

At PPPL THIS WEEK

WEDNESDAY, APR. 8

Colloquium

4:15 p.m. ♦ MBG Auditorium
[Type II Solar Radio Bursts: From Fundamental Plasma Physics to Space Weather Research](#)

Professor Iver Cairns, University of Sydney - School of Physics

THURSDAY, APR. 9

Colloquium

4:15 p.m. ♦ MBG Auditorium
[Dawn, the Asteroid Redirect Mission, and the Future of Solar Electric Propulsion](#)

Dr. John Brophy, NASA Jet Propulsion Laboratory

UPCOMING

WEEK OF APR. 13

Lab-wide office cleanup

FRIDAY, APR. 17

Open Public Tour

10 a.m. ♦ LSB Lobby
Email jjackson@pppl.gov to register

TUESDAY, APR. 21

Grounds Cleanup

10:30 a.m.
Lunch for volunteers
April 23 rain date

WEDNESDAY, APR. 22

Earth Day Celebration at PPPL

Exhibits, Earth Day video, and special Earth Day colloquium

THURSDAY, APR. 23

Laboratory Management Meeting

SUNDAY, APR. 26

[Community at Princeton University and downtown Princeton](#)

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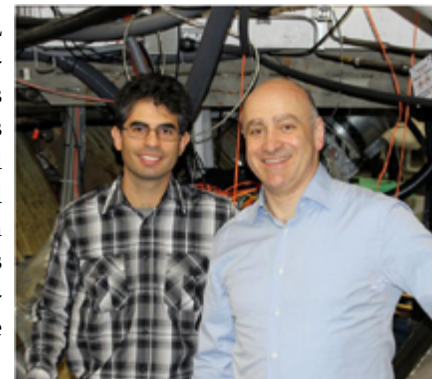
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Scientists make breakthrough in understanding how to control intense heat bursts in fusion experiments

By Raphael Rosen

Researchers from General Atomics and PPPL have made a major breakthrough in understanding how potentially damaging heat bursts inside a fusion reactor can be controlled. Scientists performed the experiments on the DIII-D National Fusion Facility, a tokamak operated by General Atomics in San Diego. The findings represent a key step in predicting how to control heat bursts in future fusion facilities including ITER, an international experiment under construction in France to demonstrate the feasibility of fusion energy.



Carlos Paz-Soldan, left, and Raffi Nazikian at the DIII-D tokamak. (Photo by Lisa Petrillo/General Atomics)

The studies build upon previous work pioneered on DIII-D showing that these intense heat bursts – called “ELMs” for short – could be suppressed with tiny magnetic fields. These

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Guest Corner

Teamwork and the “Jaws of Life” help solve a weighty problem



By Fran White, head of the Site Protection Division, ESH&S

Teamwork and collaboration are a critical part of the culture here at PPPL. So is the Emergency Services Unit’s (ESU) desire to practice and refine its emergency rescue expertise. Recently, all of these attributes came together as members of the ESU teamed with the modulator/regulator (mod/reg) vault demolition team by using hydraulic rescue tools (better known as the “Jaws of Life”) to facilitate the safe demolition of a large, unwieldy concrete slab.

The slab was removed to create space for a new low-temperature plasma lab in the RF Building, which is part of PPPL’s campus plan. In order to do this, the C-Site neutral beam mod/reg vault needed to be disassembled and the concrete slab beneath it removed.

A bit of history on the mod/reg: They were originally built for the Princeton Large Torus (PLT) in the ‘70s and acted as a big series of switches to precisely control the high-voltage pulse needed for the neutral-beam ion sources. The apparatus was decommissioned in the early ‘90s but successfully reactivated in 2003-2004 to show readiness for the National Compact Stellarator Experiment (NCSX).

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ELMs Mitigation

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tiny fields cause the edge of the plasma to smoothly release heat, thereby avoiding the damaging heat bursts. But until now, scientists did not understand how these fields worked. “Many mysteries surrounded how the plasma distorts to suppress these heat bursts,” said Carlos Paz-Soldan, a General Atomics scientist and lead author of the first of the two papers that reported the seminal findings back-to-back in the same issue of Physical Review Letters in March.

Multi-institutional team

Paz-Soldan and a multi-institutional team of researchers found that tiny magnetic fields applied to the device can create two distinct kinds of response, rather than just one response as previously thought. The new response produces a ripple in the magnetic field near the plasma edge, allowing more heat to leak out at just the right rate to avert the intense heat bursts. Researchers applied the magnetic fields by running electrical current through coils around the plasma. Pickup coils then detected the plasma response, much as the microphone on a guitar picks up string vibrations.

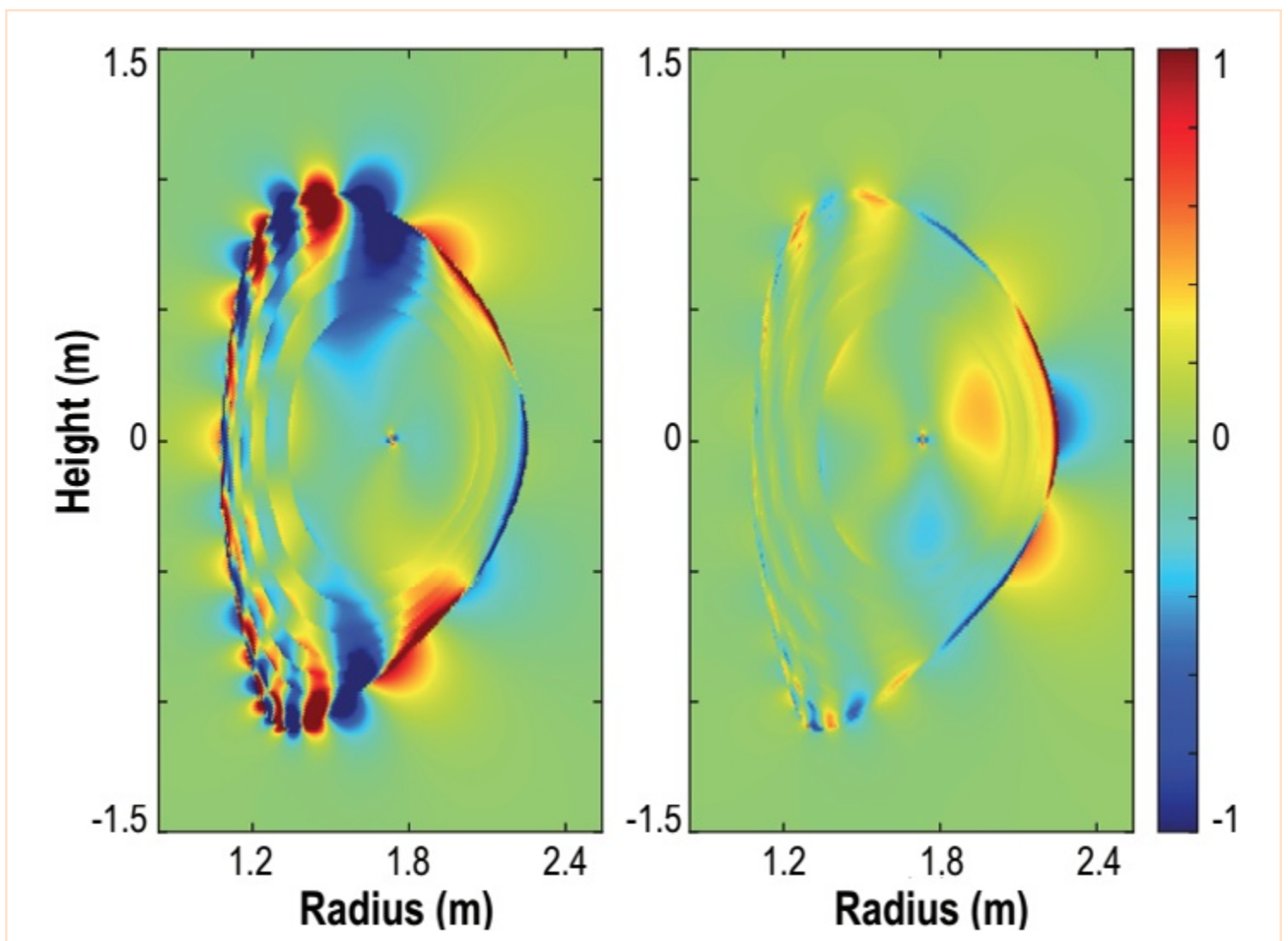
The second result, led by PPPL scientist Raffi Nazikian, who heads the PPPL research team at DIII-D, identified the changes in the plasma that lead to the suppression of the large edge heat bursts or ELMs. The team found clear evidence that the plasma was deforming in just the way needed to allow the heat to slowly leak out. The measured magnetic distortions of the plasma edge indicated that the magnetic field was gently tearing in a narrow layer, a key prediction for how heat bursts can be prevented. “The configuration

changes suddenly when the plasma is tapped in a certain way,” Nazikian said, “and it is this response that suppresses the ELMs.”

The work involved a multi-institutional team of researchers who for years have been working toward an understanding of this process. These researchers included people from General Atomics, PPPL, Oak Ridge National Laboratory, Columbia University, Australian National University, the University of California-San Diego, the University of Wisconsin-Madison, and several others.

The new results suggest further possibilities for tuning the magnetic fields to make ELM-control easier. These findings point the way to overcoming a persistent barrier to sustained fusion reactions. “The identification of the physical processes that lead to ELM suppression when applying a small 3D magnetic field to the inherently 2D tokamak field provides new confidence that such a technique can be optimized in eliminating ELMs in ITER and future fusion devices,” said Mickey Wade, the DIII-D program director.

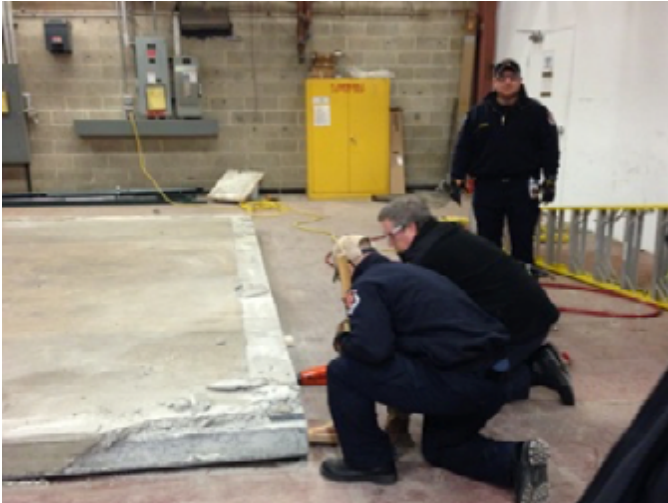
The results further highlight the value of the long-term multi-institutional collaboration between General Atomics, PPPL and other institutions in DIII-D research. This collaboration, said Wade, “was instrumental in developing the best experiment possible, realizing the significance of the results, and carrying out the analysis that led to publication of these important findings.”



Computer simulation of a cross-section of a DIII-D plasma responding to tiny magnetic fields. The left image models the response that suppressed the ELMs while the right image shows a response that was ineffective. Simulation by General Atomics.



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ESU members use a “Jaws of Life” to help lift a concrete slab. From left: Training Coordinator Jamie Dunnigan, ESU Driver/Operator Robert Lamb and Capt. Howard Caruso (Photo by Steven DePasquale)

Disassembling such a structure is very complicated. The vault housed four identical mod/reg, each containing a large high-voltage transformer submerged in oil, a high-power tetrode vacuum tube, and various other control circuitry, cabling and cooling-water piping. The entire structure was some 12-feet-high, 17-feet-wide and built atop a concrete slab with a lip of concrete blocks around the perimeter to prevent oil spills and contamination. The concrete slab alone weighed close to 12,000 pounds and was resting on a floor embedded with a continuous sheet of copper for RF shielding that was glued together with asbestos-containing material.

The disassembly was creative, well designed, integrated, and safe. The superstructure of the mod/reg enclosure proved no match for the efforts of many PPPL’ers, including the cognizant engineer Steve DePasquale, technician Tim Conwell, and the general mechanics crew, together with technician Ed Bush and the neutral beam crew and many others from neutral beams, RF, AC power, Powers Electric, the tech shop, Facilities, ESH&S, fire protection, and telecommunications.

After the superstructure was removed, the concrete slab on which it was built needed to be demolished. But the demolition would generate excessive noise, dust, debris, and potential asbestos exposure, all occurring in a sensitive experimental area.

Enter Driver/Operator Bob Lamb from the ESU who, while issuing a flame permit, noticed workers attempting to drive wooden wedges under the edges of the concrete slab to lift it off the subfloor. Bob suggested to Steve and Tim that ESU hydraulic rescue tools could be used to safely raise the slab off the floor.

After discussing and reviewing the safety of the plan, other members of the Site Protection Division including Training Coordinator Jamie Dunnigan, Capt. Howard Caruso, and Officer Jeff Chaplin, joined Lamb in using the hydraulic rescue tools from Fire Engine 66. As a team, they methodically worked their way around the concrete slab, slowly lifting and bracing, lifting and bracing.

According to Steve, “within minutes, a third of the slab was elevated and broken away from the rest.” Using leverage, four-by-fours and gravity, the group safely broke the entire slab into three pieces. These pieces were elevated from the floor, so any future cutting would be much easier and would not risk damaging the floor or disturbing the asbestos-laden copper beneath.

Later, Tim Conwell’s general-mechanics crew from Facilities jackhammered and saw-cut the large concrete pieces into smaller pieces and used a forklift along with dollies to easily and safely remove the debris.

No fuss, less dust—and no asbestos contamination!



The concrete slab after it was successfully lifted off the ground. (Photo by Steve DePasquale)

This example of collaboration is happily a regular occurrence at PPPL, where teamwork and collaboration – coupled with Integrated Safety Management techniques – lead to effectiveness, efficiency, and accomplishment. As Steve noted in this example, the officers “worked with a marked professionalism that clearly comes from years of practice together...and they saved us weeks of tedious and potentially hazardous labor and eliminated all danger of disturbing the asbestos-laden flooring below.”

As for the ESU officers, they not only got to work with other PPPL’ers, but were able to practice together and keep their rescue skills sharp for life-saving missions. As Steve observed, “As the team from ESU communicated among themselves, sometimes with hand-gestures, I kept picturing them doing the same work out on Route 1 saving someone’s life after an auto accident.” 📍

Steve DePasquale, Mike Viola, and Tim Stevenson contributed to this article.



The “Jaws of Life” equipment that lifted the concrete slab. (Photo by Sean Galie)



I AM THE LAB

Andrea Moten



Andrea Moten finds gratification in finding and hiring new employees

If you were hired at PPPL over the last 16 years, chances are you met Andrea Moten when you first got the job. Moten, who is now deputy to the director of Human Resources, is in charge of hiring new employees and enjoys the process of helping managers find the right person for the job. She supervises the training function and as the Lab's diversity officer helps to ensure that the environment is diverse and inclusive.

Moten says the field of Human Resources is a good fit for her strong personal and interpersonal skills. She enjoys working with people and brings her even temper, patience and compassion to a job in which people need help with everything from what documents are needed for employment to assisting an employee with how to handle a difficult work situation.

A lifelong resident of New Jersey, Moten grew up in Jersey City and graduated from Seton Hall University with a bachelor's degree in computer science and an MBA. She worked with the New Jersey Department of Higher Education's Educational Opportunity Fund, administering the grant program for financially disadvantaged college students, before joining the Prudential main office in the Human Resources Department for the comptroller's division. She joined Princeton University's Human Resources Department in 1995 and after nearly four years on the main campus transferred to PPPL. She and her husband, Greg, an architect who is technical director for Gensler in Morristown, live in Somerset. They met while commuting to their jobs on New Jersey Transit. Greg graduated from Princeton University in 1983 in the same class as University President Chris Eisgruber and Craig Robinson, the brother of First Lady Michelle Obama. The couple have two daughters: Camille, 25, a marketing and enrollment director at DePaul School in Philadelphia, and Maya, 19, a freshman majoring in engineering at Dartmouth College and a former intern at PPPL. Moten is involved in her church and is very active in community service projects through her sorority.

What is the most fun or rewarding thing about your job?

Hands down the most rewarding thing is being able to offer employment to people.

The reactions never get old. I get to hear and experience all kinds of reactions. From tears because a person has been out of work for two years, to pure excitement when it's a first "real" job. I even enjoy the more difficult conversations when I am trying to convince someone to take the position with us and not Lockheed Martin or Google (I lost that one).

How would you describe yourself in relation to your work? Are you a people person?

The field of HR suits me, my interests and my personality. Most people might think I am an extrovert, but while I have that characteristic, I love my personal space and quiet time.

I am an even-tempered person, not quick to judge or have a knee-jerk reaction to situations. However, I can be extremely passionate about those things that I truly believe in. I think one of my key strengths as it relates to HR is not only my technical knowledge of HR, but the interpersonal skills that help me talk folks off the ledge, provide a sounding board and be a problem solver, which benefits both the organization and the PPPL employees.

In addition to your regular job, what other activities do you do at PPPL?

I am currently head of the Diversity and Inclusion Working Group. The goal of the group is to make PPPL a workplace that is inclusive and a place where individuals are respected and feel that they can grow. Competition for talent is tough and is only going to get tougher. If we want to stand out and remain an employer of choice we have to welcome and respect the talents of all types of people – even if they may seem "different." As Stephen Covey [author of "The 7 Habits of Highly Effective People"] said, "Strength lies in our differences, not similarities."

Can you discuss your activities outside work?

I am a board member of the Princetonians of Color (PCN) Employee Resource Group on the main campus.

I am a 35-year member of Alpha Kappa Alpha Sorority, Inc. the nation's first sorority established for women of color. The major focus of the sorority is scholarship, the education of our youth, and service to the community. I am an incorporator, board member and former president of PEARLS (Pursue Education and Really Learn Something), Inc., the charitable arm of my sorority. I also spend time volunteering at the First Baptist Church of Lincoln Garden's bookstore

How did you manage to balance work and family life?


One of the most challenging periods of my life was balancing work and family.

My children were very active in sports, dance, theater, after-school enrichment programs – you name it. I was blessed to have a solid community of family and friends and was lucky to work in an environment where I was able to get to the important events and activities in my children's lives. It was not without some professional and personal sacrifices but in the end, to me, it was well worth it.

What do you tell your friends and family about PPPL?

My family and friends know that I feel that PPPL is a great place to work. The mission of the Lab is exciting, and helping people inside and outside of the organization is what fuels me.

What is one thing you'd like PPPL'ers to know about you or your job?

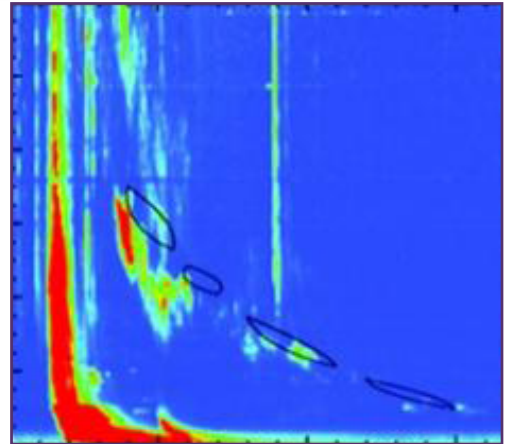
I have hired or been a part of the hiring process for 58 percent of the current staff and countless others who have passed through PPPL. 

COLLOQUIUM

Type II Solar Radio Bursts: From Fundamental Plasma Physics to Space Weather Research

Professor Iver Cairns

University of Sydney - School of Physics



Wednesday, April 8

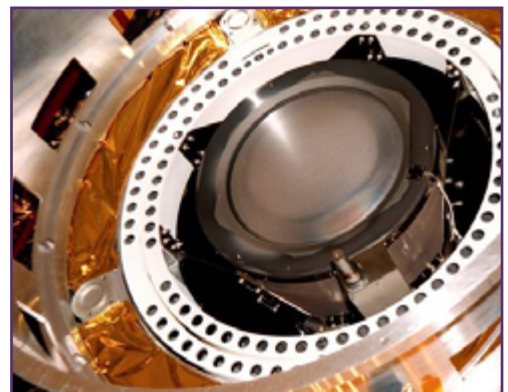
4:15 p.m. (coffee/tea at 4 p.m.)

M.B.G Auditorium, Lyman Spitzer Building

Dawn, the Asteroid Redirect Mission, and the Future of Solar Electric Propulsion

Dr. John Brophy

NASA Jet Propulsion Laboratory



Thursday, April 9

4:15 p.m. (coffee/tea at 4 p.m.)

M.B.G Auditorium, Lyman Spitzer Building

Math meets plasma physics

Mathematician Cédric Villani describes his struggle to develop a theorem for Landau damping, which creates stability in plasma, in a five-part BBC reading from his book "Birth of a Theorem." Villani developed the core of his theorem as a visiting scholar at the Institute for Advanced Study, during which time he

briefly encountered PPPL physicist Greg Hammett and toured the Laboratory. His work earned Villani the Fields Medal, the top honor for mathematicians under the age of 40. Each 15-minute reading is available for a limited period, with the first available through Tuesday and the last through Saturday.

[All five episodes are available here.](#)

Brock & Co. Presents The Celebrity Guest Chef Series

Some of the biggest names in the business, from Gordon Ramsey to Paula Dean, will be right here at The Brock Café... Kind of.

Each month we will feature some of the favorite dishes of some of today's brightest culinary stars, preparing the recipes from the "Guest Chef's" own cookbook.

Everyone who purchases the featured special will not only enjoy a wonderful meal, but will also be entered into a drawing to win one of several of the "Guest Chef's" cookbooks that will be given away that day.

APRIL: Alton Brown
"Feasting on Asphalt"

MAY: Anthony Bourdain
"Les Halles"

JUNE: Paula Dean
"Southern Cooking Bible"

BROCK

MARK GAZO
Chef Manager



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.

	Monday April 6	Tuesday April 7	Wednesday April 8	Thursday April 9	Friday April 10
COMMAND PERFORMANCE Chef's Feature	CELEBRATING MAJOR LEAGUE BASEBALL Choice of Pasta with Red or White Clam Sauce	Black Bean Quesadilla with Marinated Vegetables & Brown Rice	Chicken, Sausage, Shrimp Jambalaya	Garlic Rosemary Pork Served with Braised Cabbage & Fried Pierogies	Breaded Fried Tilapia with Creamy Dijon Caper Sauce Served with Rice & Vegetable
Early Riser	Blueberry Pancakes Served with Sausage	French Toast Bread Pudding	Two Eggs Any Style Served with Smothered Hash Browns	Bananas Foster French Toast	Sausage, Egg & Cheese Croissant
Country Kettle	Black Bean with Turkey	Minestrone	Beef Barley	Escarole, Chicken & Pasta	Navy Bean with Spinach & Tomato
Grille Special	Philly Cheesesteak Served with Cracker Jacks	Shredded Pork Tacos with Pickled Red Onion and Slaw	Tuna Melt with Swiss & Tomato on Rye	Whole Wheat Pizza Supreme with Turkey Sausage & Cheese	Fried Ravioli with Marinara Sauce
Deli Special	Hot Soft Pretzel with Nacho Cheese Sauce	Pastrami & Cheddar Cheese on an Onion Roll	Corned Beef on Rye with Coleslaw, Swiss Cheese & Russian Dressing	Fried Flounder Torpedo with Bang Bang Sauce	Cobb Salad Wrap
Panini	Foot-Long Ball Park Frank Served with Boston Baked Beans	Fried Eggplant, Salami, Fresh Mozzarella, Roasted Pepper & Pesto Mayo Ciabatta	Chicken, Wild Mushrooms & Swiss Cheese Quesadilla	Broccoli, Spinach, Roasted Pepper, Onion, Mushroom, Artichoke & Mozzarella Quesadilla with Chipotle Ranch	Roast Beef, Swiss, Spinach, Roasted Peppers & Honey Mustard

MENU SUBJECT TO CHANGE WITHOUT NOTICE

Menu Item is in keeping with American Heart Association (AHA) and U.S. Department of Agriculture (USDA) guidelines.

VEGETARIAN OPTION

WEEKLY

Editor: **Jeanne Jackson DeVoe** ♦ Layout and graphic design: **Kyle Palmer**

Photography: **Elle Starkman** ♦ Science Editor: **John Greenwald** ♦ 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 WEDNESDAY. Other stories should be submitted no later than noon on TUESDAY.

Comments: commteam@pppl.gov ♦ PPPL WEEKLY is archived on the web at: <http://w3.pppl.gov/communications/weekly/>.