PPPL PRINCETON PLASMA PHYSICS LABORATORY
A Collaborative National Center for Fusion & Plasma Research
U.S. DEPARTMENT OF ENERGY
WEEKLY
October 20, 2014

At PPPL THIS WEEK

OCT. 20 - NOV. 15

Open Enrollment for Princeton Healthcare Plans

MONDAY, OCT. 20

Benefits Changes Presentation
1 - 2 p.m. ◆ MBG Auditorium

THURSDAY, OCT. 23

PPPL Benefits Fair
10 a.m. - 2 p.m. ◆ LSB Lobby

UPCOMING EVENTS

October 27-31

56th Annual Meeting of the APS Division of Plasma Physics
New Orleans
http://www.aps.org/

November 4

PPPL Colloquium
4:15 p.m. ◆ MBG Auditorium
HTS and ARC for Fusion
Dennis Whyte - MIT

Nov. 11

PPPL's America Recycles Day Celebration
10:30 a.m. to 1 p.m. ◆ LSB Lobby

Nov. 11

Electronics Recycling Collection
7 - 10 a.m. ◆ Lower Parking Lot

Inside...

Scientists use plasma shaping to control turbulence in stellarators

By John Greenwald

Researchers at PPPL and the Max Planck Institute of Plasma Physics in Germany have devised a new method for minimizing turbulence in bumpy donut-shaped experimental fusion facilities called stellarators. This month in a paper published in Physical Review Letters, these authors describe an advanced application of the method that could help physicists overcome a major barrier to the production of fusion energy in such devices, and could also apply to their more widely used symmetrical donut-shaped cousins called tokamaks. This work was supported by the DOE Office of Science.

Turbulence allows the hot, charged plasma gas that fuels fusion reactions to escape from the magnetic fields that confine the gas in stellarators and tokamaks. This turbulent transport occurs at comparable levels in both devices, and has long been recognized as a challenge for both in producing fusion power economically.

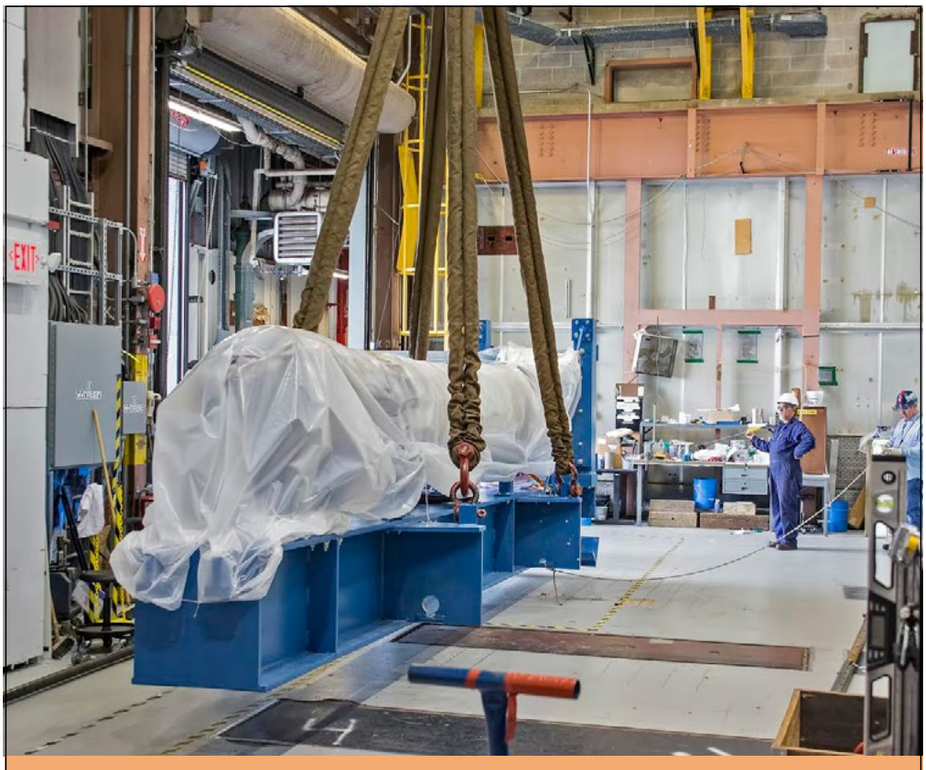
"Confinement bears directly on the cost of fusion energy," said physicist Harry Mynick, a PPPL coauthor of the paper, "and we're finding how to reshape the plasma to enhance confinement."

Advanced computer codes

The new method uses two types of advanced computer codes that have only recently become available. The authors modified these codes to address turbulent transport, evolving the starting design of a fusion device into one with reduced levels of turbulence. The current paper applies the new method to the Wendelstein 7-X stellarator, soon to be the world's largest when construction is completed in Greifswald, Germany.

continued on page 4

NSTX-U Center Stack moves



The NSTX-U center stack was moved from the CS high bay (the coil winding/ QUASAR area) to D site on Oct. 3 The first step, shown here, was loading the large blue beam called a tilt beam and lifting the center stack onto a flatbed truck. (See photo on page 3)

Holiday Photo Video Shoot Goes Smoothly

Carol Ann Austin, far left, and dozens of other PPPL'ers assembled on the lawn of the Lyman Spitzer Building on Oct. 15 with their rectangular pieces of orange oaktag for the PPPL holiday card video. PPPL photographer Elle Starkman filmed the card from the bucket of a cherry picker (inset). PPPLers did a modified wave in which everyone lifted the cards over their heads to form the logo and PPPL letters. Photo: J. Jackson-Devoe

PPPL'ers wait for shooting to begin as Starkman is lifted into the air. Photo: C. Cane

Starkman and Mark Snyder, right, who operated the crane, land after completing the video shoot. Photo: J. Jackson-Devoe

After the video shoot was over, Starkman second from right, and John DeLooper, far right, who directed the event on the ground, pose with from left to right: Snyder, Joe Byczkowski and Sly Vinson. Photo: J. Jackson-Devoe

PPPL'ers who formed the letter L in the logo, gathered on the side so they could rush in at the last minute while the letters were forming as part of the video. Photo: J. Jackson-Devoe

Most of the PPPL staff turned out for the video shoot on the front lawn. Photo: G. Czechowicz

What's Happening at PPPL?

NSTX-U Center Stack moves to D-Site

The center stack is transported by truck to D Site. On Oct. 6, workers drove the truck through the TFTR Test Cell and into the NSTX South High Bay. The next step will be to install the casing and complete the assembly of the center stack before placing it into NSTX-U.

Photo: J. Chrzanowski

PPPL offering individual public tours

Arturo Dominguez, right, led a new public tour for individuals on Oct. 10. The tours open up the Laboratory to members of the public who are not affiliated with a large group or organization. They are being offered on the first and third Fridays of each month at 10 a.m.

Princeton University Freshman families tour PPPL

John DeLooper leads a tour of Princeton University freshmen and their families for Freshman Family Weekend. About 50 people took part in the tour on Friday, Oct. 10, which was led by DeLooper, Robert Kaita and Ray Camp. Around 80 people attended the first tour on Saturday, Oct. 11 and another 55 attended the second tour. The tours were led by Sam Lazerson, Nate Allen and Henry Carnevale.

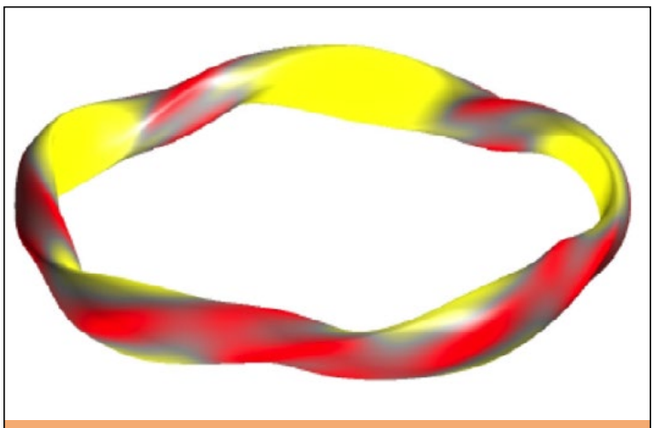
Photo: J. Jackson-Devoe

Turbulence

continued from page 1

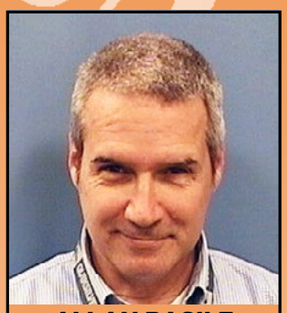
Results of the new method, which has also been successfully applied to the design of smaller stellarators and tokamaks, suggest how reshaping the plasma in a fusion device could produce much better confinement. Equivalently, improved plasma shaping could produce comparable confinement with reduced magnetic field strength or reduced facility size, with corresponding reductions in the cost of construction and operation.

The simulations further suggest that a troublesome characteristic called "stiffness" could occur in reactor-sized stellarators. Stiffness, the tendency for heat to rapidly escape as the plasma temperature gradient rises above a threshold, has been observed in tokamaks but less so in stellarators. The possibility that stiffness might be present in reactor-sized stellarators, wrote the authors, could stimulate efforts "toward further optimizing stellarator magnetic fields for reduced turbulence."



Magnetic field strength in a turbulence-optimized stellarator design. Regions with the highest strength are shown in yellow.

PPPL Welcomes New Employees!



ALLAN BASILE
Diagnostic Design Engineer
Engineering

JAY BASLER
Machine Technician
Engineering

CHAD ENNIS
Machine Technician
Engineering

ROBERT LUNSFORD
Associate Research Physicist
Plasma Science & Technology

JOHN MITCHELL
Mechanical CAD Designer
Engineering

CATALIN ROMAN
Diagnostic Design Engineer
Engineering

Holiday Schedule

Thanksgiving Holiday

The Laboratory will be closed Thursday, Nov. 27 and Friday November 28. These are the University holidays.

Christmas and New Year's Holiday

The Laboratory will be closed Wednesday Dec. 24 through Jan. 2, 2015. The Lab will reopen on Monday, Jan. 5.

The University holidays are:

Thursday, Dec. 25,
Friday Dec. 26,
Thursday, Jan. 1 and
Friday, Jan. 2.

Staff may use their two personal days and two vacation days for the period of time that the Laboratory is closed other than the University holidays listed above.

Tuesday, Dec 23 is the Laboratory Holiday Party. It will take place at noon.

Information on paycheck availability and timesheet submission for the biweekly and hourly staff during the period when the Laboratory is closed will be emailed in early December. If you have questions please call Paulette Gangemi at extension 2224 or email pgangemi@pppl.gov.

Open Enrollment begins Oct. 20

OPEN ENROLLMENT will begin on Monday, Oct. 20 and continue through Friday, Nov. 14.

Linda Nilsen, Executive Director of Compensation & Benefits for Princeton University, will give a presentation on benefits changes for 2015 on Oct. 20 from 1 to 2 p.m. in the MBG Auditorium.

PPPL will hold its annual Benefits Fair on Oct. 23 from 10 a.m. to 2 p.m. in the LSB Lobby.

Conference Exclusions

Certain types of events* are excluded from the DOE conference order/process. To clearly identify whether or not an event is excluded, please fill out the event form on PPPL's travel website.

The types of events excluded are listed below:

- Meetings necessary to carry out statutory oversight functions related to PPPL operations and/or programs. Examples: investigations, inspections, audits, site visits.
- Meetings to consider DOE internal agency business matters held in federal or contractor facilities, that are related to the Laboratory's or the agency's regular business. Examples: Annual OFES FWP meeting, project review meeting, project kick-off meeting, etc.
- Meetings under bilateral and multilateral international cooperation engagements that do not qualify as a formal conference. Examples: ITER Project meetings, Max Planck Princeton Center, JET, etc.
- Formal classroom training held in government facilities that do not qualify as a formal conference. Includes regular courses of training at the National Training Center, etc.
- Classroom training available through federal and commercial sources required as part of a certification program and for the performance of an employee's position that do not qualify as a formal conference.
- Meetings such as Advisory Committee and Federal Advisory Committee meetings, Funding Opportunity Announcements, Review Board meetings, peer review meetings, program kick-off and review meetings.

** An event is typically considered a conference if it focuses on a topic of interest to multiple agencies and/or has non-governmental participants. Some indications of a formal conference include: registration, registration fees, a published substantive agenda, and a location at a commercial facility such as a hotel or conference center.*

SPD•TIP•OF•THE•WEEK

Tips for Travelers to Annual APS Meeting

The Site Protection Division and the Travel Office would like to provide some reminders for PPPLers travelling to the APS-DPP Meeting in New Orleans on Oct. 27-31.

Transportation - Travellers planning to use the vans provided by the Travel Office should plan to meet the vans at the LSB Lobby Circle Driveway. Transportation information will be posted at this entrance. Please arrive 15 minutes before your scheduled departure time to ensure that the transportation services leave the Laboratory on time.

Personal Vehicles - Travellers planning to leave a personal vehicle at the Laboratory during the APS/DPP meeting are asked to notify the Site Protection Division (dchristie@pppl.gov or Ext. 2898) and should park the vehicle in the Lower "N" Parking Lot, in the designated overnight parking spots. Please do not park in the D-Site Lot, as there is limited space for employees. Remember to remove personal or valuable belongings from the vehicle. Provide vehicle type, license plate or PPPL decal number and emergency contact information to Dina Christie.

Foreign National Visitors - Foreign National visitors invited to visit PPPL before or after the APS/DPP meeting should complete the on-line Foreign National Registration Form as soon as possible in advance of the visit (http://fnvisit.pppl.gov/fnregister.aspx).

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. 20 OCT.	TUE. 21 OCT.	WED. 22 OCT.	THU. 23 OCT.	FRI. 24 OCT.
COMMAND PERFORMANCE CHEF'S FEATURE	 Ota Ya Sushi	 Green Pepper Steak served over Rice	 Home-style Meatloaf with Mac & Cheese & Stewed Tomatoes	 Create Your Own Pasta	 English Style Fish And Chips
EARLY RISER	Blueberries & Cream French Toast	Apple Pancakes served with Homemade Turkey Sausage	Grilled English Muffin with Peanut Butter, Honey & Banana	Hearty Chicken, Apple & Kale Breakfast Strata	Vegetable Egg White Omelet served with Potatoes
COUNTRY KETTLE	Beef Rice	Potato Leek with Mushrooms	Spicy Louisiana Seafood Chowder	Tomato with Spinach & Lentils	Navy Bean with Ham
GRILLE SPECIAL	Meatball Parmesan Torpedo	Andouille Sausage Torpedo with Peppers & Onions	Mozzarella Sticks served with Marinara Sauce	BBQ Bleu Turkey Burger served with Onion Rings	Fried Potato Cheese Pierogies
DELI SPECIAL	Veggie Burger Parmesan on a Kaiser Roll	Roast Beef with Bleu Cheese, Arugula & Tomato on a Wheat Roll	Bologna & American Cheese on White with Lettuce & Tomato	Seafood Salad Platter	Chicken Salad Club Sandwich
PANINI	Buffalo Chicken over Mixed Greens	Classic Vegetable Reuben	Chicken Pot Pie with Puff Pastry	Eggplant, Portobello Mushroom on a Whole Grain Roll	Meatloaf Sandwich with Cheddar Cheese, Lettuce & Tomato

MENU SUBJECT TO CHANGE WITHOUT NOTICE

VEGETARIAN OPTION

CLICK HERE FOR A PRINTABLE WEEKLY MENU

WEEKLY

Editor: **Jeanne Jackson DeVoe** ◆ Layout and graphic design: **Gregory J. Czechowicz**
Photography: **Elle Starkman** ◆ Webmaster: **Chris Cane**

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/.