

PPPL to Host U.S. ITER Home Office

On July 13, U.S. Department of Energy (DOE) officials announced that PPPL will host the U.S. project office for ITER, a major international fusion experiment. PPPL, in partnership with DOE's Oak Ridge National Laboratory (ORNL), will be responsible for overseeing the U.S. ITER Project Office and providing it with the requisite staffing and facilities.

"The United States and our international partners are in talks to launch ITER, a critically important experiment to test the feasibility of nuclear fusion as a source of electricity and hydrogen," Secretary of Energy Spencer Abraham said.

"Throughout its history, Princeton Plasma Physics Laboratory has earned a reputation for the highest-quality science and top-flight management," Secretary Abraham said. "Ever since fusion research began at Princeton University in 1951, our nation and the world have looked to this facility's researchers for scientific and engineering insights that will enable mankind to realize the benefits of fusion, the energy that powers the stars and the sun."

"That is why I am pleased to announce that, after careful review, we have selected the Princeton Plasma Physics Laboratory/Oak Ridge National Laboratory partnership to run the U.S. ITER Project Office," Secretary Abraham said. "I am confident that our partners in the ITER negotiations will recognize our choice of PPPL/ORNL to manage the U.S. participation in ITER for what it is: the clearest possible indication that our Nation takes ITER — and our role in ITER — very seriously."

PPPL Director Rob Goldston said, "PPPL is very pleased to have been selected to host the U.S. ITER Project Office in partnership with the Oak Ridge National Laboratory. We had very highly qualified competition, and so we are particularly pleased with the outcome of the selection process. The efforts of the U.S. in support of ITER will be nationwide and we will be drawing on the capabilities of the whole U.S. fusion research community."

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Open House Draws Crowd of 2,000



During a cryogenics show, PPPL's Ray Camp helps an Open House visitor dip flowers in liquid nitrogen, which makes them brittle.

The chance to tour a fusion machine and play with plasma — the fourth state of matter — drew about 2,000 visitors to the Open House at PPPL on Saturday, June 12. The Laboratory's visitors, ranging from tots to seniors, walked around the National Spherical Torus Experiment (NSTX), learned about the physics behind sports

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The U.S. ITER Project Office at PPPL will be responsible for project management of U.S. activities to support construction of this international research facility. These will include securing technical assistance from the U.S. fusion community; procuring and shipping U.S. hardware contributions; arranging for U.S. personnel to work abroad at the ITER site; representing the U.S. with the international ITER organization on construction and preparation for ITER operations; and coordinating and integrating the U.S. fusion community's ITER project activities with the international ITER project.

Sauthoff Named Project Manager

PPPL's Ned Sauthoff has been named Project Manager and ORNL's Carl Strawbridge has been named Planning Control Manager.

Sauthoff said, "Our team is thrilled to be selected to serve. ITER is important not only because of its fusion science and technology, but also for the new paths it will blaze for international collaborations. ITER's success will demand coordination of project activities by six nations or groups of nations, who together will provide components for the assembly and operation of the world's first magnetic fusion burning plasma experiment."

Present activities for the team include technical and organizational action to enable an efficient start of construction. These include:

- Building a multi-institutional U.S. project team.
- Exploring strategies for acquiring the challenging components that the U.S. will provide to ITER.
- Identifying and mitigating risk to ensure ITER's success.
- Engaging industry in prototyping the manufacturing methods and qualifying suppliers of high-tech components and materials.

The PPPL/ORNL proposal was one of three proposals submitted by DOE national laboratories to lead the Project Office. The two other proposals were from Lawrence Livermore National Laboratory and Idaho National Engineering and Environmental Laboratory. The applications were reviewed by a merit



Ned Sauthoff

review committee, which was appointed on April 12 by Dr. Raymond L. Orbach, Director of the Office of Science. The committee was comprised of six members — five current senior DOE federal officials and one retiree, who were selected for their experience overseeing complex projects. The panel included legal advice. The review panel conducted a rigorous, objective and fair review of the three proposals and forwarded their evaluations to Dr. Orbach, who made the final selection.

On January 30, 2003, President Bush announced that the U.S. was joining the negotiations for the construction and operation of the international magnetic fusion experiment ITER. There are two competing sites to host the \$5 billion test bed for harnessing nuclear fusion to generate electricity. The European Union has selected Cadarache, France, as its candidate site; Japan's contender is Rokkasho. The U.S. supports the Japanese site.

Priority One

The ITER international fusion experiment was priority one in Facilities for the Future of Science: A Twenty-Year Outlook, a proposed portfolio of 28 new facilities and upgrades of current facilities that Secretary Abraham released in November 2003 to serve as a roadmap for future scientific facilities to support DOE's basic science and research mission and to help the Department plan its future scientific investments. ●

PPPL NEWS

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Open House

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games, and participated in tabletop demonstrations about electromagnetism, thermodynamics, and common plasmas, as well as in hands-on safety activities. “We had a great time showing our Laboratory to our neighbors, entertaining children with our science, and explaining fusion energy,” said PPPL Director Rob Goldston.

Added John DeLooper, PPPL Associate Director of External Affairs, “An Open House lets us show the community what we do at PPPL and spread the message about fusion. Our staff, students, and guests all had a great time together.” DeLooper headed the Open House efforts.

Open House guests talked to PPPL researchers about fusion and the Laboratory’s progress while taking self-guided tours of NSTX, smaller experimental areas, and the test cell where a new experimental facility, the National Compact Stellarator Experiment, will be built. The event also featured activities ranging from cryogenics shows that demonstrated how ordinary objects behave in strange ways when cooled to the temperature of liquid nitrogen (-320 degrees Fahrenheit) to tours of the Hall Thruster, a plasma-based propulsion system for space vehicles such as satellites. Other popular features included a lecture, “Lighting a Star

on Earth,” by Rob Goldston; fire extinguisher training; and computer-controlled milling machine demonstrations. Along the route, there were a variety of energy and plasma-related exhibits, as well as displays about PPPL departments and activities. ●



At right, Emily Margolis (right) helps a young visitor with a prototype of a vehicle propelled by human-powered wings designed by PPPL's Dave Cylinder. The prototype was among the Science Education demos at the Open House.

PPPL Joint Advanced Computing Projects Chosen

PPPPL is part of two consortiums whose projects have been selected by the DOE Office of Fusion Energy Sciences for the Scientific Discovery through Advanced Computing (SciDAC) program. The principal investigator for each is from PPPL. The two new SciDAC projects are: “Center for Extended Magnetohydrodynamic (MHD) Modeling” and “Gyrokinetic Particle Simulations of Plasma Turbulence and Kinetic-MHD Physics,” each of which will be funded at approximately \$1 million per year for the next three years.

The Center for Extended Magnetohydrodynamic Modeling is a consortium of PPPL, Science Applications International Corporation, the University of Wisconsin, the University of Utah, Utah State University, TechX Corporation, the University of Colorado, New York University, and Massachusetts Institute of Technology, headed by Stephen Jardin of PPPL. It is aimed at developing powerful simulation codes for studying the macroscopic dynamics of MHD-like phenomena in fusion plasmas, such as sawteeth, tearing modes, resistive wall modes, fast-ion modes, disruptions, edge localized modes, and pellet fueling.

The Gyrokinetic Particle Simulations of Plasma Turbulence and Kinetic-MHD Physics project is a consortium

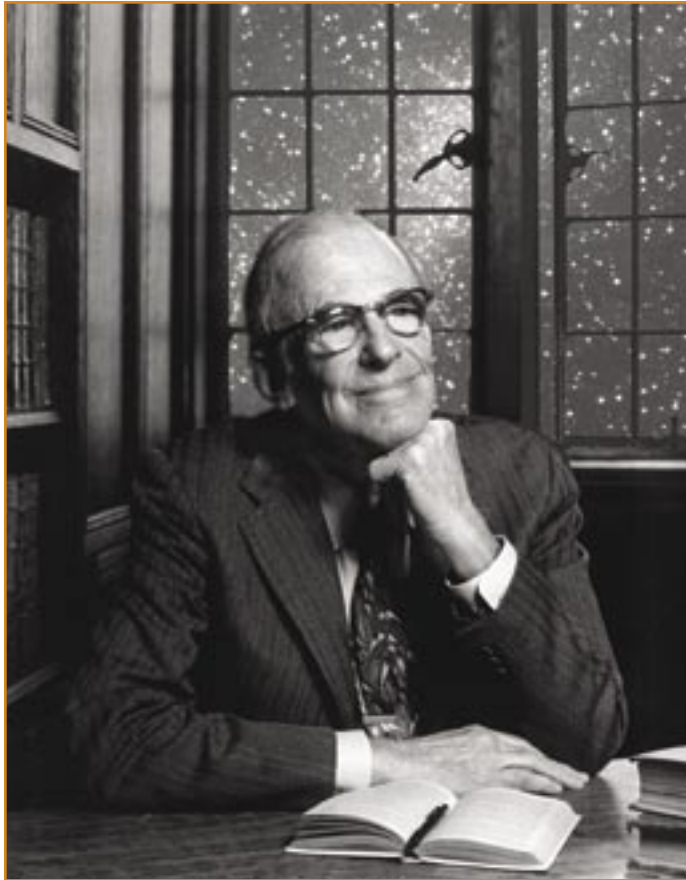
of PPPL, the University of Colorado, the University of California-Irvine, the University of California-Los Angeles, Columbia University, and the University of Tennessee, led by W.W. Lee of PPPL. The goal of this project is to develop gyrokinetic particle simulation codes to carry out simulations of turbulent transport to investigate plasma confinement properties of burning plasmas, such as ITER.

“We are very pleased that these two proposals in which the PPPL Theory Department and PPPL Computational Plasma Physics Group are playing a key role were the ones selected by the review committee. It makes it even more rewarding that we were able to line up such a great group of collaborators from other laboratories, universities, and industry. All of this talent will be needed to carry out the ambitious work that is promised in the proposals,” said Jardin.

Although the principal investigators of both proposals are from PPPL, the funding will be widely spread among all of the participants, with PPPL receiving less than 30 percent of the total funding. These two projects were selected from a total of seven proposals following a rigorous review process. ●

NASA Names Telescope after PPPL Founder

Photo by Denise Applewhite



Lyman Spitzer, Jr., founded PPPL in 1951 and served as the Lab's Director for several years..

By Steven Schultz

NASA has named a major new space telescope after PPPL founder Lyman Spitzer, Jr. The Spitzer Space Telescope, formerly the Space Infrared Telescope Facility, is one of three companions to the Hubble Space Telescope. Spitzer, a giant in theoretical astrophysics and plasma physics who died in 1997, first advocated placing observatories above the Earth's atmosphere.

"The Spitzer Space Telescope takes its place at the forefront of astronomy in the 21st century, just as its namesake, Dr. Lyman Spitzer, Jr., was at the forefront of astronomy in the 20th," said NASA's Associate Administrator for Space Science Ed Weiler.

"Lyman Spitzer was the father of space telescopes," said Neta Bahcall, a Princeton University professor of astrophysics who worked closely with Spitzer for many years. Spitzer proposed the idea of launching a telescope into space in 1946, long before the technical capacity existed, and worked for decades to convince political and scientific doubters of its worth.

"It is very appropriate that this massive undertaking, which has been so successful and so revolutionary for our understanding of the universe, is commemorated with the name of Lyman Spitzer," said Scott Tremaine, chair of astrophysical sciences at Princeton.

The Spitzer Space Telescope is the fourth observatory to be launched under NASA's Great Observatories program. The first of the series was the Hubble telescope, which was launched in 1990 and observes the visible and ultraviolet portions of the electromagnetic spectrum. The second was the Compton Gamma-Ray Observatory, which was taken out of orbit in 2000. The third is the Chandra X-Ray Observatory. Each type of radiation allows scientists to observe different aspects of the solar system, the galaxy and universe.

The infrared portion of the spectrum is particularly important for studying the birth of stars and galaxies, which are shrouded in dust clouds that block most visible light but not the infrared. It also will allow scientists to observe relatively cool objects, such as very small stars only slightly bigger than planets, as well as objects at the farthest reaches of time and space.

Spitzer was one of the world's leading scientists in studying the interstellar medium — the gas and dust between stars — and understanding how stars and galaxies formed from this material. The infrared telescope, which was launched in August after more than 20 years of planning, is expected to advance this line of research dramatically.

A 50-year Odyssey

The idea of putting telescopes in space and avoiding the blurring effects of the Earth's atmosphere had captured Spitzer's imagination for five decades. In a 1946 report under Project Rand, and more than a decade before the launch of the first artificial satellite, he proposed the development of large space telescopes that would overcome astronomical "seeing" problems, increase the wavelength coverage available and function better in the stability of low-gravity environment. He eventually steered the development of the Hubble Space Telescope through several difficult stages of development and refurbishment. After Hubble was launched, Spitzer participated in brainstorming ways to repair a flaw in the telescope's mirror.

The first images from the Spitzer Space Telescope were released December 18. The infrared space telescope project is managed by NASA's Jet Propulsion Laboratory in Pasadena, California. Science operations are conducted at the Spitzer Science Center at the California Institute of Technology in Pasadena. ●

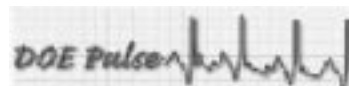
NCSX Vacuum Vessel Prototype Arrives



Is it art? Is it furniture? No — it's a prototype of a National Compact Stellarator Experiment (NCSX) vacuum vessel section. The curved piece of inconel prominently displayed in the PPPL Lobby was manufactured by Major Tool and Machine in Indianapolis and delivered to PPPL in April. Above, some PPPL members of the joint PPPL-Oak Ridge National Laboratory (ORNL) team checked out the new arrival. From left are Mike Zarnstorff, Charlie Gentile, Hutch Neilson, Phil Heitzenroeder, H.M. Fan, Craig Prinski, Tom Brown, Lew Morris, Henry Carnevale, Marianne Tyrrell, Jerry Levine, Fred Dahlgren, Eric Fredrickson, Larry Dudek, Don Monticello, Chang Jun, Mike Viola (seated), Rob Goldston, Ron Strykowski, Judy Malsbury, Art Brooks, Frank Malinowski, Wayne Reiersen, Bob Simmons, David Mikkelsen, Irving Zatz, Martha Redi, Mike Kalish, Allan Reiman, Erik Perry, Gary Oliaro, Neil Pomphrey, Mike Messineo, Rich Hawryluk, and Bruce Paul.

Team members presently are comparing the supplier's dimensional inspection data with the project's design model. "The dimensional inspection of complex-shaped NCSX parts and their comparison with design data is a nontrivial technological challenge and an important component of the project's manufacturing development program," said NCSX Project Head Hutch Neilson. ●

Special credit goes to The Oak Ridge National Laboratory NCSX vacuum vessel design team, which includes Mike Cole, Paul Goranson, Jim Lyon, Brad Nelson, and David Williamson.



The U.S. Department of Energy's (DOE's) National Laboratories house world-class facilities where more than 30,000 scientists and engineers perform cutting-edge research spanning DOE's science, energy, national security, and environmental quality missions. Interested in the latest achievements of the National Laboratories? Then visit the DOE Pulse at: <http://www.ornl.gov/news/pulse/>.

Post-Zwicker Named Science Education Head



PPPL's Andrew Post-Zwicker (above) has been appointed Head of the Laboratory's Science Education Program. Post-Zwicker is responsible for overseeing educational programs for teachers and for kindergarten through college undergraduate students, as well as for implementing new educational initiatives at the Lab. Present programs range from comprehensive workshops for students and teachers, to the National Undergraduate Fellowship Research Program and the Science Undergraduate Laboratory Internships, to the New Jersey regional competition of the National Science Bowl® and the Science-on-Saturday lecture series.

Post-Zwicker joined PPPL's Science Education Program in 1997 as a Senior Program Leader and became Lead Scientist for the program in 2000. Since coming on board, he has created the Plasma Science Education Laboratory at PPPL, as well as the Plasma Camp and Plasma Academy programs, which are intensive summer programs for high school teachers and students, respectively.

After receiving a bachelor's degree in physics from Bard College in Annandale-on-Hudson, New York, in 1986, Post-Zwicker went on to receive a master's and a Ph.D. in physics from Johns Hopkins University in 1988 and 1992, respectively. ●

Moten Heads Diversity Efforts at PPPL

PPPL Employment Manager Andrea Moten recently assumed additional responsibilities as the Laboratory's Diversity Officer and Hispanic Employment Program Coordinator.

Diversity Officer

As Diversity Officer, Moten oversees the Laboratory's diversity efforts, including diversity training for staff and recruitment of diverse applicants.

She works with man-

agement to ensure that the pools of applicants are diverse and that a fair search is conducted. Hiring scientists requires additional efforts on her part, such as attending conferences for minority students and professionals, and developing ties with institutions that serve minority and nontraditional students.

"Having diverse pools is the result of prework, that is, developing contacts, attending job fairs, and visiting educational institutions before we have job vacancies," said Moten.

Hispanic Employment Program Coordinator

As the new Hispanic Employment Program Coordinator, Moten coordinates PPPL's support of the Department of Energy's nascent Hispanic Employment Plan and ensures that the plan is part of the work force planning process. The plan, approved by Energy Secretary Spencer Abraham, establishes a path for addressing Hispanic under-representation in the DOE by proposing methods to break down artificial barriers to the recruitment and hiring of Hispanics. According to statistics, Hispanics are not represented in the DOE work force in proportion to their numbers in the civilian work force.

Moten, who has 15 years of experience in the field of human resources, has a bachelor's degree in business administration and an M.B.A. in management from Seton Hall University. She came to PPPL in 1998 after working for four years at Princeton University's Human Resources Office. In 2000, she received Professional in Human Resources and Equal Employment Opportunity certifications. ●



Andrea Moten

PPPL Welcomes Students for Summer Programs

This summer's National Undergraduate Fellowship (NUF) and Science Undergraduate Laboratory Internship (SULI) college students arrived at PPPL in June. The students participated in a one-week intensive course on plasma physics and fusion engineering before beginning nine weeks of research on various projects at PPPL and other institutions. At right are the NUF and SULI participants for 2004. Twenty will be at PPPL until the end of August. ●



Students Show Science Projects to PPPL Staff



Seven area students exhibited their science projects at PPPL on April 7 during the Laboratory's annual Science Day Fair. The Science Fair honors the winners of PPPL's Corporate Awards, who were chosen among student exhibitors at the Mercer Science and Engineering Fair at Rider University and the North Jersey Regional Science Fair at Rutgers University in March. Above, Katie E. O'Mara describes her project, "How Effective is the Airborne Propagation of Maple Seeds?" to PPPL's Dave Cylinder at the Lab's Science Fair. ●

Lab Hosts Conference for Female Students



On March 24, about 200 female students, grades 8-12, attended the "Expand Your Horizons Mini-Conference for Young Women in Science, Mathematics, and Technology" at PPPL. The conference, hosted by PPPL's Science Education Program, Director's Advisory Committee on Women, and Director's Minority Advisory Committee, included talks and exhibits. Students were from area schools; presenters and exhibitors were from Bristol-Myers Squibb, the CWA Apprenticeship Program, the Engineering Education Service Center (Oregon), the Fashion Institute of Technology, FMC, the New Jersey Department of Environmental Protection, the New Jersey State Museum, PPPL, Princeton University's Geosciences, Rutgers University, and Yale University. Above, students check out exhibits in the Lobby. ●

Awards • Awards • Awards

At a White House ceremony on May 4, PPPL scientist **Jonathan Menard** received the Presidential Early Career Award for Scientists and Engineers. Menard was among 58 researchers supported by 11 federal agencies who received the award. The Presidential award is the highest honor bestowed by the U.S. government on outstanding scientists and engineers who are beginning their independent careers. The same day, Menard also received the Department of Energy's Office of Science Early Career Scientist and Engineer Award. Both the Presidential and Department of Energy awards cite Menard for performing studies to optimize the stability of fusion plasmas and providing the heart of the physics basis for a new, spherical plasma fusion reactor.



Jon Menard

PPPL recently received two safety awards from the State of New Jersey. State officials gave the Lab a "Recognition Award" for achieving an away-from-work lost-time incidence rate of 3.0 or less during calendar year 2003. The Lab also received a "Commissioner of Labor Award" for the National Spherical Torus Experiment Project for working three consecutive years, 2001 through 2003, without an away-from-work lost-time injury or illness.



The inventors at the Patent Dinner are, from left, Charles Skinner, Scott Klasky, Margaret Lumia, Doug McCune, Kenneth Hill, Eliot Feibush, Manfred Bitter, Christopher Brunkhorst, Dana Mastrovito, Masayuki Ono, Andrew B.W. Bigley, Lewis Meixler, and John Desandro.

Nobel Laureate **Russell Hulse**, a scientist at PPPL, recently was elected a Fellow of the American Association for the Advancement of Science (AAAS). Hulse was cited for the "discovery of the pulsar in a binary system and the resulting evidence for gravitational energy radiation." Hulse won the 1993 Nobel Prize in Physics jointly with Princeton University Professor Joseph Taylor for their 1974 discovery of the first binary pulsar—a twin star system that provides a rare natural laboratory in which to test Albert Einstein's prediction that moving objects emit gravitational waves, as well as other aspects of Einstein's general theory of relativity.



Russell Hulse

The Plainsboro Township Committee recently presented **PPPL's Site Protection Division** with a "Resolution of Appreciation" for the Laboratory's Commitment to the Community through its Emergency Services Mutual Aid Program. PPPL's John Bavlish and Jim McGuire accepted the award from Plainsboro Mayor Peter Cantu and Plainsboro Director of Public Safety Cliff Mauer.

The resolution noted that PPPL and Plainsboro Township have a mutual interest in maintaining public safety within the Township and that the Lab has provided mutual aid to Plainsboro's police, fire, and emergency medical services for more than 25 years. According to the resolution, the Lab's "expertise in the area of disaster and major emergencies is a valuable asset to Plainsboro's emergency services."

PPPL honored its inventors in June at the twenty-second annual Patent Awareness Program Recognition Dinner at Princeton University's Prospect House. The event honored those who disclosed inventions during Fiscal Year 2003. Those recognized include **Michael Anderson, Alexey Balakin, Andrew B. W. Bigley, Manfred Bitter, Christopher Brunkhorst, James E. Butler, Wonho Choe, John Desandro, Ilya Dodin, Eliot Feibush, Nathaniel J. Fisch, Gennady Fraiman, Charlie A. Gentile, David J. Geveke, Kenneth W. Hill, Michael Kalish, Scott Klasky, James Kukon, S. G. Lee, Margaret E. Lumia, Vladmir Malkin, Earl S. Marmar, Dana Mastrovito, Doug McCune, Lewis Meixler, Masayuki Ono, Robert F. Parsells, Jean-Micael Rax, John E. Rice, Lane Roquemore, Charles Skinner, and Brent Stratton.** ●