

U.S.-German collaboration bears first fruits

PPPL-designed Coil Arrives In Stellar Condition

by John Greenwald

Engineers at the U.S. Department of Energy's Princeton Plasma Physics Laboratory (PPPL) have designed and delivered a crucial barn-door size component for a major device for developing fusion power. The component, called a "trim coil," marks the initial installment of one of the largest hardware collaborations that PPPL has conducted with an international partner.

The 2,400-pound trim coil is the first of five coils that PPPL is producing for the Wendelstein 7-X stellarator, or W7-X, that the Max Planck Institute for Plasma Physics (IPP) is building in Greifswald, Germany. The powerful coils will fine-tune the shape of the superhot, charged gas called plasma that the W7-X will use to study conditions required for fusion when the machine begins operating in 2015.

In exchange for the coils, PPPL scientists will be able to lead and carry out experiments on the W7-X. Stellarators are one of the two major devices that scientists are using to develop fusion as a source of clean and abundant energy. The

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Everson Tesla staffers with completed trim coil.

Photo by: Tom Stenulis, Everson Tesla

At PPPL THIS WEEK

TUESDAY, JULY 17

Special Theory Seminar

10:45 a.m. - Noon ♦ T-169

Omnigenity as Generalized
Quasisymmetry in Stellarators

Dr. Matt Landreman (MIT)

FRIDAY, JULY 20

DIII-D Science Meeting

1 p.m. ♦ B-233

PPPL Advisory Committee Guides Lab's Mission with "Tough Love"



The PPPL Advisory Committee, from left: Stew Smith, Timothy Meyer, Dave Anderson, Bill Dorland, Patricia McBride, Sybille Guenther, Tony Taylor, Curtis Hillegas, Ronald Parker, Steve Cowley, Jack Anderson, Hiroshi Yamada, Karen Downer, and Stewart Prager.

Committee Guides Lab's Mission with "Tough Love"

by John Greenwald

Twice a year, leading experts from research institutions in the United States and around the world gather at the U.S. Department of Energy's (DOE) Princeton Plasma Physics Laboratory (PPPL). These experts form the PPPL advisory committee, which was created in 2008 to help support and guide the Laboratory's mission. "They try to ensure that we're as good as we can be in science and operations," said John De Looper, who heads the best practices and outreach department at PPPL. "They keep us on our toes."

The 18-member panel dispenses what it calls "tough love," according to physicist Ronald Parker, a professor emeritus at MIT who chairs the committee's advisory board. "All the members have the interest of the Laboratory at heart and are not afraid to say so if we feel that things are moving in the wrong direction," said Parker. "We don't pull any punches" at committee sessions, which are held each April and October. However, Parker adds that the board has been very supportive of the Lab's leadership and "gives out many more bouquets than brickbats."

The panel functions in this fashion:

- Members are divided into two separate groups — one devoted to science, the other focused on operations. For portions of the meeting, the committee gathers as a whole and in other segments, members divide into the two groups. Members hear one and one-half days of presentations from Laboratory senior managers and department leaders and produce recommendations.
- An advisory board composed of Parker and the co-chairs of both groups then meets to discuss the recommendations and put them in final form.
- The advisory board reports the recommendations to a body called the "PPPL Management Group Board of Directors" that represents the top leadership of Princeton University, which runs the Laboratory.
- Princeton President Shirley Tilghman chairs this high-level board. Serving alongside her are: Princeton Provost Christopher Eisgruber; Dean of the Faculty David Dobkin; and Dean for Research A.J. Stewart Smith, the Class of 1909 Professor of Physics, who oversees the Laboratory for the University. Also serving as directors are Parker; Steven Cowley, director of the Culham Centre for Fusion Energy in Abingdon, United Kingdom, and co-chair of the advisory committee science group; and Stewart Prager, director of PPPL. William Madia, vice president of the Stanford Linear Accelerator Center, stepped down as a director and as co-chair

of the operations group earlier this year because of the press of other business. Madia had been an original member of the advisory committee and a substantial contributor to it.

- The Laboratory logs and tracks board-approved proposals to ensure that they are enacted.


The involvement of leaders of Princeton University distinguishes the PPPL advisory committee from other research institution panels that Parker has served on. These have chiefly been concerned with scientific programs and have typically reported to laboratory directors. "Having access to the Princeton administration has been a tremendous asset for the Laboratory," said Parker.

This dialogue with Princeton has helped to strengthen ties between the University, the Laboratory and DOE, noted advisory committee member Jack Anderson. "I've been impressed by how open and candid the Laboratory management has been in addressing many of the challenges it faces," said Anderson, who is leaving his post as director of the Office of Integrated Performance Management at the DOE's Oak Ridge National Laboratory in Tennessee to become chief operating officer of DOE's Fermilab in Batavia, Ill.

The Princeton leaders do "listen very eagerly" to the advisory committee's recommendations, said committee member Tim Meyer. The leaders "want to know how to empower PPPL and what resources they can bring to bear," said Meyer, who heads strategic planning and communications for TRIUMF, Canada's national laboratory for particle and nuclear physics.

Results of the committee's counsel include advancing partnerships between Princeton and PPPL in plasma astrophysics and materials science. "We're going to see a PPPL that interfaces with materials science at Princeton and other universities," said Meyer. "We gave the Laboratory a nudge in that direction."

Other initiatives to emerge from the advisory committee's prompting include moves to communicate the importance of fusion energy research to the public. PPPL has taken the lead in organizing a workshop to bring together representatives of laboratories working on fusion and other participants this fall. PPPL is "one of the leaders of the worldwide fusion program and should walk and talk like a leader," Meyer said.

The committee's tough love thus goes far beyond spotting situations that may need fixing. Good oversight, said Meyer, also calls for recognizing the Laboratory's strengths and encouraging future accomplishments. 

Trim Coil

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other device is the tokamak. “Stellarators offer solutions to problems facing magnetic fusion reactors that haven’t been solved in any other way to date,” said Hutch Neilson, director of advanced projects at PPPL.

Delivery of the first trim coil on June 26 capped two years of teamwork between PPPL and IPP and a final month of intense activity. PPPL engineers Mike Mardenfeld and Steve Raftopoulos, together with colleagues from IPP, made eleventh-hour trips to coil manufacturer Everson Tesla in Nazareth, Pa., when surface imperfections appeared in the epoxy-like resin that encases the copper coil. “The stakes are fairly high,” said Neilson. “Whenever you build the first of anything there are always unexpected surprises that you have to work your way through. In this case, the imperfections turned out to be nothing and were easily removed.”

Hastening the last-minute rush was the fact that all five coils are to be delivered to IPP by January 2013. “Getting the first coil out the door was very challenging,” said PPPL engineer Stephen Langish, who manages the trim coil project and monitored the first one with Mardenfeld, Raftopoulos and quality assurance expert Frank Malinowski. “We just had a very aggressive schedule.”

Delivery of the coil over the 4,300-mile sea and land route to Greifswald proved no less challenging. Workers at Everson Tesla had to crate the device standing up since it was too wide to travel on German roads without a police escort. “There was enough wood in the crate to build two backyard decks,” said Greg Naumovich, the president of Everson Tesla, which is manufacturing the coils under an \$800,000 contract with PPPL.

The standing crate was barely within the 13-foot height ceiling for German roads when the coil arrived in Antwerp, Belgium, from Chester, Pa., and was loaded onto



Max Planck staffers with delivered trim coil.

Photo credit: Anja Richter Ullmann, IPP

a flatbed truck. Planners carefully plotted the 500-mile route from Antwerp to Greifswald in northeast Germany to avoid low highway clearances.

Safe delivery of the huge coil ended a period of anxious waiting in Greifswald. “I was relieved that the coil was not damaged, and also proud of the result of our teamwork with PPPL,” said engineer Konrad Risse, the trim coil project leader at IPP. “This collaboration was very special because the trim coils are the first large component to be provided by another scientific laboratory.”

Technicians will assemble the coils on the W7-X alongside other key parts from more than 30 companies throughout Europe. Installation of the first trim coil is scheduled to be completed in September. The coils will enable stellarator experiments to run smoothly by correcting any errors in the magnetic field that surrounds and shapes the plasma. Such corrections are essential, said Risse, since the stellarator field is very sensitive to non-systematic deviations.

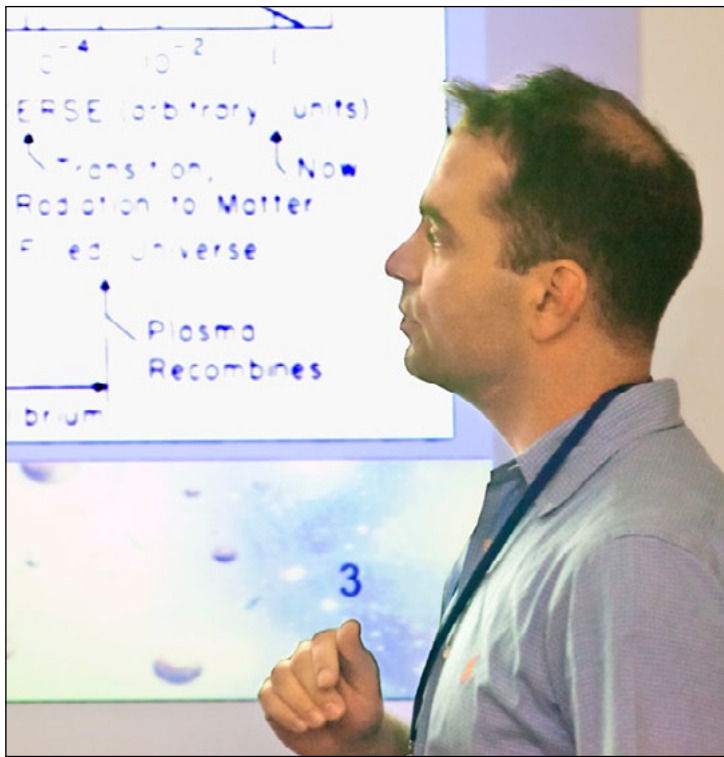
Back at PPPL, engineers have completed the design of five electric power supplies that will run the W7-X trim coils when the stellarator begins operating. The project is already reviewing bids from manufacturers for the contract to produce the supplies, which are to be delivered to Greifswald by August 2013. Shipment of the parts will complete the Laboratory’s hardware collaboration with IPP, and set the stage for PPPL to prepare its own W7-X experiments.

Timely delivery of the first trim coil was thus a key step for the overall project. “It’s an important accomplishment that puts us on target to deliver all five coils in excellent fashion,” said Neilson. “We’re probably going to come in ahead of schedule and under budget.”

At left: The crated coil arrives at Max Planck Institute for Plasma Physics in Germany.

Photo by: TK





Princeton University physicist Christopher Tully spoke at PPPL about a prototype facility that the University and the Laboratory are setting up here to detect one of the oldest and most elusive substances in the universe—neutrinos that were created less than a second after the Big Bang. Detection of these “relic neutrinos” by the facility, called the Princeton Tritium Observatory for Light, Early Universe, Massive Neutrino Yield (PTOLEMY), could affect scientific understanding of the formation and makeup of the universe.

DID YOU KNOW?



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PPPL BLUEFISHING TRIP

aboard the 80ft. Charter Boat SUZIE GIRL

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COST: \$70 (INCLUDES POLES, BAIT, FOOD, BEVERAGES, FISH CLEANING)

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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 JULY 16

TUESDAY JULY 17

WEDNESDAY JULY 18

THURSDAY JULY 19

FRIDAY JULY 20

**COMMAND PERFORMANCE
CHEF'S FEATURE**



OLD ENGLISH STYLE FISH N' CHIPS



CINCINNATI CHILI OVER PASTA WITH TOPPINGS



MAPLE BRINED ROAST PORK LOIN



TILAPIA AND CRAB CEVICHE, BROWN RICE



CHICKEN CORDON BLUE OVER PASTA

EARLY RISER

Cranberry Pancakes w/ Bacon

The XL Egg White Omelet w/ Home Fried Potatoes

Egg, Choice of Meat, and Cheese Breakfast Panini

Steak, Egg and Cheese Burrito

Toasted Open Faced Ham, Egg and Cheese on a Bagel

COUNTRY KETTLE

Beef Rice 🍎

Cream of Turkey and Wild Rice

Vegetarian Minestrone 🍎

Hearty Beef Chili

Split Pea with Ham 🍎

GRILLE SPECIAL

Italian Hot Dog with Rings

Mexican Burger with Fries

Fresh Made Asian Style Pork Burger with Fries

Ribeque Sandwich with Pickles, Onions with Fries

Italian Burger with Fresh Mozzarella with Fries

DELI SPECIAL

Turkey, Turkey Bacon, Swiss Cheese

Fresh Mozzarella, Salami, Pepperoni, Lettuce, Tomato

Toasted Open Face Ham and Swiss Sandwich on a Hoagie

The Toasted Turkey Pastrami Rubeen Hoagie

Louisiana Chicken Salad Wrap

PANINI

Sicilian Eggplant Parmesan

Italian Sausage, Peppers, Onions and Provolone

Ham, Hickory Smoked Bacon, Tomato, Provolone

Classic Tuna Melt On Rye

The Turkey Avocado

MENU SUBJECT TO CHANGE WITHOUT NOTICE

[CLICK HERE FOR A PRINTABLE WEEKLY MENU](#)

WEEKLY

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Send to: pwieser@pppl.gov ♦ Comments: commteam@pppl.gov ♦ PPPL WEEKLY is archived on the web at: <http://www.pppl.gov/ppplweekly.cfm>