Looking back in satisfaction: first review of cooperation between ITER & CERN

Last week saw the third meeting of the CERN-ITER Steering Committee. The committee was set up within the scope of the Cooperation Agreement between the two Organizations with the aim of sharing knowledge and information on technologies such as superconductivity, magnet coils and cryogenics.

Since its implementation in 2006 the collaboration has assisted the ITER Organization and the Domestic Agencies on various projects such as preparing technical specifications for the Procurement Arrangements for ITER's Toroidal Field Coils, conducting the tests for the Poloidal Field Insert Coil in Naka, Japan, and the development of High Temperature Superconductor Current Leads together with the Chinese Domestic Agency.

"Looking back, the year 2008 has been very successful, summarized Arnaud Devred, Section Leader for the Superconductor Systems & Auxiliaries and together with Neil Mitchell, Head of the Magnet Division, the ITER representatives on the Steering Committee. "Six out of seven tasks defined last year have been completed. All except instrumentation were finished."

One example that proves that this cooperation is more than a paper agreement is the fact that CERN staff witnessed the PF insert tests in Naka, explains Neil Mitchell. "Experts from CERN assisted us to define the requirements and finally run the tests in the Japanese test facility."

"Working for fusion is not within our mandate, although links always existed between fusion and high-energy physics, and the LHC benefited from Tore Supra's experience 20 years ago", explains

News

Final Design Review for ITER Divertor

Starting tomorrow, Tuesday, 2 December, the final design review for the ITER Divertor will take place in Cadarache. The three day meeting will be attended by about 50 experts from the ITER Organization, the Domestic Agencies concerned (EU, JA, RF) plus additional experts. The Panel will be chaired by Rene Raffray from the US. Prior to this meeting we talked to Mario Merola, Divertor Section Leader, about the goal of this review and the roadmap for the next months to come.

Newsline: Last year we went through a very comprehensive design review of the ITER machine as a whole. Why is this specific design review focusing on the divertor necessary?

Merola: Design reviews are an integral part of the systems engineering process. They are conducted to assess whether the proposed solution meets the design input requirements and whether the proposed solution is the most robust, efficient and effective solution to achieve the product requirements. With this specific design review we also want to assess the status of the design in terms of the completeness of the drawings and specifications. In particular, this final design review is mandatory for Quality Class 1 components like the divertor at the completion of the detailed design phase and before the signature of the Procurement Arrangement. It thus forms an important part of the ITER Quality Assurance Programme.

What are the key issues of this design review? Are we talking about choice of material or design?

All the features that may have an impact on the divertor design will be reviewed. After an overview of the ITER divertor requirements and physics basis, the divertor design will be presented, including all the physical interfaces concerned and a description of how the divertor system is integrated into the machine. The design supporting analysis will also be assessed as well as the manufacturing issues. These are of particular importance since the divertor is one of the most technically challenging components of the ITER machine. The remote handling, the assembly procedure as well as the proposed schedule are also key features and form part of the review.

There has been a proposal from Europe to implement an all-tungsten divertor right from the start of ITER operations? What is the status of this proposal?

As a result of the review by the Scientific and Technical Advisory Committee (STAC) of the 2007 ITER baseline design, the Topical Working Group (TWG) 07 "Divertor Armour Strategy" was established in November 2007. This Group included experts from the ITER Organization, and from the EU, RF, JA, US, CN and KO Domestic.

Local

Vinon goes photovoltaic

Five kilometres south of Vinon-sur-Verdon, the familiar landscape of rolling hills, ploughed fields and pastures suddenly changes into a science-fiction scene. Hundreds upon hundreds of aluminium frames, facing upward, seem to be waiting for a message from outer space.

The message will come soon and it will be in the form of energy — once the frames are all fitted with solar panels, which should be done by 1 March, 2009, the 10.4 hectares park will start feeding electricity into the nearby high voltage power grid.

What Solaire-Direct is building here is France's largest photovoltaic park. The company, founded two years ago, wanted the place to be a "showcase" for their expertise, spectacular and visible from afar. They've definitely succeeded in this...

"Generating 4.2 MW, which will amount to an input of 9 GWh per year into the national grid, is not trivial" says Thierry Leperq, Solaire-Direct's president. "It is enough to meet the needs of 4,000 households, the equivalent of the village of Vinon."

By the end of March, 2009, the 10.4 hectares park will start feeding electricity into the nearby high voltage power grid.

Of course, the electricity produced by the 18,860 solar panels will not go directly into the Vinonnais's appliances. Regulations require EDF, the French utility, to buy all privately produced electricity before feeding it into the grid.

"The system holds because the economic model is a bit artificial, acknowledges Claude Cheilan, Vinon's newly elected mayor. For the next 20 years EDF will buy the electricity produced by this park at three times the market price. ..."

Solaire-Direct, who has invested 18 million euros in the venture, expects a return on investment in 15 to 20 years. But Vinon's photovoltaic park is not only about business. Says Thierry Leperq: "We will be paying the Manosque Communauté de communes,
Philippe Lebrun, Head of the Accelerator Technology Department in CERN. “But this cooperation is about transferring and sharing technology. CERN is a model for International Cooperation and we do have some experience in how to share technology and development across the globe. We do not have to invent the wheel twice.”

Announcements

First announcement of ITER Vacuum Leak Localisation Workshop

Leaks into ITER vacuums during operations will occur even with a strong strategy to engineer ITER for maximum availability. Without means to effectively detect and localize leaks on ITER then the project goals and timescales will be jeopardized. A workshop is thus being organized in February 2009 to bring together experts in different fields from across the world and identify possible techniques which could be adapted or developed to solve the ITER leak localisation issues. In addition, as the methodologies of leak localisation must be integral with key component designs, participation of IO and DA designers is essential. In particular the main systems affected would be blanket water manifold, blanket modules, divertor cassettes, port plugs, water system, thermal shields, magnets, vacuum vessel, and remote handling.

For further information, register interest, and to make proposals please contact: Robert Pearce, Vacuum Section Leader —Robert.Pearce@ITER.org

TU Berlin seeks Professor for Plasma Physics

The Technical University of Berlin intends to fill the post of University professor in experimental plasma physics, W2 (Ref. No. II-776), in its Centre for Astronomy and Astrophysics. The post is a joint appointment (S-Professor) within the framework of a co-operation agreement between the Technical University of Berlin and the Max-Planck-Institute for Plasmaphysics in Garching/Greifswald.

The focus of the appointment lies in the area of experimental plasma astrophysics (laboratory astrophysics, high temperature plasmas, cold plasmas, spectroscopy). It is expected that the successful candidate will represent the discipline in research and be active in acquiring contract funding. He or she will also be involved in the Bachelor and Masters teaching programme of the Centre for Astronomy and Astrophysics. The teaching duties involve five hours a week (5 SWS).

Candidates must fulfil the requirements for professorial appointments according to art. 100 of the Hochschulgesetz (BerlHG), and have teaching experience and an outstanding research record in the area of experimental plasma physics.

Written applications (quoting the reference number II-776) with the usual documentation should be sent to the President of the Technische Universität Berlin, Fakultaet II Mathematik und Naturwissenschaften—Geschaeftsstelle Physik, Sekretariat EW 2-1, Hardenbergstr. 36, 10623 Berlin by 31.01.2009.

Agencies. The conclusions were reported at the STAC meeting of May 2008. It was identified that operation with a carbon fibre reinforced carbon composite (CFC) target has advantages for the start of ITER operation given its proven range of compatibility with a number of plasma conditions in present devices, particularly at low densities with significant additional heating. CFC also promises to make the development of techniques for ELM control and disruption mitigation easier by taking advantage of the larger tolerance of the plasma to carbon as opposed to tungsten and its absence of melting. A decision taken now to implement a full-tungsten divertor at start of operation would lead to a significant delay in the project, mainly due to the need to develop and qualify the high heat flux technologies required. Furthermore it would necessarily assume that the related physics R&D, planned for the period until 2013, is successful.

As a consequence, the TWG-07 recommended not to implement a divertor with full-tungsten armour at the start of operations but proposed to support the physics and technology R&D required to qualify the use of tungsten in the divertor starting from the second set of plasma-facing components and almost certainly in advance of DT operation. STAC agreed with the IO recommendation.

Which parties are participating in the divertor design and manufacturing?

The procurement sharing foresees the Inner and Outer Vertical Targets being procured by the EU and Japan respectively. However, the related performance tests during construction will be carried out by the Russian Domestic Agency, which will also procure the Dome. All three divertor plasma-facing components have to be shipped to Europe, to be assembled onto the cassette body, also procured by EU, prior to the final shipment to the ITER site. This complex sharing will bring additional challenges to the technical ones, but I am confident that we will cope with them.

When is the Procurement Arrangement foreseen to be signed?

The PAs for the divertor Plasma-Facing Components will be ready to be signed in February 2009, and for the Cassette Body in July 2009. We have already had several iterations with the DAs concerned and I cannot identify any showstoppers.

As a consequence, I hope that the DAs will sign the PAs soon after we do.

More ITER Babies!

Fusion works!!! Should you ever have had any doubt about it, here is yet another proof: last Friday, Shiori Hasegawa (Admin Division) and her husband Barry Prescott (Project Office) had a beautiful baby girl, called Leyna Prescott. Leyna, weighing 3.3 kg, was born at 07h10 in the morning in Aix Hospital. The ITER team wishes both mother and baby all the best!

Corrigendum:

Last week we happily announced the birth of little Mirosлав Encheva and announced the little boy being the first ITER baby. We were told that this is not correct. On 4 August this year, Olivier Jean, ITER planning officer, became the father of a son called Loann. Then, on 10 September, Olivier to which Vinon belongs, some 60 to 70,000 â€“ per year in professional tax. We have decided to match half that sum and give it to the village to promote local initiatives in the field of renewable energies.*

As for the farmer who has agreed a 40 year lease to Solaire-Direct, he’ll soon be able to bring his sheep back to their familiar pasture: all 10.4 hectares will be seeded and planted with native grass and forbs. “It will grow fast,” says Sébastien Davière, the engineer in charge of construction. “Then the place will become much less oppressive...”

-Robert Amoux

Newcomers

Chang-Hwan Choi

Chang-Hwan Choi joined ITER on November 3rd 2008 as System and Mechanical Engineer in Remote Handling Section of the Tokamak Department.

He previously worked for the Korea Atomic Energy Research Institute.

Chang-Hwan is married and has two daughters. He and his family live in Manosque.

In his spare time he enjoys reading or just taking a well-earned rest.

Sandrine Rosanvallon

Sandrine Rosanvallon joined ITER on November 3rd 2008 as Senior Safety Analysis Technical Officer in the Project Office.

She previously worked for the CEA as part of the fusion Institute and before that spent just over 3 years in JET.

Sandrine is single and lives in Vinon sur Verdon.

Most of her spare time she spends with friends or working on her newly built house, but she also does a lot of swim training.

Wouter van Baaren

Wouter van Baaren joined ITER on November 3rd, 2008 as Section leader, Site Layout and Infrastructure within the Civil Construction and Site Support Office.

For the last 4 years he worked for an architect and engineering company in Holland, and before that — during 6 years — for the Civil Engineering Group at CERN.

Wouter is married and has two daughters of 11 and 13 years old. His family will join him in summer next year. So up until then he will spend most of his spare time on the phone with his family and flying back and forth to Holland. But once his family is here he can start really enjoying Provence and dedicate some time to his favourite pastime activities, triathlon and cross country skiing.

Leyna Prescott

Wouter van Baaren

http://www.iter.org/newsline/issues/60/ITERnewsline.htm
ITER Organization—Newline

The Technical University Berlin wishes to ensure equal opportunities for men and women; it therefore specifically invites women with the above qualifications to apply for this post.

Seriously handicapped persons with equal qualifications will be given preference.

Contact: Sabine Westermayr
[sabine.westermayr@ipp.mpg.de]

9th International Symposium on Fusion Nuclear Technology

This is an announcement of the 9th International Symposium on Fusion Nuclear Technology (ISFNT-9) to be held October 11-16, 2009, in Dalian, China.

Click here to read more...

Seminar on Diagnostic Developments for Quasi Steady-State Operation of the Wendelstein 7-X Stellarator

This Friday, 5 December 2008, Ralf König, Max-Planck IPP Greifswald, will give a seminar on "Diagnostic Developments for Quasi Steady-State Operation of the Wendelstein 7-X Stellarator". The seminar will be given in the Salle de Conférences René GRAVIER, B506, CEA Cadarache, at 11h00.

For more information, contact: Karine Ruiz, tél. +33 (0)442 25 62 60, karine.ruiz@cea.fr

The stellarator W7-X will be equipped with quasi-continuous ECRH heating power of 10 MW at 140 GHz, the pulse length at full power only being limited to 30 minutes by the size of the cooling water reservoir. Monte Carlo simulations show that diagnostic components in direct view of the plasma will be exposed to heat loads of 50-100 kW/m² by plasma radiation alone. At some locations additional convective losses can result in even higher total heat loads of up to 500 kW/m².

We will report about our efforts to find, for various types of diagnostics, ways to cope with high heat loads during long pulse discharges. Without any cooling, components exposed to heat loads of 50 kW/m² can easily reach their radiation equilibrium temperature of the order of 700 °C within 5-10 min. To avoid such temperature excursions we are for example developing actively water cooled windows, which are particularly needed for high optical throughput diagnostic observation systems. Where light levels permit, observation through a pinhole is usually the method of choice. An ITER-like IR/visible endoscope design study for divertor control and observation as well as the design of a toroidal view video diagnostic will be presented. For the interfero-polarimeter as well as for the multichannel interferometer high heat load compatible retroreflectors, which will be integrated into the carbon tiled heat shield at the inner wall, are presently being designed. The thermal analysis of the divertor integrated pop-up Langmuir probe arrays showed that the probe tip temperature can be limited to an acceptable equilibrium value of less than 300°C. Diagnostics like the soft x-ray multi camera tomography system (XMCST) and the diamagnetic loops, which might be exposed to significant convective loads, require a baffle like cooling structure made of clamped carbon tiles. In particular for the XMCST a detailed thermal analysis of the entire system was necessary to design the independent cameras cooling system. In addition a small vacuum compatible shutter is being designed a small vacuum compatible shutter is being design the independent cameras cooling system. In

Guerin's wife gave birth to twins who they named Nikolai and Dimitri.

We apologize for not taking proper account of these fusion reactions and herewith send a warm welcome all new team members.

Click here to view a collage

Media Watch

"We must take the right decisions now"

"We must take the right decisions now", says Iain Coren, BP Chief Executive responsible for Refining and Marketing. "The world is not running out of hydrocarbons but the global oil market, for example, is a lot tighter than it was 15 to 20 years ago. There is an urgent requirement for investment into new capacity and the IEA estimates $22 trillion of new investment in energy is required by 2030."

Read the full article published in "Energy Trends and Climate Change: A Road Ahead for Governments and Business..."

Safety Tip

Winter driving

When winter weather hits, even the most skilled driver can get into trouble. Here are some tips to help you avoid accidents:

Maintain clear visibility- clear all ice and snow from windows, mirrors and wipers to make sure you can see clearly in all directions. Make sure head and rearlights are clean too.

Prevent slippage — remove ice and snow from shoes and boots to prevent pedal slippage.

Slow down — driving too fast for conditions contributes to many winter weather accidents. Don't follow the vehicle in front of you too closely.

Avoid harsh actions — any quick force input to the tires, including quick acceleration, hard breaking or steering, can contribute to skids. Steer, brake and accelerate slowly.

Avoid distractions — pay attention to road conditions and other vehicles.

Winter tires — are your tires the right ones for winter driving? If you are like most vehicle owners, you probably have "all-season" tires on your vehicle. While they are designed to handle most driving conditions, they may not be suitable in heavy snow. All-season tires can begin to lose their grip when the temperature drops below -10°C. Winter tires are made for cold and snowy conditions.

Links

New drawing of ITER Cooling Water System

Invitation: 13 Desserts of Provence

Irmgard Zerrle
Irmgard Zerrle joined ITER on November 3rd 2008 as Civil Engineer within the Civil Construction and Site Support Office.

She previously worked as consultant for the equipment provider of the RPTC Proton Therapy Center in Munich.

Irmgard is currently in the process of moving to Manosque with her partner.

In her spare time she enjoys outdoor activities such as hiking and bicycling but she also likes reading a good book, going to the movies or visiting museum.

- Iris Rona

Fusion World

Stern-Gerlach Medal 2009 for Friedrich Wagner

Professor Dr. Friedrich Wagner from Max Planck Institute of Plasma Physics (IPP), Greifswald Branch, has been awarded the Stern-Gerlach Medal 2009 by the German Physical Society (DPG) for his work in high-temperature physics and fusion research. This prestigious award for achievements in experimental physics honours, in particular, his discovery of self-organised transport barriers as a milestone on the way to producing fusion plasmas. The medal is to be presented this coming year at the annual conference of the DPG.

To read the press release, click here...

Announcements

Understanding Chinese Culture

Invitation: 13 Desserts of Provence

Links

New drawing of ITER Cooling Water System

 ITER Organization—Newline http://www.iter.org/newsline/issues/60/ITERnewsline.htm
developed to be able to close the camera observation pinhole for calibration purposes during long pulse discharges.

In high density discharges a further problem arises from high ECRH stray radiation levels toroidally varying from 50–200 kW/m², requiring appropriate shielding measures to be taken to avoid serious damage to diagnostic components made of absorbing materials.

For the magnetic diagnostics a special digital integrator has been developed which in the lab already demonstrated its suitability for one hour discharges and which has already successfully demonstrated its suitability on the small classical stellarator WEGA.

Click here to learn more...

PlasmaNet 8-073 Postdoctoral/Research Fellow in Plasma Research

1. Postdoctoral Fellow / Research Fellow
   (A270-08CD) in Plasma Research, Research School of Physics and Engineering, ANU College of Physical Sciences

We seek a Research Fellow to co-develop forward models of selected equilibrium and fluctuation diagnostics in MAST and H-1, and integrate these models with a Bayesian inference software engine.

Closing Date: 31 December 2008.

2. Postdoctoral Fellowship (A257-08CD), Research School of Physics and Engineering, ANU

This Fellowship aims to attract candidates of the highest ability irrespective of field. The physics program in the ANU College of Physical Sciences is seeking applicants for a prestigious fellowship funded by the Oliphant Endowment Fund.

Closing Date: 12 December 2008

Click here to learn more...

Click here to learn more...

NewsLine Editor

The ITER Newsline is produced by Sabina Griffith. Suggestions for future articles, comments and corrections, as well as items for the calendar are welcome, and can be sent to sabina.griffith@iter.org.

Conferences

2-4 March, 2009
4th International Workshop on Stochasticity in Fusion Plasmas (SFP)
Julich, Germany

6-10 April, 2009
4th International Conference on the Frontiers of Plasma Physics and Technology
Kathmandu, Nepal

31 May-5 June, 2009
36th IEEE International Conference on Plasma Science (ICOPS2009) and 23rd Symposium on Fusion Engineering (SOFE2009)
San Diego, CA, USA

24-26 June, 2009
15th Topical Conference on Radio Frequency Power in Plasmas
Gent, Belgium

13-17 September, 2009
9th European Conference on Applied Superconductivity (EUCAS)
Dresden, Germany

21-24 September, 2009
14th International Symposium on Laser-Aided Plasma Diagnostics
Castelbrando, Treviso, Italy

18-23 October, 2009
21st Intl Conference on Magnet Technology (MT-21)
Hefei, China

2-6 November, 2009
51st Annual Meeting of the APS Division of Plasma Physics
Atlanta, Georgia, USA