculty and graduate students. To colleagues, many of whom had only imagined such phenomena on a theoretical level, the yearly efforts displayed a virtuosic mastery of the physical world.

He was born in Ogden, Utah, to Roy and Sarah Shoemaker. He was the second of their five sons, all of whom would go on to earn Ph.Ds. He spent his high school years in Boise, Idaho, where he met his future wife, Ruth Elizabeth Nelson. Both attended Whitman College in Walla Walla, Wash., where they were both elected to Phi Beta Kappa. Following graduation and marriage, both worked at the Radiation Lab at the Massachusetts Institute of Technology in Cambridge, Mass., on the development of radar for use in World War II.

After the war, Shoemaker received his Ph.D. in physics from the University of Wisconsin-Madison, and moved to Princeton to begin his long career here. He was instrumental in the design of Jadwin Hall, the University's physics building, bringing his practical bent to bear on questions of door widths in both corridors and elevators and the capacity of floors to withstand the load of heavy lab equipment.

He was active in research well after his retirement and was a familiar figure in Jadwin up until a year ago, when his health began to decline.

Shoemaker was a fellow of the American Physical Society and a member of Sigma Xi. He also was awarded an honorary doctor of science by his alma mater, Whitman College, in 1978. He wrote or co-wrote more than 100 papers and articles.

In addition to physics, Shoemaker's main passions were his family, classical music, sailing and dogs. Following his retirement, he and his

wife traveled extensively, visiting all 50 states and five continents.

Shoemaker was pre-deceased by his wife of 56 years, Ruth, who died in 2001. He is survived by his two daughters, Barbara Shoemaker, a 1976 Princeton graduate, and Mary Mitnacht, both of Santa Fe, N.M., and a brother, Sydney Shoemaker, of Ithaca, N.Y.

## Anne W. Herb

June 13, 2009

Anne W. Herb, age 87, passed away peacefully on Saturday, June 13, 2009, at Oakwood Village West. Anne was born in Madison on Dec. 16, 1921, the daughter of Robert C. and Maude (Miller) Williamson. When Anne was eight years old the family moved to Gainesville, Fla. Anne returned to Madison as a University of Wisconsin freshman and majored in home economics. She obtained bachelor of science and master of science degrees. In 1945 Anne married Raymond G. Herb, a UW physics professor. By 1962 the family included five children, two canoes and an Airedale. The Herbs lived in a house on two acres on Gammon Road, which was then a rural area. Sunday hikes and picnics, Wisconsin River canoe trips, and road trips in the station wagon loaded with camping gear, kids, and the dog were the norm. In the early '70s after Ray's move from the UW to National Electrostatics Corporation in Middleton, Anne and Ray bought land near Mazomanie and built a home backed up to a wooded bluff overlooking a cornfield. Keeping track of birds, wild turkeys, deer and other wildlife became part of the daily routine. Family gatherings were readily accommodated here, one of these being Anne and Ray's 50th wedding anniversary in 1995. After Ray's death in 1996 Anne moved back to Madison, and then in

2002 to an apartment at Oakwood Village West. Around this time she traveled to New Zealand, as well as Alaska, Montana and Hawaii. Anne had a cheerful, sensible nature and tremendous patience. She had many friends and was quick to appreciate humor as long as it wasn't at the expense of others. Anne was active in the League of Women Voters, served on the Wisconsin Heights School Board, and was a generous supporter of conservation and human rights causes and the arts. Anne is survived by her brother, Robert M. Williamson and his wife Sandra; three daughters, Rebecca Herb and her husband Henry King, Sara Donahoe and her husband Robert Donahoe, and Emily Herb and her husband Dalyn Grap; two sons, Stephen Herb and his wife Brigitte Heimes, and William Herb; and granddaughter, Emily King.

## Phyllis J. Fleming

June 23, 2009

Phyllis J. Fleming, Sarah Whiting Francis Professor of Physics, Emerita, at Wellesley College, died after a long illness on June 23, 2009. A physicist, she dedicated her life to the enhancement of opportunities for women in science as a pioneer in teaching, research and service. She believed to know a subject one must teach it. Thirty of her Wellesley students completed doctorates in physics including Persis Drell, the Director of the Stanford Linear Accelerator Center. Among the countless others she inspired with her wit and wisdom was Pamela Melroy, the astronaut. As Dean of Wellesley from 1968-1972, she organized the MIT-Wellesley Exchange and the Continuing Education Program which enabled women whose education had been interrupted to complete their degrees. After her return to full time teaching, she wrote a successful textbook and served as Department Chair and Director of the Science Center.

Born in Shelbyville, Indiana, she was graduated from Hanover College in 1946 and earned her M.S. and Ph.D. from the University of Wisconsin-Madison in 1948 and 1955 respectively. She was the recipient of many awards. Hanover honored her with an Alumnae Award in 1963 and an Honorary D.Sc. in 2003. In 1982 at Wellesley, she was the first scientist to win the Pinanski Prize for Distinguished Teaching. Later she also was the first winner of the Janet Guernsey Award for Exceptional Lifetime Achievement for her service to faculty, students and alumnae. More recently, she was named a 2009 Alumni Fellow of the UW Physics Department. In addition to her 50 year Wellesley career, she also taught at Mt. Holyoke College from 1948-1950. She completed her career by tutoring at Cape Cod Community College for five semesters.

She is survived by her sister, Helen Lorenz, her brother-in-law, two nephews and two great nephews and her life partner, Linda B. Miller.

## Roch Deryck Kendrick

July 10, 2009

Roch Deryck Kendrick, age 46, of New Glarus, died Friday, July 10, 2009. He was born May 11, 1963, in LaCrosse, to Dale Kendrick and Betty L. Kendrick. Roch received his bachelor's of science degree in mechanical engineering from UW-Madison in 1990. He worked for more than 22 years in the physics department at UW-Madison. Roch married Beth Blahut in the backyard of their Basco, Wis., home on Sept. 13, 1997. They spent many of their early married years together making art that was shown both locally and nationally. He was a lead engineer in designing a machine that mimics the flow of molten iron at the Earth's core in order to better understand the Earth's magnetic field. Roch was a creative person known for

inventing mechanical solutions to his own diverse projects. His friends and family all relied on his talents, creativity, and hard work whenever they needed a helping hand. He has a reputation as an entertaining and lively storyteller. Roch was a loving and dedicated Daddy to his sons. Roch is survived by his wife, Beth; two sons, Roman and Leo; mother, Betty L. Kendrick of LaCrosse; a sister, Dunnell (Chris, Finnley and Riley) Kendrick-Parker of New Glarus; mother and father-in-law, Robyn and Bob Blahut; a sister-in-law, Toni (Chris, Nora and Max) Maddi; and brothers-in-law, Robert (son, Teddy) Blahut and Jim (Elizabeth) Blahut. He was preceded in death by his father, Dale Kendrick.

## Converse Herrick "Connie" Blanchard

August 13, 2009

Converse Herrick "Connie" Blanchard, emeritus professor of physics, University of Wisconsin - Madison, died unexpectedly on Aug. 13, 2009 in Chilmart, Mass. He was a much-loved teacher, colleague, husband, father, grandfather, friend, community volunteer, and an appreciative and enthusiastic University Heights resident for 47 years. He was born to Miriam Eliza Herrick and Lindall Converse Blanchard of Abington, Mass. in September 1923. He earned an A.B. from Harvard College and served in the United States Navy Reserve from 1943-1946. In 1946 he married Margaret Alice (Mardie) Wheatley who took devoted and loving care of her husband and four children in a happy marriage of 35 years. Blanchard enrolled in the doctorate program in nuclear theory at UW Madison, and joined the faculty at Penn State University where he taught and did neutron physics and nuclear theory from 1953-1961. He returned to UW-Madison as a

faculty member with responsibility for teaching and advising the graduate teaching assistants. Mardie Blanchard died in 1981, and in 1984 he married June Miller Weisberger, now emerita professor of law at UW-Madison, with whom he had a happy later life for over 25 years. He taught at UW-Madison from 1961 to 1991. Seven students completed their doctorate research with him. In 1987, he received a campus wide distinguished teaching award in recognition of his exceptional ability to reach and inspire students both before full lecture halls and in one-on-one conversations. He was a Fellow of the American Physical Society and a past president of the Wisconsin Association of Physics Teachers. Blanchard was also a strong advocate for peace and other political and social justice causes, including being a founding member and initial chair of the Madison group of Amnesty International. In retirement he visited more than 1,600 third-grade classrooms with a

box of "experiments" and delighted in this work. He was an inquisitive, gentle man of good humor who was eager to add to his knowledge of science and other disciplines and was dedicated to the education of students of all ages. He is survived by his beloved wife, June; his sister, Mary Blanchard Hanabury of Kingston, Mass.; his children, Elizabeth (Beth) Blanchard Schaffer (Steve) of Washington D.C., Margaret (Margy) Blanchard (Bob Lewis) of Middleton, Jean Patt (Tom) of Oshkosh, and Brian Blanchard (Mary) of Madison; and his grandchildren, Michael and Carolyn Patt, and Will, Ben, and Allison Blanchard, as well as June's children, Jon Weisberger (Deborah) of Cottontown, Tenn., Lise Weisberger (Malcolm Rich) of Skokie, Ill., and Beth Weisberger (Timothy Fishbaugh) of Wheat Ridge, Colo.; and June's grandchildren, Abigail, Miriam, and Rebecca Rich, Leo Weisberger and Sidney Lucas, and Leah Fishbaugh.

"A very special thank you to all of you for your continuing financial assistance during these very difficult economic times. Your support means so very much to our department."

Baha Balantekin  
Department Chair



Physics Department donor tree.



## UW Physics

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# UW Foundation

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