PPPL PRINCETON PLASMA PHYSICS LABORATORY
A Collaborative National Center for Fusion & Plasma Research
U.S. DEPARTMENT OF ENERGY
WEEKLY
March 10, 2014

At PPPL THIS WEEK

MONDAY, MARCH 10

ACEE Highlight Seminar Series
4:30 p.m. ◆ Princeton University Computer Science Aud. 104

Making Next Generation Biofuel Systems Work; It's All in the Biomass

Richard Sayre, Los Alamos National Laboratory and the New Mexico Consortium

WEDNESDAY, MARCH 12

PPPL Colloquium
4:15 p.m. ◆ MBG Auditorium

Uncovering the Hidden Skeleton of Flow Transport

Thomas Peacock, MIT

SATURDAY, MARCH 15

Science on Saturday Lecture
9:30 a.m.◆MBG Auditorium

What Art Can Tell Us About the Brain

Margaret Livingstone, Harvard Univ.

UPCOMING EVENTS

Mar. 19
American Red Cross Blood Drive
8 a.m.- 1 p.m. ◆ Lower Parking Lot

Mar. 19
PPPL Colloquium
3 p.m. ◆ MBG Auditorium

Renewable Fuels and Chemicals

Dion Vlachos, University of Delaware

Mar. 21
Young Women's Conference
Princeton University

Volunteers needed.
Contact Deedee Ortiz x2785

Inside...

DOE website launches "Creating a Star on Earth"

By Jeanne Jackson DeVoe

A new video about PPPL called "Creating a Star on Earth" that the U.S. Department of Energy (DOE) has posted on it's website, http://energy.gov/articles/creating-star-earth has gotten the attention of some highly placed people.

The video received some great promotion when it was tweeted from The White House, https://twitter.com/WhiteHouse/status/441332501412188166, and the White House Office of Science and Technology Policy, https://twitter.com/whitehouseostp, following its release on March 5 *(see inset below)*.

The video at the DOE's website, www.doe.gov, photo below, highlights PPPL's research into magnetic fusion as a clean and abundant source of energy for generat-

continued on page 2

In the video above, learn how scientists at the Princeton Plasma Physics Lab are creating a star on Earth in the National Spherical Torus Experiment (NSTX), a magnetic fusion device that is used to study the physics principles of spherically shaped plasmas. | Video by **Matty Greene**, Energy Department.

Lithium walls keep plasmas insulated, clean, and hot

By John Greenwald

For magnetic fusion energy to fuel power plants, scientists must find ways to keep the ionized gas — or plasma — that produces fusion reactions as hot as possible, and do so as efficiently as possible. At PPPL, strides toward meeting this challenge include recent results obtained on the Lithium Tokamak Experiment (LTX). Research on the compact, donut-shaped device, or tokamak, reveals how using liquid lithium to coat the interior walls insulates the plasma from the walls of the container, facilitates the plasma's ability to conduct electric current and extends the lifetime of the ionized gas.

continued on page 3

DOE Video

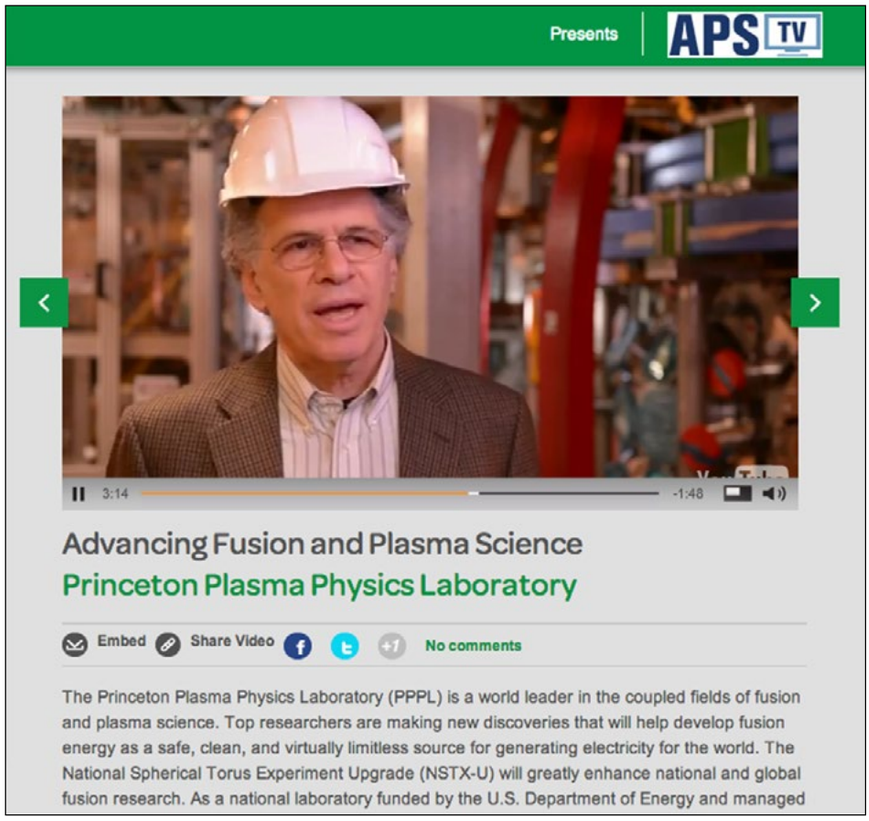
continued from page 1

ing electricity. It explains how the National Spherical Torus Experiment Upgrade (NSTX-U) will create hot ionized gases known as plasmas that are much hotter than the 15-million-degree (Celsius) core of the sun.

"At the Energy Department's Princeton Plasma Physics Lab, scientists are trying to accomplish what was once considered the realm of science fiction: creating a star on earth," the introduction states.

The video packs a lot of information into two minutes and 38 seconds. It includes several interviews with PPPL researchers and engineers and live-action images of the National Spherical Torus Experiment-Upgrade, the Lithium Tokamak Experiment (LTX) and the Magnetic Reconnection Experiment (MRX).

"It was very nicely done," said Adam Cohen, PPPL's Deputy Director for Operations. "It was crisp, very clean – the pictures were clear and bright, the interviews were edited down to make a whole coherent message. In two minutes you get an idea of why fusion, why PPPL and what are we doing."



Video produced for Space Week

DOE videographer Matty Greene and Ben Dotson, the DOE's project coordinator for digital reform, filmed the video in February for DOE Space Week after PPPL Director of Communications Kitta MacPherson came up with the idea of presenting a different take on a space-related topic. Most of the stories for Space Week focus on the numerous contributions that national laboratories have made to the U.S. space program.

The DOE is promoting the video on social media, where it can reach 166,000 followers on Twitter, 114,000 followers on Google and 35,000 "likes" on Facebook.

Another video about PPPL, *see photo above right*, produced by WebsEdge, aired at the American Physical Society March meeting in Denver last week. It can be viewed at the APS website, http://www.aps.org/meetings/march/services/apstv.cfm, and at the WebsEdge website at http://www.websedge.com/videos/aps_tv/#/.

Problems with current energy sources

"Creating a Star on Earth" opens up with dramatic footage of the Earth taken from space with a voice over by physicist Greg Hammett summing up the problems with current energy sources. "There are concerns about global warming and about energy security and so we need to explore different types of energy options," he explains as the video shows fast-action footage of crowds of people and cars rushing through a city.

"Our goal with fusion research is to create a power plant that would replace a coal plant or a nuclear power plant," Hammett says. "Fusion is one of the few energy sources — if we can get it to work economically — that could provide energy for thousands of years," he concludes as an image of the NSTX-U appears on the screen.

Laboratory Director Stewart Prager notes in the video that NSTX-U will produce a plasma five times hotter than the core of the sun. "We're trying to produce a star on earth," he says.

Andrew Zwicker, head of science education, explains to viewers that plasma is a hot gas. "This beautiful, beautiful distinct state of matter can be manipulated by an electromagnetic field and there are examples all around us – it's the sun and stars and 99 percent of the visible universe."

"Changing societies across the globe"

Project engineer Kelsey Tresemer sums up the future of magnetic fusion in the video. "It would basically change societies across the globe," she says.

The video also features John DeLooper, head of Best Practices and Outreach, giving a first-hand tour of the NSTX-U. And Physicist Ahmed Diallo explains that experiments on the NSTX-U will bring scientist closer to an understanding of how plasma will behave in a working fusion reactor.

Cohen said he hopes everyone at the Lab will watch the video and will share it with neighbors and friends. "I think they conveyed a very nice message about fusion and the Laboratory as the center of the magnetic fusion program," he said. "Now we need to make it go viral!"

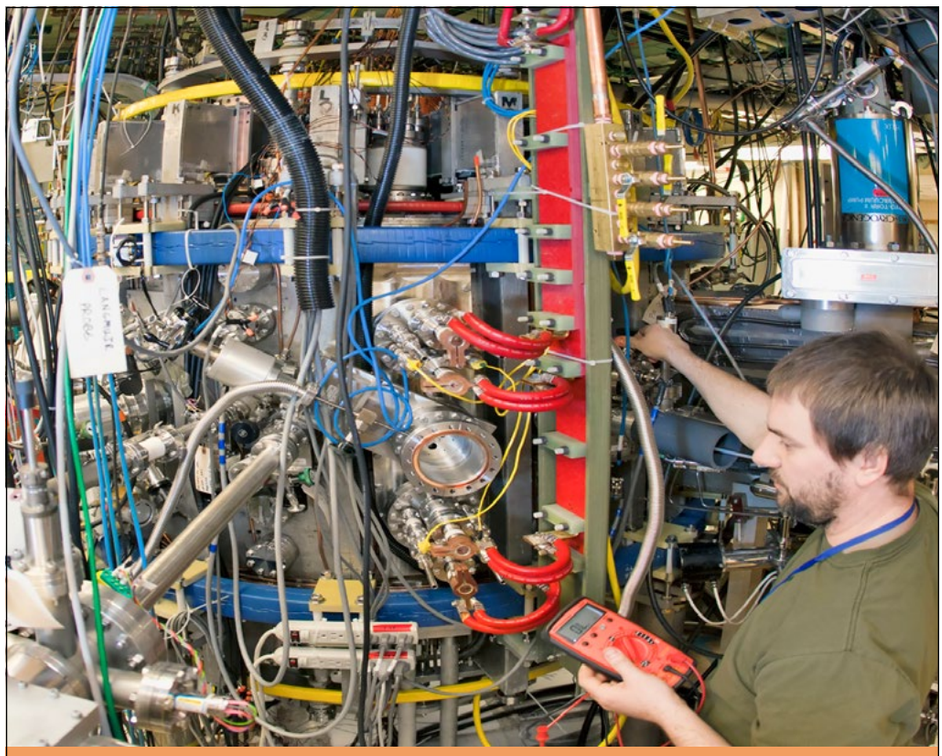
Windows® XP computers are being upgraded to Windows® 7.

- ***After April 8, Windows XP will no longer be supported by PPPL (there will be loss of network connectivity.)***
- ***Loss of network connectivity will occur on April 8th.***
- ***To ensure there is no loss of network connectivity, users should schedule their updates no later than Friday, March 21.***
- ***To schedule an update, please contact the helpdesk at x2275 or email helpdesk@pppl.gov.***

Lithium walls

continued from page 1

Tokamaks use a combination of electromagnets and the magnetic fields produced by a current that runs in the plasma to control the plasma and hold it away from the interior walls. The vital current can be generated more efficiently if the plasma is kept hot and clean. "The material that the walls in a tokamak are made of has a major effect on both the cleanliness of the plasma and how efficiently we can heat it," said physicist Dick Majeski, the principal investigator on the experiment. "LTX tests one approach to improving both."



PPPL Associate Research Physicist John Schmitt checks magnetic field sensors on LTX.

Recent evidence of the benefits of liquid lithium has been particularly encouraging. By employing a new technique that produces thicker, cleaner lithium coatings over the LTX interior, researchers have substantially decreased heat losses from the plasma, said physicist Robert Kaita, a member of the LTX team. The lithium coating soaks up any plasma particles that do escape and keeps them from bouncing back into the core of the plasma and cooling it off — effectively insulating the plasma from the tokamak walls.

This insulation isn't perfect: The hot plasma always scrubs off some of the wall material, which finds its way into the plasma core. Lithium helps mitigate this problem too, since the lightweight lithium atoms don't cool the plasma nearly as much as heavier metals such as steel or tungsten would.

The new technique uses a high-power electron beam to rapidly evaporate the lithium from a pool in the bottom of LTX and create lithium vapor that coats the interior walls. The electron beam produces a substantial lithium coating in only minutes; previous approaches took hours and produced only thin coatings. This rapid application shortens the exposure to background gas that can neutralize the highly reactive lithium and make it ineffective.

A reminder on PPPL ID badge regulations from the Site Protection Division

Some PPPL employees have recently asked the Badge Office about the proper protocol for the PPPL ID badge. One thing to keep in mind is that the PPPL ID badge is the property of the U.S. government and is issued to authorized personnel for PPPL business purposes only. Counterfeiting, altering or misusing the badge is a violation of federal law. All individuals on site are required to display their ID badges. Here are some additional reminders and responsibilities:

Individuals receiving a PPPL ID badge are responsible for the following:

- **Protecting the security badge against loss, theft, or misuse and reporting a lost, stolen or misused badge to the Site Protection Division (SPD) Badge Office as soon as possible after discovering it is missing.**
- **Maintaining the security badge in good condition and protecting its integrity by ensuring the badge is not altered, photocopied, counterfeited, reproduced or photographed for any reason other than official government business.**
- **Returning the security badge to the SPD Badge Office when it is no longer valid or required.**
- **Surrendering or returning the security badge when requested by the SPD Badge Office.**
- **Wearing the security badge conspicuously, photo side out, in a location above the waist and on the front of the body when on site. (Deviations may be permitted for health or safety reasons.)**
- **Removing or covering the badge when not on site.**

Badge Office

The PPPL SPD Badge Office has a new email: Badge@pppl.gov

This email address should be used by staff for all issues concerning badges, lanyards, keys, card reader access requests, etc. The new email address allows the Badge Office to continue to respond to badge requests in a timely fashion. The Badge Office is located in MOD VI.

Badge Office Hours:
Monday through Friday
9:30 a.m. - Noon and 1:30 p.m. – 3 p.m.

Please address any questions or concerns on this topic to Dina Christie or Dolores Stevenson in the PPPL Badge Office (Badge@pppl.gov). Thank you for your support in keeping the Laboratory safe and secure!

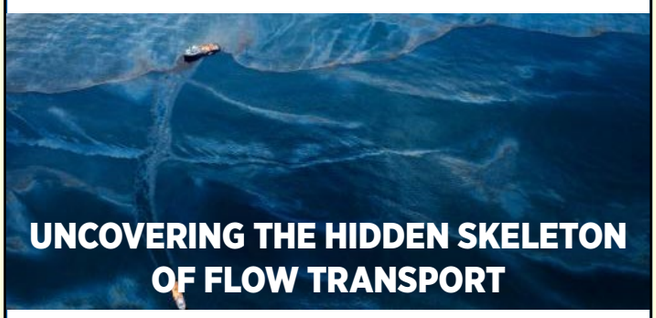
Make an appointment for PPPL's Blood Drive!

Someone in the U.S. needs blood every two seconds, according to the American Red Cross. Just one pint of blood could save up to three lives! The need is especially great this winter since there have been thousands of uncollected blood and platelet donations due to winter storms and freezing weather.

You can help by making an appointment to donate blood during PPPL's AMERICAN RED CROSS BLOOD DRIVE on Wednesday, March 19, from 8 a.m. to 1 p.m. in the lower parking lot. Please call the OMO at ext. 3200 to schedule an appointment.

American Red Cross

COLLOQUIUM



UNCOVERING THE HIDDEN SKELETON OF FLOW TRANSPORT

THOMAS PEACOCK, M.I.T.

Wednesday, Mar. 12

4:15 p.m. (Coffee/Tea at 4 p.m.) • MBG Auditorium

What Art Can Tell Us About The Brain

MARGARET LIVINGSTONE
Harvard University

Saturday, March 15

9:30 a.m. • MBG Auditorium

Many volunteers still needed for the Young Women's Conference, Friday, March 21

The Young Women's Conference desperately needs at least 30 volunteers to help out with the conference as group leaders and in other roles. Please sign up here or contact Deedee Ortiz at dortiz@pppl.gov, ext. 2785, for more information.

BROCK Café at PPPL Menu

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

— MARK GAZO, Chef Manager

	MON. 10 MAR.	TUE. 11 MAR.	WED. 12 MAR.	THU. 13 MAR.	FRI. 14 MAR.
					
COMMAND PERFORMANCE CHEF'S FEATURE	*OTA-YA Sushi Bar* Made to order Rolls & Sushi	Baked Eggplant Parmesan served over Pasta	Beef Tips Stroganoff served over Parsley Egg Noodles	Cajun Chorizo Sausage, Chicken & Shrimp Jambalaya	Grilled Maple Mustard Glazed Salmon with Rice Pilaf
EARLY RISER	Ham, Egg & Cheese Panini	Poached Eggs Florentine over English Muffin with Hash Browns	Cajun Sausage, Peppers, Onions & Potato Omelet	Grilled Kielbasa with 2 Eggs Any Style & Potatoes	Baked Apple Crisp with Rolled Oats & Cream
COUNTRY KETTLE	Chicken Rice	Vegetable Minestrone	Chicken Sausage Gumbo	Cream Of Mushroom with Sherry	Mushroom Barley
GRILLE SPECIAL	Grilled Tofu over Mediterranean Chopped Salad & Lemon Drizzle	Texas BBQ Beef Sandwich with Southwest Coleslaw	French Toasted Monte Cristo with Ham, Turkey, Swiss & Syrup	Fish Cake Sliders served with Fries	Grilled Cajun-Rubbed Chicken Breast with Bacon on French Bread
DELI SPECIAL	Corned Beef & Turkey on Pumpernickel	Peppered Ham & Muenster Cheese on French Bread	Moo Shu Shrimp Wrap	Waldorf Turkey Salad with Cranberries on Multigrain Roll	Portobello Caprese on Ciabatta
PANINI	Ham, Provolone & Tomato Panini with Pesto & Arugula	Fried Fish with Creole Peppers & Onions on French Bread	Buffalo Popcorn Chicken Wrap served with Carrot & Celery Sticks	Vegetable Cacciatore Sub with Mozzarella, Peppers & Onions	Hot Roast Beef with Bleu Cheese & Caramelized Onions

MENU SUBJECT TO CHANGE WITHOUT NOTICE

VEGETARIAN OPTION

CLICK HERE FOR A PRINTABLE WEEKLY MENU

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://w3.pppl.gov/communications/weekly/.