PPPL U.S. DEPARTMENT OF ENERGY

PRINCETON PLASMA PHYSICS LABORATORY WEEKLY

MONDAY, SEPTEMBER 24, 2012

At PPPL THIS WEEK

MONDAY, SEPTEMBER 24

Vision of Performance of Excellence Award Site Visit

PPPL Theory Retreat

TUESDAY, SEPTEMBER 25

Vision of Performance of Excellence Award Site Visit

PPPL Theory Retreat

WEDNESDAY, SEPTEMBER 26

Yom Kippur

Vision of Performance of Excellence Award Site Visit

4:15 p.m. ◆ M.B. Gottlieb Auditorium
PPPL Colloquium:
Is It Higgs Boson?
Professor James Olsen, Princeton University
Refreshments at 4 p.m.
Click here for more information.

THURSDAY, SEPTEMBER 27

PPPL Theory Retreat

INSIDE ...

New Jersey firm creates jobs and vital components for world-leading experiment.

By John Greenwald

One of the largest scientific projects since the moon landing has Oxford Superconducting Technology in Carteret, N.J., humming around the clock. The company is producing nearly 10,000 miles of superconducting wire for ITER, a huge international venture being built in the south of France to demonstrate the scientific and technological feasibility of fusion as a clean and abundant source of energy for generating electricity.

Oxford Superconducting has created new jobs, expanded its capacity and is operating three shifts a day to fill two ITER contracts that it landed in 2009. The company has hired 60 new workers, bringing its workforce to 240 employees. At the same time, "we've invested several million dollars in new equipment," said Mark Glajchen, director of business development for Oxford Superconducting, a division of Oxford Instruments in Abingdon, England.

ITER represents the next major step toward the development of a commercial fusion reactor. The project will be the largest experimental fusion facility, or tokamak, ever constructed. Plans call

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This superconducting wire will become thin as a needle when Oxford Superconducting Technology finishes manufacturing it. (Photo credit: Elle Starkman, PPPL Office Of Communications)

Stephen F. Paul, a PPPL Physicist for 30 Years, Dies at Age 58

By Jeanne Jackson DeVoe

Stephen F. Paul, a principal research physicist at PPPL who worked on many projects over a 30-year career, from the Poloidal Divertor Experiment (PDX) in the early 1980s to, most recently, the National Spherical Torus Experiment (NSTX), died on Saturday, Sept. 15, of pancreatic cancer. He was 58.

Philip Efthimion, Head, Plasma Science and Technology Department, said Paul would be remembered for bringing "enormous energy and enthusiasm to whatever he did." He noted that Paul was collaborating with Columbia University while he was getting

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Stephen F. Paul, a PPPL Physicist for 30 Years, Dies at Age 58

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chemotherapy treatments. "The illness couldn't diminish his spirit or his passion for his research and work," Efthimion said.

Paul grew up in Cranford, N.J. and lived in Princeton for 20 years before moving to West Orange about a decade ago.

After earning a bachelor's degree in applied physics from Cornell University, he went on to earn his Ph.D. in plasma physics from Columbia University in 1981, the year that he joined PPPL. He worked on the S1 Spheromak and later worked on the PDX, the PBX-M (the Princeton Beta Experiment-Modification) and the TFTR (Tokamak Test Fusion Reactor). He worked on a diagnostic to measure the velocity of the plasma on the NSTX and was working on plasma spectroscopy and radiated power measurements before NSTX shut down for an upgrade in November of 2011.

"He was fully involved in fusion and very passionate about what we do here," said Brent Stratton, head, Diagnostic Development Division, who worked with Paul since the late 1980s.

Paul's specialty was plasma spectroscopy, which involved looking at the radiation emitted by ions in the plasma to find impurities that could interfere with the plasma's performance in fusion experiments.

"He was one of the brightest, best informed and thoughtful persons about a vast area of knowledge in the Lab," said Lewis Meixler, head, Technology Transfer and Applications Research.

While working at PPPL, Paul spent his time off developing an alternative motor fuel made from organic material found in municipal and agricultural waste, such as food waste, paper, leaves and grass clippings. He named it P-Fuel to accentuate his link with Princeton University. The material was patented in 1997 by Princeton University. Paul established a company, The Trenton Fuel Works, based in an abandoned municipal waste processing plant in Trenton, N.J., to produce the fuel. The company is still in operation and is being run by Paul's partner.

Despite being ill for the past two years, Paul managed to collaborate with Columbia University's High-beta Tokamak program on optical diagnostics as part of PPPL's Off-Site University Research Program. "Steve was an outstanding scientist and very much loved by everyone in the plasma lab," said Michael Mauel, Professor of Applied Physics at Columbia University, and co-head of Columbia's tokamak program. "Steve patiently guided our graduate students and helped several of them design and install a new plasma diagnostics."

Paul was also very active in his synagogue, B'Nai Shalom, in West Orange. He was devoted to his family and is survived by his wife Gilda, of West Orange, who works in Princeton University's Office of the Dean of the Faculty, and three grown children: Jordana Paul, Aaron Paul and Rachel Paul Yogev, along with her husband, Dean.

Funeral services were on Sept. 16. Donations in Paul's name can be made to Memorial-Sloan Kettering Cancer Center to support the pancreatic cancer research of Dr. Eileen O'Reilly or to the American Technion Society to support the Technion-Israel Institute of Technology. The family would welcome cards and emails, which can be sent to **gilda@princeton.edu** or to 61 Howell Drive, West Orange, N.J., 07052.

Vision of Excellence Award Team Visits PPPL This Week

By Jeanne Jackson DeVoe

A team of eight Vision of Excellence Award Examiners will be visiting PPPL from Monday to Wednesday this week as part of an assessment of the Laboratory's overall performance.

The team will be meeting with department heads and supervisors in a dozen meetings throughout the day Monday.

The team will hold more meetings on Tuesday to discuss the results that PPPL produces and wrap up on Wednesday. They will spend the rest of the week writing recommendations. The report will likely be released to PPPL by the end of the calendar year, explained John DeLooper, Head of Best Practices and Outreach, who is overseeing the application process.

PPPL submitted the application as part of an agreement with the Department of Energy. "The value of it is not the award," DeLooper said. "The value is the independent feedback that says here are ways you can improve your business."

The site visit is reserved for high-scoring applicants after a lengthy application process in which applicants describe and analyze their own leadership; strategic planning; customer focus; measurement, analysis and knowledge management; work force focus and operations focus.

Members of the Vision Team will also talk to staff members in the cafeteria or hallways to find out more about how staff members do their work, what controls they use and how they measure what they're doing. DeLooper said he is confident that they'll like what they hear because of the processes PPPL has in place to manage and operate the Lab.

His advice to staff members who talk to the Visions Team is to "be friendly, welcome them to the laboratory and be proud of the great work that we do because when visitors come here and see the amazing things that we do, it's pretty impressive."

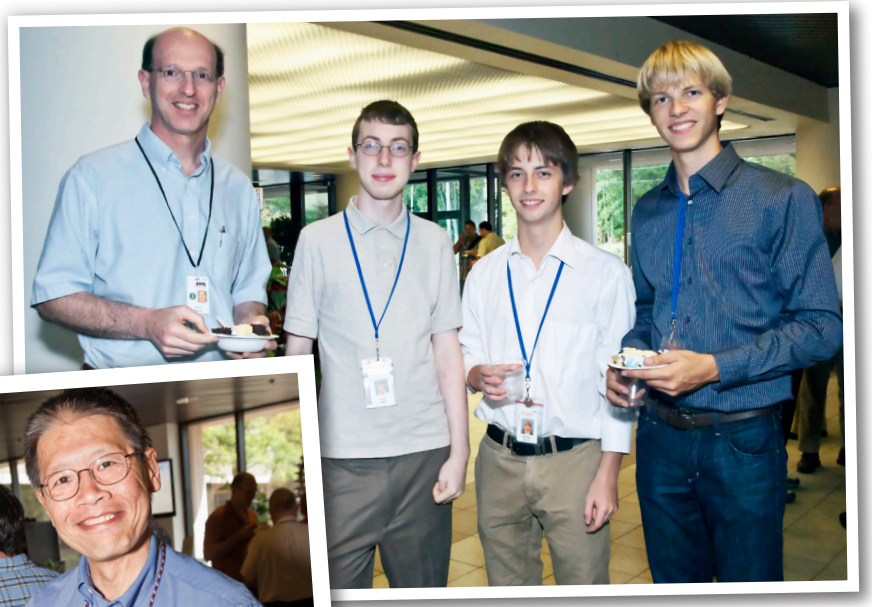
The Vision of Performance Excellence Award Program includes New Jersey, Delaware and Rhode Island and is the state version of the Malcolm Baldridge National Quality Award, a national performance award under the U.S. Department of Commerce that is named for the late Malcolm Baldridge, the U.S. Secretary of Commerce under President Ronald Regan. The Vision program is run by The Excellence in Missouri Foundation.

End of Summer Party
Wishing Good Luck to a Colleague Heading to Afghanistan

Deputy Director for Operations Adam Cohen, at left, with Gerrish.

Good luck cake for Neil Gerrish, third from right, who is being deployed to Afghanistan with the Connecticut National Guard. From left to right is: Virginia Finley, Mark Hughes, Emily Moder, Dorothy Strauss, Zoe Shaheen, Sandy Shaw, Gerrish, Leanne Meyer and Jerry Levine.

The good luck cake



Eliot Feibush, at left, and high school interns from the Bergen County Academy, from left to right: Jared Miller, Michael Knyszek and Matthew Lotocki.

John Dong enjoys some ice cream.

New Jersey firm creates jobs and vital components for world-leading experiment

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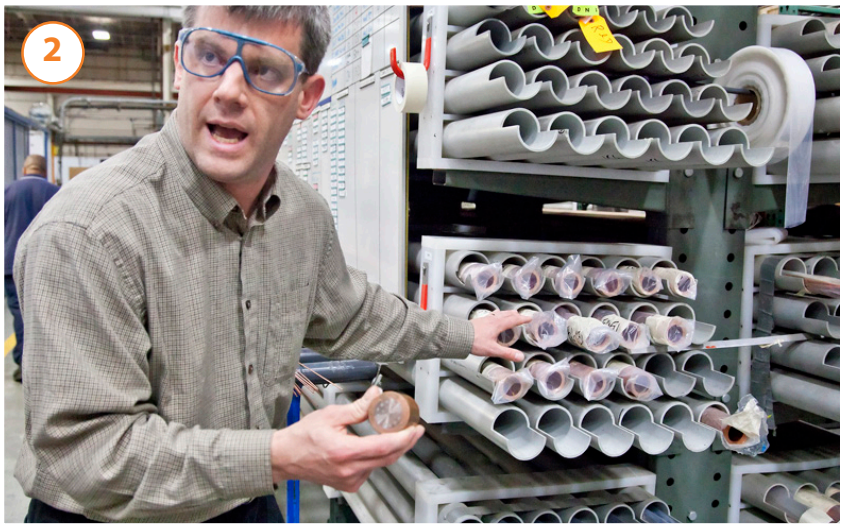
for ITER to produce 500 million watts of fusion power for at least 400 seconds by the late 2020s, and to deliver up to 10 times more energy than will be needed to create the power.

ITER also represents an unprecedented example of scientific coordination on a global scale. The project is a joint effort of the United States with the People's Republic of China, the European Union, India, Japan, the Republic of Korea, and the Russian Federation—a partnership that includes more than half the world's population.

U.S. ITER contractors include the U.S. Department of Energy's (DOE) Princeton Plasma Physics Laboratory (PPPL), which is managed by Princeton University. More than $100 million of U.S. ITER funds will flow through PPPL for diagnostic and electric network equipment

How to make superconducting wire for fusion



1. Oxford Superconducting begins with a foot-long copper and niobium billet that weighs several hundred pounds.
2. The billets are drawn down until more than a dozen can be stacked inside a hollow copper tube like those that General Manager Jeffrey Parrell shows here. He holds a section of a billet-filled tube that has been drawn down some more.
3. The wire grows ever thinner as it is pulled through funnels like this one and wound onto spools.
4. Mark Glajchen, director of business development, displays a coil of finished superconducting wire that is some three-hundredths of an inch thick.

(All photos by Elle Starkman, PPPL Office Of Communications)

New Jersey firm creates jobs and vital components for world-leading experiment

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over the next 10 years. PPPL will do part of this work itself and subcontract some 60 percent of the funds to research institutions and private industry. Click **here** to read more about PPPL work on ITER diagnostics. "Participating in ITER is vital to the mission of our Laboratory," said PPPL director Stewart Prager. "We contribute our expertise and share in the knowledge of fusion energy that's generated by the ITER project."

The U.S. ITER project office has thus far awarded funding and subcontracts with a total value, including options, of up to $767 million to U.S. companies, universities and DOE laboratories. Funding for the U.S. portion of the ITER project comes from the DOE's Office of Science through U.S. ITER at the DOE's Oak Ridge National Laboratory in Oak Ridge, Tenn. "These funds support manufacturing, engineering, and other high tech jobs in the United States," said Ned Sauthoff, who leads the team executing the U.S. contributions to ITER. "U.S. companies are also winning contracts from other ITER members—about $75 million so far, with more opportunities in the near future."

Oxford Superconducting is among those suppliers with contracts from both the United States and other ITER partner nations. The company has completed an $11.6 million order that came directly from the U.S. ITER office, and is halfway through a $47.3 million contract from the European Union. When measured by the type of wire that ITER requires, Oxford Superconducting has expanded from producing a few tons a year before the orders to 30 tons a year at present.

This wire will be a key component of the 10-story tall ITER reactor vessel. When woven into giant electromagnetic coils, the strands from Oxford Superconducting and six other suppliers will produce powerful magnetic fields to confine and shape the hot charged gas called plasma that fuels fusion reactions. Superconducting wire is essential because electric current flows through it without resistance when the wire has been cooled to temperatures far below zero degrees centigrade. This free-flowing current permits superconducting electromagnets to run with relatively little electric input for extended periods of time that would cause conventional wire to overheat and burn out.

Filling the ITER orders has strengthened Oxford Superconducting's design and manufacturing process. "The ITER quality requirements are quite rigorous, so we've had to increase our expertise in that area," said Jeffrey Parrell, Oxford Superconducting vice president and general manager. "These improved skills will be with us after the project is over, and we've already applied them to other areas of the business as well."

Such areas include producing the next generation of superconducting wire for particle accelerators so that scientists at DOE national laboratories such as Fermilab in Batavia, Ill., and Brookhaven National Laboratory in Upton, N.Y., can study the basic nature of matter. "We work very closely with the laboratories to make conductor wire, which they use to make better magnets, which feeds back into our conductor design," Parrell said.

Oxford Superconducting has spent decades honing its superconducting skills. The company began as a joint venture between a large New Jersey industrial gases company called Airco and Britain's Oxford Instruments, a leading maker of scientific and medical devices that built the first superconducting magnet and pioneered magnetic resonance imaging (MRI) systems. Oxford Instruments bought out Airco in 1986 to form Oxford Superconducting, which today counts MRI equipment makers among its major customers.

Producing superconducting wire is a bit like stretching taffy. The process starts with a billet—a foot-wide, copper and niobium cylinder that weighs several hundred pounds. An Oxford Superconducting supplier lengthens and narrows this to a width of about four inches through a process called extrusion. Oxford Superconducting then inserts tin rods into the billet and pulls the stretched-out cylinder through a series of smaller and smaller funnels, or dies, in a procedure called drawing down. This stretches and thins the billet until more than a dozen can be packed into a two-inch-wide tube. The company then draws down the billets some more. The final result of this constant stretching is a more than half-mile long strand of superconducting wire that is just some three-hundredths of an inch thick, or about the width of a hypodermic needle.

All this is only the first step in the production of electromagnetic coils for ITER. Oxford Superconducting ships spools of its wire to New England Wire Technologies, a U.S. ITER vendor in Lisbon, NH, which twists some 1,400 of the needle-thin strands into 1.6 inch-wide cables. These cables then go to High Performance Magnetics in Tallahassee, Fla, another U.S. ITER vendor, which encases them in stainless steel jackets called conduit and ships them to Italy, where they are wound into the final coils for ITER.

For Oxford Superconducting, winning the ITER contracts marks a rewarding result of the company's research and development. "There's been a long history between us and the U.S. government on collaborative efforts to develop strand capability," said Glajchen, the director of business development at the New Jersey company. The thousands of miles of wire that Oxford Superconducting is producing for ITER thus represent "another milestone in our history of translating joint work on strand development into an application not only for the United States but globally."

COLLOQUIUM

IS IT HIGGS BOSON?

Professor James Olsen
Princeton University

Wednesday, Sept. 26 at 4:15 p.m
M.B. Gottlieb Auditorium

Professor Olsen will trace the saga of the Higgs Boson from invention to possible discovery, and outline the additional measurements that are necessary to determine if the new particle observed at the LHC is indeed that proposed by Peter Higgs et al. in 1964.

Refreshments at 4 p.m.

BLOOD DRIVE

October 5, 2012

8:00 a.m. - 1:00 p.m.

The American Red Cross blood supply is at critical levels.

Please help out by donating your blood during the Oct. 5 blood drive from 8 a.m. to 1 p.m. at the American Red Cross Mobile van in the Lower End Parking lot. All blood types are needed. One pint of donated blood can save up to three lives!

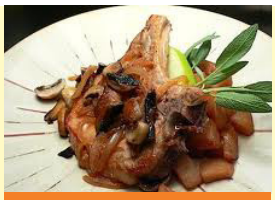
To schedule a donation appointment, please contact the OMO at extension 3200.

Thank you,
American Red Cross
OMO staff

American Red Cross

PPPL Café Menu

BREAKFAST..... 7 a.m. • 10 a.m.
CONTINENTAL BREAKFAST..... 10 a.m. • 11:30 a.m.
LUNCH..... 11:30 p.m. • 1:30 p.m.
SNACK SERVICE..... until 2:30 p.m.

	MONDAY - SEPT. 24	TUESDAY - SEPT. 25	WEDNESDAY - SEPT. 26	THURSDAY - SEPT. 27	FRIDAY - SEPT. 28
COMMAND PERFORMANCE CHEF'S FEATURE	 Jungle Curry with Tofu over Rice	 Feta Chicken & Vegetables over Couscous	 Beef Fried Rice	 King Ranch Chicken Mac & Cheese	 Brined Pork Chops, Apple Compote & Home-Fried Potatoes
Early Riser	Oatmeal Raisin Pancakes with Turkey Sausage	The XL Western Omelet with Home Fries	Homestyle Breakfast	Pork Roll, Egg and Cheese on a fresh baked Croissant	The Belly Buster Hoagie
Country Kettle	Shrimp & Crab Mardi Gras	Beef Barley	Buffalo Chicken	Manhattan Clam Chowder	Sweet Potato Curry
Grille Special	Fat Cat Hoagie with Onion Rings	Trenton Turkey Cheese Burger with Fries	Grilled Turkey Pastrami Reuben with Fries	2 Hot Dogs with Pickle Relish & Mustard served with Onion Rings	Chicken Tender Parmesan Hoagie with Fries
Deli Special	Toasted Italian Hoagie	Toasted Roast Beef & Cheddar Hoagie	Turkey, Roasted Eggplant, Red Peppers, Provolone & Spicy Mayo	Asian Cabbage Wrap	Ham, Pepper Jack, Red Pepper, Lettuce, Tomato & Spicy Mayo
Panini	Ham, Turkey, Swiss, Tomato, Peppers & Honey Mustard	Tuna Melt with Tomato & Cheddar	BBQ Chicken Burger with Pepper Jack, Tomato & Chipotle Mayo	Gyro Meat, Cucumber, Tomato, Onion and Feta Spread	Sausage, Onion & Peppers with Provolone Cheese

MENU SUBJECT TO CHANGE WITHOUT NOTICE

WEEKLY

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The PPPL WEEKLY is published by the PPPL Office of Communications on Mondays throughout the year except for holidays.
Deadline for calendar item submissions is noon on Thursday. Other stories should be submitted no later than noon on Wednesday.

Comments: commteam@pppl.gov ◆ PPPL WEEKLY is archived on the web at: http://www.pppl.gov/ppplweekly.cfm

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