

Hotline

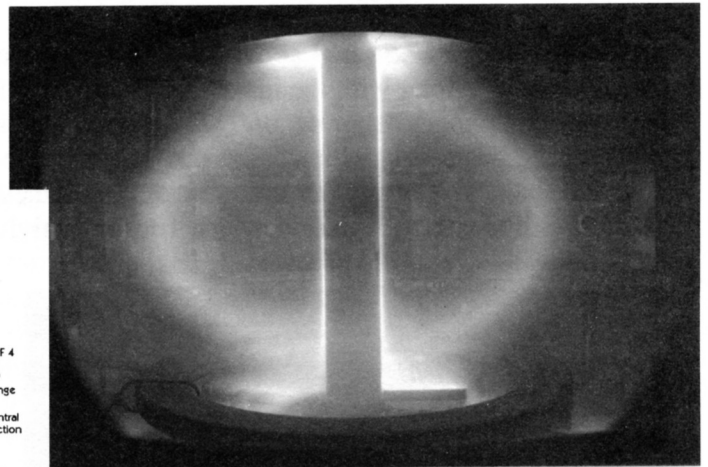
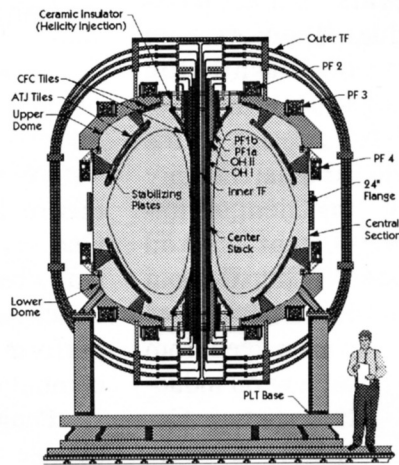
The Princeton Plasma Physics Laboratory is a United States Department of Energy Facility

NSTX Project is On The Boards

In another two years, a new toroidal device will start operations at PPPL. Construction of the National Spherical Torus Experiment (NSTX) — a national fusion science project to be sited at PPPL — is expected to begin in fiscal year 1997.

The new experiment is designed to reach mega-amp-level plasma currents and investigate the physics of spherically shaped toroidal plasmas. Such plasmas (also known as “low-aspect-ratio plasmas”) resemble spheres with holes through their centers, which are different from the donut shape of tokamak plasmas. The spherical torus (ST) configuration is expected to have several physics advantages, a major example being the ability to confine high plasma pressure for a given magnetic field. Since the amount of fusion power produced is proportional to the square of the plasma pressure, this alternate concept could play an important role in the development of smaller and more economical fusion reactors.

Laboratory Director Ronald C. Davidson said, “The NSTX is a highly innovative experiment that will advance our understanding of plasma science and provide an important focus for experimental research here at



Above is the NSTX team. At top right is a plasma produced by a spherical torus. It is from START, a small pioneering spherical torus experiment at Culham Laboratory in the United Kingdom. At left is an artist's rendition of the National Spherical Torus Experiment.

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NSTX

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PPPL. My congratulations to our collaborators and the entire NSTX team.”

The program planning efforts for NSTX are moving ahead following recent DOE approval to begin construction in fiscal year 1997, said Martin Peng, NSTX Program Director.

“We are beginning to develop a plan for the research program,” said Peng, who is on assignment at PPPL from the Oak Ridge National Laboratory (ORNL). “Along with the institutions who can collaborate on NSTX, we are discussing which experimental tests we should carry out to accomplish the NSTX research

mission. The NSTX mission is to investigate the physics principles of the ST plasma, which is rich in attractive, scientific features for plasma startup, heating and current drive, magnetics and stability limits, transport and fluctuations, and divertor and scrape-off layer.”

National Collaboration

The design and construction of the NSTX Project is a national collaboration among several institutions, including PPPL, ORNL, Columbia University, and the University of Washington at Seattle. PPPL has primary responsibility for the Project. ORNL, which will lead the power and particle handling activities, already contributes in several key physics design activities. The University

of Washington will lead the physics design of the co-axial helicity injection, an important test on NSTX to find out if the ST devices can be freed from relying on inductive startup. Columbia University will contribute in the area of plasma stabilization at high pressures.

The Program Director said the

Engineering, Cost and Schedule Review Committee, headed by Professor Bruce Montgomery of the Massachusetts Institute of Technology, recently endorsed the NSTX Project and provided a number of constructive suggestions.

“The NSTX is a highly innovative experiment that will advance our understanding of plasma science and provide an important focus for experimental research here at PPPL.”

—Ronald Davidson

“We benefited a great deal from this review. Project Director Masa Ono and the NSTX team have already begun to improve the design, which will become simplified and perform better as a result of the committee’s advice,” said Peng.

Peng said the NSTX device will be able to use many of the existing facilities and equipment at PPPL. “NSTX will have a tremendous potential for delivering powerful high performance plasmas utilizing the facilities at PPPL,” he said.

Analysis indicates that the ST configuration could permit small,



The NSTX physics team, from left, includes, Wonho Choe, Neil Pomphrey, Henry Kugel, Bob Kaita, Jon Menard, Dick Majeski, Steve Jardin, Stanley Kaye, NSTX Program Director Martin Peng, and NSTX Project Director Masa Ono.

HOTLINE

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cost-effective devices for fusion research and development. Offered Peng, "For example, the present center stack in NSTX will give us the ability to produce plasmas of high currents for aspect ratios as low as 1.25, an important capability for investigating the ST plasma properties. NSTX, with an upgraded center stack and additional auxiliary drive power, could allow us to produce plasmas comparable in pressure to TFTR and the Joint European Torus. Initial tests on NSTX will provide the data needed for us to take this next step." Aspect ratio is the ratio of the major radius of a plasma to its minor radius.

Broad Vision

Project Director Masayuki Ono said, "We are particularly fortunate to have Martin Peng with us on NSTX. Martin's background as the originator of the modern-day-ST concept and his broad vision for the ST future make him uniquely qualified to direct the NSTX Program."

The recently formed NSTX Program Advisory Committee, made up

of senior fusion researchers in the U.S. and the European Community, will regularly review and advise the PPPL Director on the direction of the NSTX Research Program.

The evaluation of NSTX began in 1993, when the project was called the Princeton Spherical Tokamak Experiment. National ST workshops in 1994 at Oak Ridge and in 1995 at PPPL provided important forums for formulating the scientific mission and design concept for the NSTX. During the same period, ST experiments complementary in research mission and device design to the NSTX were also successfully developed. Most notable are the GLOBUS-M in Russia and the MAST in the United Kingdom, which recently began construction.



The NSTX engineering team includes, from left, (standing) NSTX Program Director Martin Peng, John Robinson, Art Brooks, Bob Parsells, Mike Kalish, Judy Malsbury, NSTX Project Director Masa Ono, Dwight Bashore, John Citrolo, and H.M. Fan; (seated) John Spitzer, Charles Neumeyer, Randy Wilson, and Jerry Levine.

Design and construction of NSTX will cost \$20 million and the research program is being planned for an annual budget of \$25 million. The NSTX research effort is anticipated to be at about 50 percent of the present TFTR level. About 40 percent of the annual NSTX research budget will be devoted to facility operation, which will be a PPPL responsibility. The remaining 60 percent of the budget will be devoted to scientific research activities.

Two-thirds from PPPL

Two-thirds of the research team would be from PPPL while the remaining one-third would be from the collaborating institutions. "Instrumentation control and diagnostics data acquisition can be made accessible through the Internet," commented Peng.

NSTX's first plasma is scheduled for April, 1999. "We will have a national research team ready to begin the experiments," said Peng. ●



The management team for NSTX includes, from left, (seated) PPPL Associate Director for Research Rob Goldston, NSTX Project Director Masa Ono, NSTX Program Director Martin Peng, and NSTX Physics Manager Stanley Kaye; (standing) PPPL Deputy Director Dale Meade, PPPL Advanced Projects Head John Schmidt, DOE's Greg Pitonak, NSTX Project Control Manager Tom Egebo, NSTX Engineering Manager Charles Neumeyer, and PPPL Director Ronald C. Davidson.

For an additional description of NSTX, see the August, 1996, Information Bulletin, which is available through PPPL Information Services.

Sauthoff Receives IEEE Leadership Award

PPPL's Plasma Science and Technology Department Head Among Five Honorees

In recognition of his "outstanding leadership," Plasma Science and Technology Department Head Ned Sauthoff has been awarded the IEEE's 1996 United States Activities Board (USAB) Divisional Professional Leadership Award. The IEEE is the Institute of Electrical and Electronic Engineers.

Sauthoff is one of five 1996 recipients of the Regional/Divisional Professional Leadership Awards, which were given in September.

The award honors individuals in the Institute's Divisions and Technical Societies for their "outstanding leadership efforts in advancing the professional aims of IEEE in the United States." Sauthoff, who is presently the Vice Chair of the IEEE-USA Technology Policy Council, served as Chair of the Council's Energy Policy Committee (EPC) in 1994-95.

"We are especially proud of Dr. Sauthoff. He has been honored with this award for his distinguished leadership of the Energy Policy Committee."

—Joel B. Snyder

"We are especially proud of Dr. Sauthoff. He has been honored with this award for his distinguished leadership of the Energy Policy Committee in preparing and executing a comprehensive review of all USAB position statements previously initiated by the EPC; for initiation of several new position statements requiring

close coordination with the Power Engineering Society; and for preparation of testimony for presentation to Congressional committees," said USAB Chairman Joel B. Snyder in a letter to PPPL Director Ronald C. Davidson.

Davidson, responding to the news, said, "Ned Sauthoff is highly deserving of the prestigious IEEE Professional Leadership Award. He brings extraordinary technical and leadership talent to the IEEE-USA Technology Policy Council."

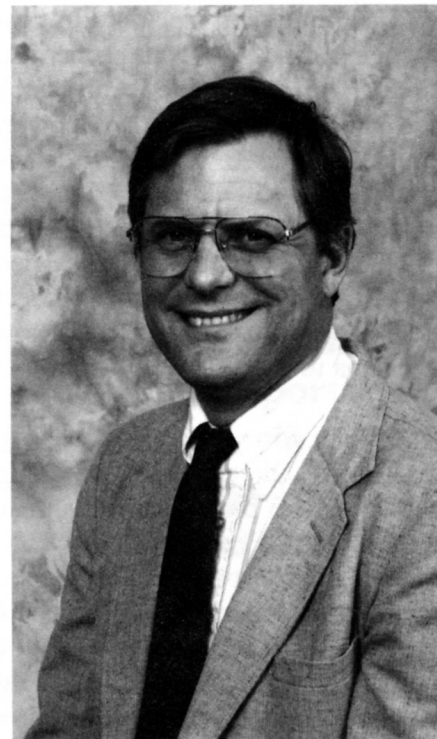
Technology Policy Interests

The Technology Policy Council addresses the technology policy interests of the 240,000 U.S. members of IEEE. The Council has committees on Energy Policy, Research and Development Policy, Aerospace Policy, Medical Technology Policy, Computing and Information Policy, and U.S. Competitiveness.

These committees prepare position papers, present oral and written testimony before Congress, respond to requests for information from Legislative and Executive Branches of the government, and inform IEEE-USA members of issues and opportunities for grassroots actions in technology policy areas in which IEEE has competence.

Sauthoff has been involved with the Institute since 1988, when he became Chair of the Energy Policy Committee's Fusion Subcommittee.

Commenting on his more recent efforts as the Vice Chair of the Technology Policy Council, Sauthoff said, "I am devoting most of my energy toward increasing the quality of the IEEE-USA's technology policy position statements and improving the



Ned Sauthoff

effectiveness of the IEEE-USA in providing relevant information and recommendations to the government and the IEEE members."

Sauthoff said he is also working with the chairpersons of the policy committees in establishing firmer bases for recommendations and in improving the effectiveness of the interactions between the U.S. government and the U.S. members of the IEEE.

Sauthoff, a Principal Research Physicist, joined the Laboratory's staff in 1972 as a research assistant. He received a bachelor's degree in physics from the Massachusetts Institute of Technology (MIT) in 1971, a master's degree in nuclear engineering from MIT in 1972, and a Ph.D. in Astrophysical Sciences from Princeton University in 1975. ●

PPPL'ers Talk Fusion with Congressional Staff at Forum

P PPL participated in the Fusion Forum for Congress held this spring in Washington, D.C. In addition to a display in the Cannon House Office Building, PPPL representatives called on U.S. Representatives, Senators, and staffers. Participants representing the Lab included Troy Carter, Bob Heeter, Phil Snyder, John Wright, Greg Czechowicz, Terry Birch, Dale Meade, Mike Williams, Daniel Weitz, John DeLooper, Pam Lucas, Andrew Post-Zwicker, Gerry Shannon, and Nan Wells. Shannon and Wells are from Princeton University's Office of Government Affairs in Washington, D.C.

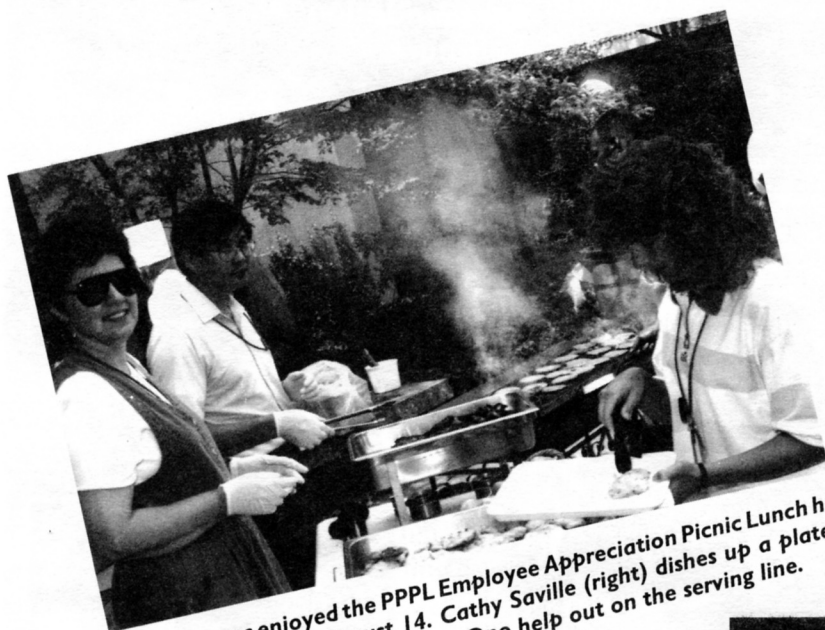
At right, PPPL Deputy Director Dale Meade chats with former Tennessee Congresswoman Marilyn Lloyd in front of the Lab's exhibit. At bottom, Daniel Weitz, who came in sixth nationally in the Westinghouse Science Talent Search and has spent several summers at PPPL, chats with Louisiana Congressman Bob Livingston (right). In the background is Kathy M. Thorpe, Vice President, Government Affairs, Science Applications International Corporation (SAIC). ●



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Commercial Photography

Good Food, Sunshine, and Plenty of Camaraderie

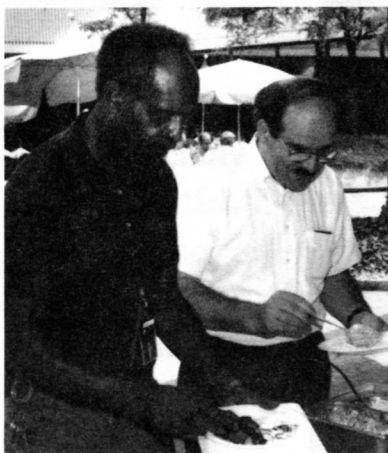
PPPL's Employee Appreciation Lunch Pays Tribute to Staff



Lab employees enjoyed the PPPL Employee Appreciation Picnic Lunch held in the Courtyard on August 14. Cathy Saville (right) dishes up a plate as volunteers Joyce Bitzer and Masa Ono help out on the serving line.



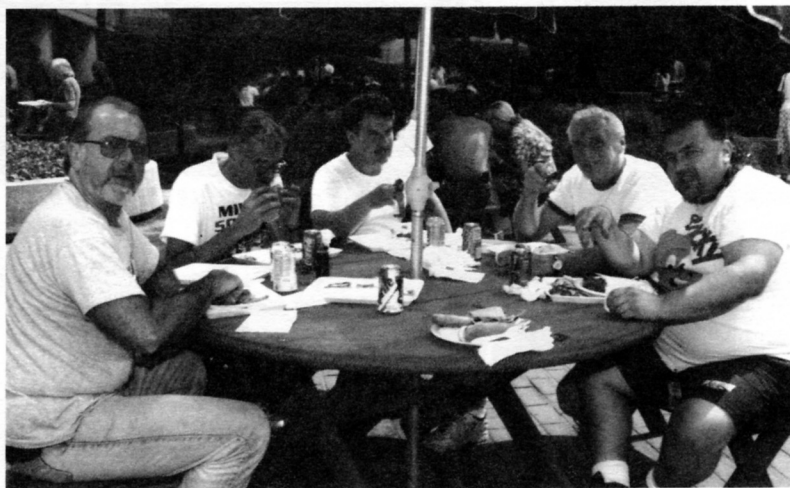
Ed Winkler (left) and Mike Williams serve burgers.



Roland Snead (left) and Kevin McGuire.

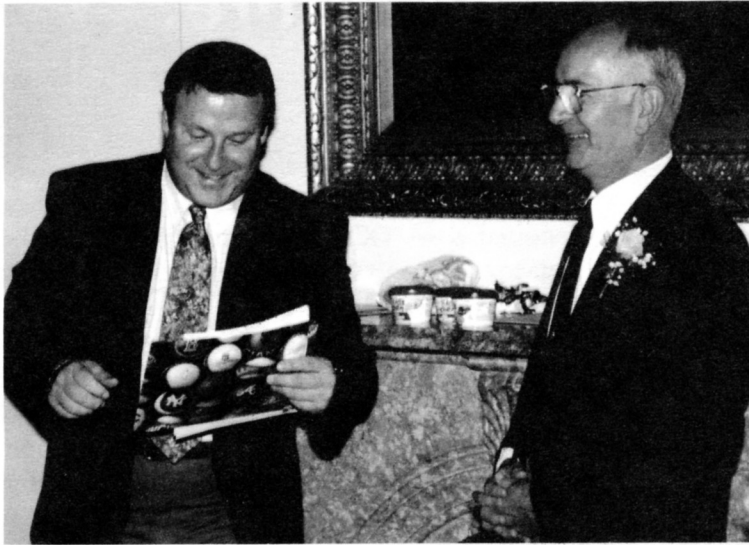


PPPL Director Ronald C. Davidson (in tie) chats with a group of PPPL'ers at the employee picnic.



PPPL picnickers enjoy the fare at the Employee Appreciation Lunch.

What's Happening at PPPL



Angelo Candelori (right) receives a certificate for a Princeton University rocking chair from Steve Iverson, Head of the Office of Human Resources, during Candelori's recent retirement dinner at Prospect House. Candelori, Head of Administration Services, had been at the Lab for more than three decades.

TFTR Demonstrates New Tritium Technology

In August, the Lab successfully completed the TFTR tritium fuel cycle by employing the Tritium Purification System (TPS). The TPS is a unique, low-inventory cryogenic distillation isotope separation system capable of separating tritium from other hydrogen isotopes and plasma exhaust gases.

The TFTR tritium team completed the fuel cycle by purifying the tokamak plasma exhaust to less than 97 percent molecular tritium. This initial batch of tritium, approximately 1 kilocurie, has been transferred to one of the storage beds in the Tritium Storage and Delivery System for reuse in future deuterium-tritium experiments.

The TPS was designed and built by the Canadian Fusion Fuels Technology Project of Ontario, Canada. ●

TRANSITIONS

Retirements

Vickramasingam Arunasalam, a principal research physicist, retired on October 1 after 32 years of service.

George Bronner, an engineer for the EAD Power Systems, retired on September 1. Bronner had been at PPPL for 37 years.

Jean Hurley, a staff assistant in Human Resources, retired on September 1. She had worked at PPPL for 23 years.

Eloise Racine, a staff accountant, retired on June 1. She had been at the Lab for 18 years.

Virginia Zelenak, a user support coordinator in the Computer Systems Division, retired on September 1. Zelenak had been at the Lab for 15 years.

"Factoids" Needed for Open House Handout

In preparation for the PPPL Open House on Saturday, October 26, Carol Phillips is putting together a handout for the visitors. One page will be devoted to interesting, educational, and fun facts about the Laboratory.

If you have information regarding some of PPPL's lesser known details, please help Carol out by sending your suggestions via e-mail (caphilli@pppl.gov), telephone (ext. 2754), or by dropping by her office at LOB, B-378. Your input is needed by **Wednesday, October 16.** ●



FUSION SCIENCE

The foundation for the future.

OPEN HOUSE

at the

Princeton Plasma Physics Laboratory

Saturday, October 26, 1996

10 a.m. — 3 p.m.

- REFRESHMENTS • DISPLAYS • TOURS • SOUVENIRS •
- HOT DOGS • COLD DRINKS • DEMONSTRATIONS •

Volunteers for the Open House are Needed!
Please call John DeLooper at ext. 3047.