



**U.S. Burning Plasma Organization e-News**  
**February 15, 2008 (Issue 17)**

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*Dear Burning Plasma Aficionados:*

This newsletter provides a short update on U.S. Burning Plasma Organization activities. E-News is also available online at <http://burningplasma.org/enews.html>. Comments on articles in the newsletter may be sent to the editor (R. Nazikian [mnazikian@pppl.gov](mailto:mnazikian@pppl.gov)) or assistant editor (Emily Hooks [ehooks@mail.utexas.edu](mailto:ehooks@mail.utexas.edu)).

Thank you for your interest in Burning Plasma research in the U.S.!

**Director's Corner** by J. Van Dam

I'm writing this month's column on Valentine's Day, so it seems appropriate to express heartfelt appreciation to a number of people, while also commenting on some recent events.

**STAC Issue Working Groups:** To begin with, a number of US scientists are working very hard to address urgent issues concerning the ITER design. International working groups have been set up for each of the issues that had been highlighted at the September 2007 meeting of the Science and Technology Advisory Committee. On the US side, this effort is being coordinated by Brad Nelson, engineering manager for the US ITER Project Office. Our profound thanks to all of these people for their valuable work. Their conclusions will be reviewed at a special STAC meeting to be held April 7-9. The STAC will also hold a regular meeting a month later (May 19-21) to review the proposed cost and schedule impacts of the changes that will be a part of the Overall Project Cost and Overall Project Schedule documents being prepared by the ITER Organization.

**Burning plasma outreach materials:** This week the 2008 annual meeting of the American Association for the Advancement of Science is being held (February 14-18, Boston). On Saturday, February 16, there will be a symposium on magnetic fusion energy research, with six distinguished speakers (<http://www.aaas.org/meetings/>). During the entire meeting, the US ITER Project Office will have an exhibit about the ITER facility. The exhibition booth features a scale model of the ITER device, display panels that describe the history and mission of the international project, and a 3D movie. The movie begins with an outside view of the Cadarache site, then zooms inside the building that will house the facility, shows a cutaway of the device itself, and further zooms into the plasma to show how it is heated to 100 million degrees. The work on developing these outreach materials was led by Bonnie Hebert of the USIPO, with assistance from the ORNL Creative Media Department. Thanks to Don Batchelor of the USBPO, who provided a good deal of technical input about burning plasma science, including ICRF wave simulations for the 3D movie and a fusion-theme computer game for children.

**International Tokamak Physics Activity (ITPA):** The US part of the ITPA and the USBPO were merged on the US national level last year, so that the US members of the ITPA are now part of the USBPO and USBPO topical group members can contribute to ITPA activities. The ITPA on the international level is in the process of being re-organized so as to come under the auspices of the ITER Organization, according to a revised charter that has been approved by the international partners. Upcoming ITPA meetings are listed on the calendar of events in each issue of *eNews*, as well as on the USBPO web page (<http://burningplasma.org/events.html>). The next such meeting is of the MHD Topical Group, in Naka, Japan, February 25-29. We are discussing how we could schedule pre-meeting discussions and/or post-meeting reports from US ITPA participants in order to enhance the flow of information related to these meetings. Feedback and suggestions from USBPO members would be welcomed.

**Transport Task Force (TTF) Meeting:** Here is an advance notice for USBPOers who plan to attend the annual TTF Meeting (March 25-28, Boulder, CO). Wayne Houlberg, who newly joined the Fusion Science and Technology Department of the ITER Organization, will give a talk about transport and integrated modeling needs for ITER. A special evening session during the TTF Meeting has been scheduled for his presentation.

**Budget Planning Meeting:** Two presentations from the USBPO are on the agenda for the annual OFES Budget Planning Meeting (March 11 and 12, Gaithersburg, MD). One will be an update about USBPO activities, and the other will describe US involvement in the STAC issue working groups. The latter talk will be given by Dr. Rich Hawryluk, a primary scientific leader for this effort.

**FY09 fusion budget:** The presidential budget proposal for FY 2009 was released two weeks ago, on February 4. It contains a large increase for fusion energy sciences, including the US commitment of \$214M for ITER construction. Next week Thursday (February 21), many of us will have an opportunity to visit congressional offices in Washington, D.C., in connection with the annual Fusion Education Day. We hope that this favorable budget will hold up during this election year.

**Verification and Validation:** Last year, the USBPO Transport Task Force, led by Paul Terry and Ed Doyle, organized a special task group on the subject of verification and validation (V&V), a topic of increasing importance for theory and simulations of burning plasmas. The task group came up with several original contributions to the subject of V&V. The draft of their paper is now ready to be submitted for publication.

**Congratulations:** A member of the USBPO Council, Steve Cowley, who is currently a professor of physics at UCLA with a part-time appointment also at Imperial College London, has been selected to become the next director of UKAEA Culham Laboratory. We wish him all the best.

**Appreciation:** Thanks to all the members of the USBPO Council and the leaders and deputy leaders of the 12 Topical Groups for their considerable investment of time and effort. Thanks also to Emily Hooks, our reliable USBPO Administrator, for her indefatigable administrative services, and to Jim DeKock, for managing the web site. And last, but certainly not least, thanks to Raffi Nazikian for faithfully ensuring that this newsletter is published every month!

## 📣 **Announcements**

*Submit BPO-related announcements for next month's eNews to Raffi Nazikian at [rnazikian@pppl.gov](mailto:rnazikian@pppl.gov).*

## **Reports**

### **Updates on ITER Science and Technology Advisory Committee (ITER-STAC) Activities**

#### **Task T01a: vertical stability control by Dave Humphreys**

The ITER Design Review of 2007 identified several critical issues still to be addressed before certain elements of the construction phase of ITER should proceed. The ITER Parties are presently engaged in a set of R&D tasks mandated by the ITER STAC to resolve these issues. STAC Task T01a involves analysis of various candidate solutions to address limitations in vertical stability control capability identified in the Design Review. Proposals for augmenting the vertical plasma control capability in ITER include increasing voltage capability of key PF coils, adding copper active control coils either in-vessel or between the vacuum vessel walls, and/or adding in-vessel copper passive stabilizing structures to reduce the instability growth rate. All of these approaches would have a significant impact on the engineering design. Analysis to date indicates that

several of these candidate approaches would bring the ITER vertical stability control capability up to the level found necessary in present devices. Analysis is continuing.

### **Tasks T01b & c by Chuck Kessel**

STAC Task T01b&c involves the plasma shape control and volt-second capability of ITER. The STAC requests the assessment of PF coil current capabilities over a range of planned operating scenarios and determination of whether current saturation can be avoided while maintaining plasma control. If more PF coil current is required to startup and control the plasma, one possibility is to subcool the PF coils to gain more current carrying capacity. In addition, the group is asked to assess methods for conserving volt-seconds in the current ramp up phase in order to guarantee the 400 sec flat top burn at 15 MA. The work plan for this area has 5 major components, 1) definition of operating space available with the existing PF coils, and with upgrades to PF coils, 2) establishment of the feedback control current headroom required in each PF coil, 3) benchmarking studies between the free-boundary evolution codes used (such as DINA, TSC, CORSICA), 4) documentation of present tokamak experimental experience in plasma startup and flat top. The magnet division at the IO has already begun to redefine some PF coils requirements and capabilities based on the STAC review. The STAC assessment will contribute to decisions on a range of possible upgrades to allow a more robust operating space for ITER.

## **2008 BPO-Related Meetings**

Feb 14-18

[Am Assoc for the Advancement of Science Annual Mtg](#)

Boston, MA

Feb 19-20

[US DOE FESAC Public Meeting](#)

Gaithersburg, MD

Feb 20-22

[IAEA Int'l Wksp on Challenges in Plasma Spectroscopy for Future Fusion Research Machines](#)

Jaipur, India

Feb 25-29

ITPA MHD Topical Group Mtg / US-Japan MHD Wksp / IEA Wksp on ELM & RWM control

Naka, Japan

Mar 10-13

[15th Joint Workshop on Electron Cyclotron Emission & Electron Cyclotron Resonance Heating](#)

Yosemite, CA

Mar 24-28

[Progress in Electromagnetics Research Symposium](#)

Hangzhou, China

Mar 25-28

[21<sup>st</sup> US Transport Taskforce Wksp](#)

Boulder, CO

Mar 30-Apr2

[2008 International Sherwood Fusion Theory Conference](#)

Boulder, CO

Apr 1-4

[35th Annual Conf on the IOP Plasma Physics Group](#)

London, UK

Apr 7-9

ITER Science and Technology Advisory Committee Mtg

Cadarache, France

Apr 12-15

[International Conference on HEDP/HEDLA-08](#)

St. Louis, MO

Apr 15-18

ITPA Diagnostics Topical Group Mtg

Lausanne, Switzerland

Apr 22-24

ITPA SSO Topical Group Mtg

Boston, MA

Apr 22-25

ITPA TP, CDBM Topical Group Mtg  
Oakridge, TN

Apr 28-30  
ITPA Ped Topical Group Mtg  
San Diego, CA

May 5-6  
[PRC Magnetic Fusion Collaboration Wksp](#)  
Austin, TX

May 11-15  
[17th High-Temperature Plasma Diagnostics Conference](#)  
Albuquerque, NM

May 12-16  
[6th Int'l Symp on Non-Thermal Plasma Technology](#)  
Taipei, Taiwan

May 15-16  
[Magnetics 2008 Conference](#)  
Denver, CO

May 18-23  
[5th Int'l Conf on Physics of Dusty Plasma](#)  
Ponta Delgada, Azores, Portugal

May 26-28  
[18th Int'l Conf on Plasma Surface Interactions in Controlled Fusion Devices \(PSI-18\)](#)  
Toledo, Spain

Jun TBD  
ITPA CC Topical Group Mtg  
Location TBD

Jun 8-12  
[ANS Annual Meeting](#)  
Anaheim, CA

Jun 9-13  
[35th EPS Conference on Plasma Physics](#)  
Hersonissos, Crete, Greece

Jun 15-19  
[35<sup>th</sup> IEEE International Conference on Plasma Science \(ICOPS2008\)](#)  
Karlsruhe, Germany

Jun 15-19  
[23rd Symposium on Plasma Physics and Technology](#)  
Prague, Czech Republic

Jun 24-27  
Innovative Confinement Concepts  
Reno, NV

Jul 6-11

[17th Int'l Conf on High-Power Particle Beams \(BEAMS'08\)](#)

Xi'an, China

Jul 13-20

[37th Scientific Assembly of the Committee on Space Research and Associated Events \(COSPAR 2008\)](#)

Montreal, Canada

Jul 15-19

[19th Europhysics Conf on the Atomic and Molecular Physics of Ionized Gases \(ESCAMPIG-2008\)](#)

Granada, Spain

Jul 27-Aug 2

[7<sup>th</sup> International Wksp on Strong Microwaves: Sources and Applications](#)

Nizhny Novgorod, Russia

Aug 25-29

[24<sup>th</sup> Summer School & International Symp on the Physics of Ionized Gases](#)

Novi Sad, Serbia

Sep 1-4

[13th EU-US TTF Wksp](#)

Copenhagen, Denmark

Sep 8-12

[Int'l Congress on Plasma Physics](#)

Fukuoka, Japan

Sep 15-18

ITPA SolDiv Topical Group Mtg

Japan

Sep 15-19

[25th Symp on Fusion Technology \(SOFT\)](#)

Rostock, Germany

Sep 22-27

[Int'l Conf & School on Plasma Physics & Controlled Fusion and 3rd Alushta Int'l Wksp on the Role of Electric Fields in Plasma Confinement in Stellarators and Tokamaks](#)

Crimea, Ukraine

Sep 25-27

[18th IAEA Technical Mtg on Research using Small Fusion Devices](#)

Crimea, Ukraine

Sep 28-Oct 2

[18th ANS Topical Mtg on the Technology of Fusion Energy](#)

San Francisco, CA

Sep 29-Oct 2

[coNuSS 2008](#)

Belgrade, Serbia

Oct 12-18

[22nd IAEA Fusion Energy Conf - 50th Anniversary of Controlled Nuclear Fusion Research](#)

Geneva, Switzerland

Oct 20-25

[11th Int'l Conf on Electrostatic Precipitation \(ICESP-XI\)](#)

Hangzhou, China

Oct 20-22

ITPA CBDM, Transport, and Pedestal & Edge Physics Mtgs  
Milan, Italy

Oct 20-22

ITPA MHD Topical Group Mtg  
Lausanne, Switzerland

Oct 20-23

ITPA SSO Topical Group Mtg  
Location TBD

Nov TBD

ITPA/IEA Joint Experiment Coordination Mtg  
Location TBD

Nov 9-13

[ANS Winter Meeting](#)

Reno, NV

Nov 17-21

[50th APS-DPP](#)

Dallas, TX

Nov 23-25

MHD Control Wksp  
Austin, TX

Nov/Dec TBD

ITPA Diagnostics Topical Group Mtg  
IPR, India

*Please submit your 2008 events to Emily Hooks at [ehooks@mail.utexas.edu](mailto:ehooks@mail.utexas.edu).*

For more Fusion Research-related events, visit the USBPO Upcoming Events page online at <http://burningplasma.org/events.html>.