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newsletter

EUROPEAN FUSION DEVELOPEMENT AGREEMENT

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Interview with Dr. Janez Potočnik - EU Commissioner for Science and Research

Bridging the gap with the public

EFDA Newsletter (E.N.): During FP6 the big European challenge in the field of energy (e.g. security of supply, acceptability, sustainability) have come out in full. Being an economist yourself, what are your ideas to tackle this issue?

Janez Potočnik (J.P.): Well, the escalation of global energy prices might turn out to have been a blessing in disguise, since it has forced us to search for more earth-friendly, sustainable and cost-efficient energy sources. And we have made some progress; we're using financial incentives and emissions quotas to help make new energy sources more attractive to investors.

However, in the long term, a radical transformation of the global energy market is unavoidable. I think we are beginning to face up to this challenge in Europe, for example by supporting the development of advanced renewable technologies. That said, we can't underestimate the work involved. We need to anticipate and stimulate technological development years in advance. My job will be to galvanise the work of European research teams, so that we can keep Europe at the forefront of energy source development.

E.N.: What are, in your opinion, the main advantages and concerns for the EU to increase research expenditure to approach 3% of GDP in the EU 25?

J.P.: I think the political will is already clear on this. Most European countries have now set objectives to meet this target and new Member States have been particularly enthusiastic. However, there just isn't enough progress on this yet. Budget constraints are a continuing problem, along with the attractions of cheaper options in Asia for R&D. Our best chance is the momentum created by the new Commission, which gives us an opportunity to reinvigorate the Lisbon process and the European knowledge economy.

E.N.: The Commission is starting to prepare plans for the forthcoming FP7. Which will be, in your opinion, the most important topics?

J.P.: I'm focussing very much on making the case for a strong link between knowledge and growth. In a global world, the European model - with its high social and environmental standards - can only be successful if we build on Europe's traditional strength: knowledge. There is a clear case for doubling EU research funds to support key technological sectors, and to continue establishing a real European Research Area with mutually supportive national research programmes, and collaborative research. We will also be putting forward the idea of a European Research Council to support small teams of researchers and we will be asking for more support for the European Technology Platforms in their efforts to nurture scientific innovation. The lesson from FP6 is that we have to make everything simpler in FP7; the whole process needs to be more user-friendly to attract SMEs and those with less experience of European programmes to get involved. We've got to get our priority research themes right from the beginning, particularly in key areas like health, biotechnology and nanotechnology. I am particularly keen to see us working with our partners in industry and the scientific community on this.

E.N.: Europe is at the forefront of fusion research. The first design of a 'next step' fusion machine started already in the early 1980s. Now the target is in reach and ITER construction should be soon agreed among the partners. The European fusion community has big expectations from this important project. What are your expectations from the ITER project?

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Interview

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Dr. Janez Potočnik

Dr. Janez Potočnik is the Commissioner for Science and Research under the new Barroso Commission. For several years, Janez Potočnik has been the point man between EU headquarters in Brussels and Ljubljana. Since January 2002, the doctor of economics has served as Slovenian minister of European affairs. Previously, he served as the negotiator responsible for securing Slovenia's membership in the EU.

For his CV please see:
http://europa.eu.int/comm/commissioners/potocnik/cv_en.htm

More information on the Eurobarometer:

http://europa.eu.int/comm/public_opinion/index_en.htm
and

http://europa.eu.int/comm/public_opinion/standard_en.htm

For **more information** on the European Research Area (ERA) see:

http://europa.eu.int/comm/research/era/index_en.html

J.P.: ITER is essential: its completion will mean a large-scale, sustainable energy source for the benefit of everyone in the future. We expect that total costs for its construction and operation should amount to around 10 billion over 35 years. Once built, the reactor will be able to generate power of about 500 million watts; this will stand as an unprecedented testament to global scientific and technological cooperation. It's vital to Europe's future too, in that it will draw together a wide range of cutting-edge technologies central to the long-term competitiveness of European industry.

E.N.: On November 26 the EU Competitiveness Council gave the Commission the go ahead sign to conclude the international negotiations and bring ITER to Europe. Do you expect to fulfil this request in the short term?

J.P.: Negotiations with our ITER partners are ongoing and I don't think it's useful to commit ourselves to any sort of deadline at this stage. The Commission is doing everything possible to secure a consensus amongst all 6 parties to have the reactor based at Cadarache. In our view this is the best site from a scientific, technological and environmental point of view. We are still in talks with our Japanese partners, looking in detail at how to satisfy Japan's aspiration to maximise their interest in the project. One option could be that the EU would contribute to other fusion initiatives based in Japan to complement ITER as part of a broader approach to mastering fusion energy. We hope to conclude our negotiations in time to start construction before the end of 2005.

E.N.: The results of the Eurobarometer 2002 (Energy) show that 85% of the people questioned are not aware of EU energy-related R&D. Efforts to improve the communication between the EU institutions and the European citizens are growing. What are your recommendations to improve the situation?

J.P.: I think we've got to promote better understanding amongst people about why science is relevant to all of us. As scientists and researchers, we have a responsibility to keep the general public up to date with scientific and technological developments and how they impact on everyday life. In our current research programmes, the Commission is already conscious of the importance of communication: I can refer you to some of our initiatives in the Science and Society Action Plan, for example, the European Science Week. We are really making young people a priority now; our annual Young Scientists' Contest is providing a great opportunity for young people from across Europe to come together to learn from each other and to meet some of Europe's most prominent scientists. In recent years, up to a third of the contestants have been young women and we hope this reflects a growing interest in science amongst women in Europe. Improving communication is an on-going project for me - one of my central issues during my time as Commissioner will be to help bridge the gap with the public.

E.N.: The concept of European Research Area (ERA) is now or is becoming a reality in several fields. What further efforts do you think will be needed to move forward during the next framework programme?

J.P.: It is great to see how well the ERA has developed since my predecessor, Philippe Busquin, launched the project five years ago. But it is fair to say that there is a lot of work still to do to achieve a truly integrated "single market" for science and technology in Europe. Part of the answer has been to use an "open method of co-ordination" with Member States, which has allowed us to learn from each other and to develop complementary policies. But this is just the beginning. My plan will be to ask Member States for greater political involvement and to push forward EU guidelines on key issues like human resources and fiscal incentives. I think this is how we will create leading markets for the best European technologies in the long term.

E.N.: How will you help to make a career in science more attractive for the younger generation? What kind of funding will be available to young researchers? A possibility could be to create a European post-doctoral scheme with a clear career progression built into it. What is your opinion on such a system?

J.P.: Well, it's really about attracting the best talents to Europe, while at the same time stimulating the brightest people living here to enter research professions and stay over the long term. Looking at what has been done already, we've got the Marie Curie actions, which are available to researchers at various stages of their careers. We've also tried to tackle mobility issues by launching the European researchers' mobility portal. This pools job vacancies for researchers and gives them access to about 200 national and regional centres for help and local support. Our next step will be our recommendations to Member States about developing a European Researcher's Charter and a Code of conduct for the recruitment of researchers. With these initiatives in place, we'll be able to start building a genuine European labour market for researchers and offer more attractive career prospects. To begin with, we're planning the 2005 Researchers in Europe Initiative, a high profile public awareness campaign about the role of researchers.

Here again capturing the minds of schoolchildren is crucial. Our own surveys have shown that almost six in ten children find science at school difficult and uninteresting. It is generally agreed that science curricula are simply too heavy in content and too light in context. Commission programmes like the European Science Week are working well to respond to this problem and we have recently signed up another 7.7 million euro for a new promotional initiative, which brings universities, museums and schools together through special events and internet links. Your question on the possibility of a European post-doctoral scheme is an interesting one. Frankly, it would be naïve to think that, even with a doubling or a tripling of the budget for the Marie Curie actions, we would get immediate results from one central scheme. I think to make real in-roads we will need to bring about more significant structural changes in the European research environment. What is most important is that our future initiatives tackle the obstacles faced by researchers at all stages of their careers, including improving access to pathways between academia and industry, as well as addressing the international flows of research talent to and from Europe, the US and Asia.

Specific objectives of the 2005 Researchers in Europe Initiative:

- to improve and promote a better public understanding of the contribution of researchers to society, in terms of innovation, job creation, competitiveness and economic growth;
- to encourage more young people to embark on careers in R&D and contribute thereby to increase the number of researchers in Europe
- to contribute to the overall attractiveness of the EU as a reference area for research talent from all over the world and raise awareness of the potential of the European Research Area as a European Employment market for researchers.

Marie Curie Fellowships provide European placements for pre and post-doctoral researchers, usually up to the age of 35, and for experienced researchers.

For **more information** see:

http://europa.eu.int/comm/research/arch/tp6/mariecurie-actions/indexhtm_en.html

Associations

16th Association Day of the Association EURATOM-ÖAW

On 30th November 2004 the Association EURATOM-ÖAW (Vienna, Austria) organised her annual Association Day on Fusion Technology, which was hosted by TU-Wien/Atom-institut. At this meeting Austrian contributions to the EFDA Technology Work Programme 2004 and to the Underlying Technology Programme were presented and discussed by the respectively involved junior and senior scientists. Dr. Rainer Lässer (EFDA Garching) presented an overview on the development of materials with a view to ITER and DEMO. Dr. Ettore Salpietro (EFDA Garching) gave a lecture on "current task fields and developments in the Magnetic Structure and Integration Field". In the field "Magnetic Structure and Integration" a research group of the Association EURATOM-ÖAW at the Atominstitut has achieved important results with regard to radiation resistivity of insulation material for the ITER magnet coil system. Irradiation experiments have shown that epoxy-based insulation materials will not sustain the expectable ITER neutron fluence level. Therefore new materials based on cyanate ester resins with better performance are presently tested. Another research group of the Association at the Erich-Schmid-Institut für Materialwissenschaft of ÖAW in Leoben (Austria) has acquired specialised know-how in the characterisation and improvement of high-temperature alloys (chromium and tungsten) for possible use in future fusion power plants. Dr. Giovanni Piazza (EFDA-JET Culham) presented a lecture on JET Technology in 2005 and 2006. The meeting was also attended by Dr. Günter Mank, Head of the Physics Section of the IAEA Department of Nuclear Science and Applications and by collaboration partners from laboratories in Germany, Hungary and Slovakia.

Tungsten and its alloys feature high melting point, low vapour pressure, good thermal conductivity, high erosion resistance and good thermo-shock properties. Their ductile-to-brittle transition temperature, however, is strongly dependent on processing and impurities. As this complicates machining of complex parts, low brittleness is essential and desired. At the Erich-Schmid-Institut für Materialwissenschaft of ÖAW in Leoben tests have been performed on various samples processed by Severe Plastic Deformation (SPD) methods to achieve optimum fracture toughness.

High-power tests of the ITER Remote Steering Launcher mock-up at IPP Greifswald

The ITER Experimental Reactor will be equipped with a 24 MW Electron Cyclotron Resonance Heating (ECRH) system operating at 170 GHz. The unique ECRH properties of very localised heating and current drive in the plasma are well suited to satisfying various physics requirements such as start-up assist, bulk-heating, current drive and control of magnetohydrodynamic (MHD) instabilities. A versatile and flexible multi-purpose system is under design to meet the ITER requirements.

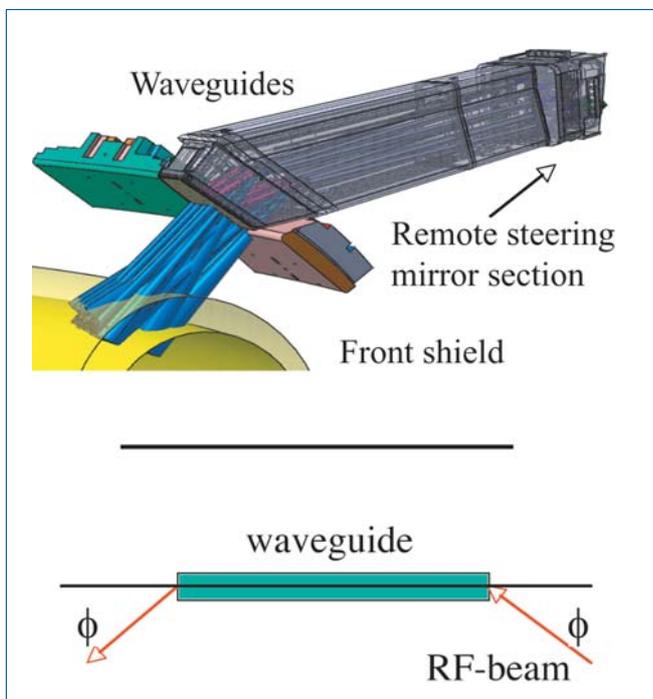


Fig. 1: ITER upper-port for ECRH-launcher

Fig. 1: Outline design of the ITER Remote Steering Launcher for one upper port. The 4 x 2 wave guide stack as designed by the consortium of European Research Institutes FOM, FZK, CNR, and CRPP is shown (top) together with a principle sketch of the RSL-concept (bottom).

The suppression of plasma instabilities, in particular the so-called neoclassical tearing modes (NTMs) which are likely to appear in reference operating scenarios of ITER, is a particularly demanding objective. Instabilities are localised at major rational magnetic surfaces corresponding to distinct radial positions within the plasma cross section. These positions can move during the development of a plasma discharge as the profile of the safety factor, q , changes. The instabilities degrade the plasma performance, therefore mitigation and/or suppression is required. Efficient control was demonstrated in various tokamak experiments by driving a localised current by EC waves in the narrow region where the instabilities are excited. In operation, the location of the instabilities must be identified by proper diagnostics and the narrow ECRH beams must be actively steered towards their exact location during the pulse. The ECRH launcher must therefore be capable of steering the narrow RF beams over a significant range of angles.

Present-day experiments are performed with a so-called Front Steering Launcher (FSL), which has a movable mirror at the end of the transmission line inside the torus. An alternative concept, the Remote Steering Launcher (RSL), is presently under investigation for the ITER upper ports as seen from Fig. 1. The main technical advantage of this approach is the avoidance of movable parts and the required driving mechanism close to the plasma, which simplifies the construction, simplifies maintenance and is expected to improve the reliability.

The launcher basically consists of a square corrugated waveguide with a steerable mirror at the entrance of the wave guide (rather than on the plasma-facing end), which is then several meters away from the plasma and outside of the primary vacuum

window. The RF-beam is launched at the waveguide entrance at variable angles and, with the dimensions of the waveguide properly chosen, is then radiated from the waveguide mouth under the same but opposite angle. A sketch of this principle is seen in Fig. 1. Fig 2 shows the calculated microwave beam propagation in an optimised waveguide: the coloured areas indicate the reflection-patterns of the wave field at the waveguide walls. It is clearly seen that the propagation in the waveguide occurs in a zig-zag manner. A full-scale prototype of the launcher is close to completion and will undergo various low- and high-power tests. As an intermediate step, a simplified uncooled RSL mock-up was designed at the Institut für Plasmaforschung (IPF), Universität Stuttgart and tested at high power in IPP Greifswald. These measurements confirmed the principles of the RSL-concept and demonstrated the expected transmission performance. The partners to the design activity in 2004 were: ENEA/CNR, CRPP, FOM, FZK, IPP, IPP/IPF and UKAEA.

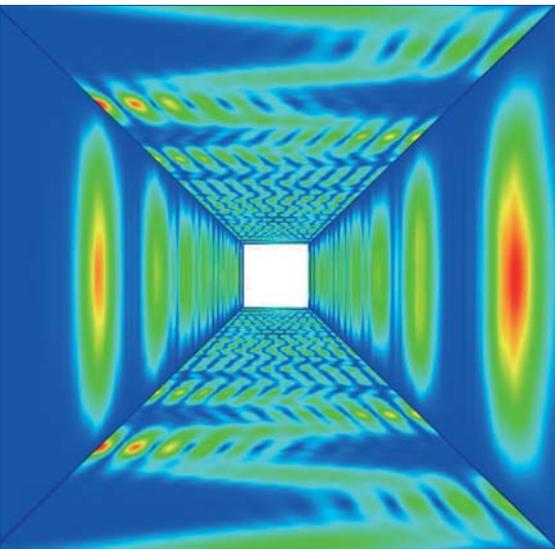


Fig. 2: Calculated wave field pattern at the inner RSL-waveguide walls. The zig-zag like propagation of the wave along the waveguide is clearly seen. The calculations were performed at IPF Stuttgart.

entrance and various diagnostics along and at the exit of the waveguide. The high-power tests were performed with a power of up to 700 kW (typically 500 kW) and pulse lengths of up to 10 seconds. The RF beams at the exit of the waveguide were steered into and absorbed by a special dummy load developed and provided by CNR-Milano. Due to the finite losses of the waveguide, the uncooled waveguide walls are heated. The losses, and thus the wall heating, is particularly pronounced in the areas where the waves are reflected from the walls along their 'bounce-motion'. The heat distribution along the waveguide can be measured from outside with an infrared (IR)-camera, as seen in Fig. 3. The hot-spots (the 2nd, 4th and 6th reflection are seen) agree well with the calculated reflection areas of the propagating wave shown in Fig. 2. This technique also allows the experimental verification of calculation of detailed wave patterns. Although the experiments were performed under ambient atmospheric conditions, this waveguide arrangement (reproducing the reference design for the waveguide system in the RS Upper Launcher for ITER) showed no breakdowns and performed well. The detailed measurements on the high-power transmission characteristics supported the low-power measurements. The far field radiation patterns of the RF-beams were measured about 2.2 meters away from the waveguide mouth with a heat-target and an IR camera in short pulses. Beam pattern measurements at different launch angles showed that a high quality Gaussian beam was obtained within the steering range of +/- 12 deg. For larger steering angles, however, beam splitting is expected from theory and was observed in the experiments. These results increase the confidence on the applicability of the RS principle to the design of the ITER EC Upper Launcher.

The 140 GHz, 10 MW, CW, ECRH system for the Wendelstein 7-X Stellarator, which is presently being installed and partially operational, provides an ideal test bed for the RSL tests, although the frequency is lower than the ITER frequency (140 vs. 170 GHz). The test arrangement was readily implemented in the IPP installation, because the Wendelstein 7-X transmission line is an open, purely optical system, which runs at atmospheric pressure. The beam from the first 1 MW, CW gyrotron, which became operational at the end of 2003, was directed into the squared corrugated waveguide by a set of mirrors. The waveguide is mounted on a stable frame construction with steerable optics at the

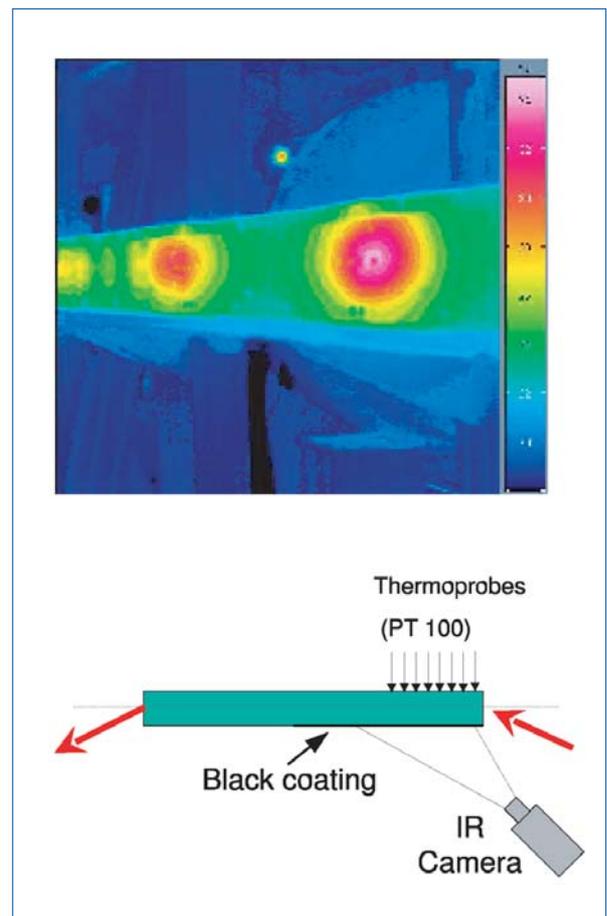


Fig.3: Heat loading of one side wall of the RSL-waveguide. The hot spots indicate the internal reflections of the RF-waves. A principle sketch of the diagnostics set-up is also shown.

The use of the JET facility is of crucial importance in the testing of technological solutions for ITER. Within the JET Fusion Technology Task Force, several ITER relevant issues have been addressed. Future activities will continue to support ITER designing and licensing activities.

Fusion Technology at JET

Increasing the use of the JET facilities for Fusion Technology R&D in preparation of ITER was one of the key objectives assigned to EFDA in 1999. For this purpose, the JET Fusion Technology Task Force (TF-FT) was set-up in 2000 when JET started being used under EFDA. Over the last five years, 68 Tasks involving several European laboratories have been launched. The programme focuses on tritium, plasma facing components, waste management, engineering and safety issues.

Tritium in the Tokamak & Plasma facing components (*EURATOM-Associations UKAEA-UK, TEKES-Finland, FZK-Germany, IPP-Germany, VR-Sweden, CEA-France*)
 In view of limiting the tritium inventory inside ITER, activities are carried out to understand and control the co-deposition of tritium and carbon. The use of JET, with its worldwide unique capability to operate with tritium, is invaluable. Investigations carried out to find how and where tritium is trapped inside JET are based on the analysis of tiles removed during shutdowns (including the use of markers such as ¹³C) or codeposition monitoring.

Methods based on laser or flash lamp are being investigated for removing tritiated co-deposited layers from plasma-facing components, with tests carried out in laboratories and a first in-situ demonstration of the flash-lamp inside JET in 2004.

Tritium processes & waste management (*EURATOM-Associations SCK-CEN Belgium, FZK-Germany, IPP-Germany, CEA-France, UKAEA-UK, MEC-Romania*).

Deuterium and tritium from the torus, are processed in the JET Active Gas Handling System (AGHS). A cryopanel prototype has been successfully tested during Trace Tritium Experiments in October 2003 to pump gas from the torus and neutral beam injectors, and could find application on ITER. A new ITER relevant purification system (PERMCAT) has also been tested in AGHS to remove impurities like He, CO₂, H₂O, CH₄ from the collected gases. Following the purification, the different hydrogen species (H, D and T) are sorted out and D and T are stored for JET fuelling.

Dedicated procedures for decreasing the tritium content inside the materials removed from the torus are being developed for tritiated stainless steel, carbon-based materials (graphite and carbon fibre composite), organic liquids (pump oils, liquid scintillation cocktails) together with process and housekeeping wastes.

The design of a fully integrated water detritiation plant as well as the testing of all its key components has been carried out. This work has driven R&D in preparation of the ITER plant and could find application at JET for on-site tritium recovery from tritiated water.

Safety & Engineering and Test beds (*EURATOM-Associations ENEA-Italy, SCK-CEN-Belgium, CEA-France*).

With 20 years of operation, the use of tritium, beryllium and remote handling for maintenance, the JET experience provides a unique source of information for ITER licensing and guidelines for ITER design. Data are collected on component failure rates in various sub-systems (AGHS, vacuum system, heating systems, power supply) and on occupational radiation exposure (dose to the workers depending on worker categories and operation conditions).

Elements of the JET facilities are also used as test beds for studying prototypes for ITER, such as bypass switches for power supplies, carbon-based tiles under high ion loads or optical fibres under D-T neutron irradiation.



Installation of a new cryopanel prototype at JET (C. Day, EURATOM-Association-FZK)

Events

Workshop on the future of scientific and technological research in Europe

In his welcome address G. Sergio, USF President, recalled the outcome of the Lisbon meeting in 2000 where the European Council agreed on a strategic goal for the present decade: 'to become the most dynamic and competitive **knowledge - based economy** in the world, capable of sustainable economic growth with **more and better jobs** and **greater social cohesion**, and **respect for the environment**'. The introductory talk, entitled "Towards the 7th Framework Programme for Research" and focused on the Commission research policy, was given by R-J Smits, acting Director of DG RTD. After having highlighted the Commission's proposal for a substantial increase (doubling) of the research budget for FP7 in order to meet the Lisbon objectives, R-J Smits presented the six key axes of the Commission's policy: basic research and competitive funding; coordination of national programmes; research infrastructures; human resources; collaborative research and technology initiatives.



The largely positive results of the web based consultation among the European research community and stakeholders on the above topics were presented by C. de la Torre, also from DG RTD. Detailed information on the consultation can be downloaded from the DG Research web site. J. Gavigan, from DG RTD, focused in more depth on the necessity to increase investment in European research (3% GDP, of which 2/3 from private sector) to the level of research investments made in Japan and US. In the first thematic talk, assigned to EU nuclear energy research policy, M. Poireau, from DG RTD, stressed that "the issue of energy supply is so important that all potential options (fossil fuels, renewables, fission and fusion) should be developed. The morning session was concluded by S. Zoletnik (KFKI Research Institute for Particle and Nuclear Physics Department of Plasma Physics,

Budapest, Hungary) who gave a scientist's panoramic view of S&T research in Hungary and New Member States.

A session was dedicated to personnel policy for research staff, 4th action programme for woman and man at the EC, women and science network at JRC, with talks given by: P. Keraudren, from DG RTD, C. Joly, from DG ADMIN and A. Paya-Perez, from DG JRC.

In their talks on the thematic session dedicated to the JRC J.-P. Malingreau, D. Albrecht and L. Debarberis, showed the intrinsic value and the unique contribution of the JRC at community level while participating to FP indirect actions and networks both in nuclear and non-nuclear activities. O. Comsa, from CITON, concluded the session with an overview of the Romanian Nuclear R&D and the planned steps towards EU integration.

The second day started with a session dedicated to European Space Policy and Air Traffic Control (ATC). L. Tytgat, from DG RTD, and M. Praet and J. Amador Monteverde, from ESA, presented to the audience the success achieved with a growing partnership between Commission and European Space Agency (ESA), in a sector of strategic technologies and future space applications at the service of the European citizens. J-M Garot, director of Eurocontrol Experimental Centre, presented a proposal, for a single European ATC system that would enhance flight safety and productivity.

Finally, in the session dedicated to thermonuclear fusion, Y. Capouet and T. Bonicelli, from DG RTD, presented the uniqueness of the European fusion programme, the leading position reached in fusion with JET and the key European role in design, construction and operation of ITER.

Among the key challenges of the EU future fusion programme Y. Capouet listed the followings: support the European procurement effort for ITER; prepare for the DEMO/PROTO

A workshop on the future of Scientific and Technological (S&T) research in Europe was held in Brussels the 9th and 10th of December last year. The aim of the workshop, organised by the Union Syndicale Federale (USF), was to foster a policy debate between scientists working in the Commission and intergovernmental research institutions on the Commission strategy document COM 353, published the 16 June 2004, entitled "Science and Technology, the key to Europe's future". More than 50 people attended the workshop at the Centre de Conference Albert Borchette. Among the invited speakers there were key persons and scientists from DG ADMIN, DG RTD, DG JRC, ESA and EUROCONTROL.

For additional information

http://europa.eu.int/comm/research/future/index_en.html

http://europa.eu.int/comm/research/future/themes/index_en.html

http://europa.eu.int/comm/spac/e/index_en.html

All the presentations will be available in due course at the USF web site:

<http://www.unionsyndicale.org/info/>

Events

 continuation from page 7

steps (demonstration and prototype of a commercial reactor) attract and train scientific and engineering staff and promote involvement of industry. T. Bonicelli, presenting the point of view of the majority of EURATOM's staff working in fusion, said: "ITER and, more in general, the development of fusion as a future source of energy require a stable organisation capable to steer the research with continuity and consistency over the long term. As a result of its farsighted and consistent policy, the Commission has, within its own staff, some of the most qualified fusion scientists and engineers worldwide. This potential of human resources must be exploited for the good of Europe and of the ITER project".

What's next? An additional consultation on thematic domains for future EU support under FP7, with a deadline 31 December 2004, was undertaken by the Commission as part of its preparations for the proposal for FP7 which, according to R.-J. Smits and C. de la Torre, is due to be published in April this year. The publication of the proposal for EURATOM's specific programme is foreseen for the 2nd semester 2005 - said Y. Capouet. Council and Parliament should adopt the EURATOM framework programme during the 2nd semester of 2006 in time for implementation on the 1st January 2007.

Commission policy proposal - 6 Key Axes:

- Collaborative Research
- Technology Initiatives (new)
- Basic research competitive funding (new)
- Coordination of national programmes
- Research infrastructures
- Human resources

World Year of Physics 2005

Einstein in the 21st Century

The World Year of Physics (WYP) is a worldwide celebration of physics and its importance in our everyday lives. Physics not only plays an important role in the development of science and technology but also has a tremendous impact on our society. WYP aims to raise the worldwide awareness of physics and physical science bringing the excitement of physics to the public and inspire a new generation of scientists. It is timed to coincide with the centennial celebration of Albert Einstein's "miraculous year". The worldwide events for the WYP can be found on the websites: <http://www.physics2005.org> and <http://www.wyp2005.org>.

Help make 2005 another *Miraculous Year!*

Timed to coincide with the 2005 Centennial Celebration of Albert Einstein's *Miraculous Year*, the World Year of Physics 2005 will bring the excitement of physics to the public and inspire a new generation of scientists. Visit www.physics2005.org to find out how you can get involved.

For more information see our EFDA website:

<http://www.efda.org>

and additionally

<http://www.jet.efda.org>

<http://www.iter.org>

EFDA Close Support Unit - Garching
Boltzmannstr. 2
D-85748 Garching / Munich - Germany

phone: +49-89-3299-4237

fax: +49-89-3299-4197

e-mail: federico.casci@efda.org

editors: Federico Casci, Doris Lutz-Lanzinger

graphic design: Karen Jens

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