

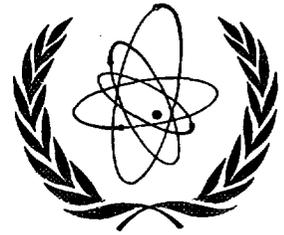


## INTERNATIONAL THERMONUCLEAR EXPERIMENTAL REACTOR

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**THIRTEENTH MEETING OF THE ITER MANAGEMENT ADVISORY COMMITTEE (MAC)  
by Dr. M. Yoshikawa, MAC Chair**

The thirteenth Meeting of the ITER Management Advisory Committee (MAC-13) was held at the ITER Joint Work Site in San Diego on 16 and 17 January 1998.

The ITER Director summarized the progress made in the ITER Engineering Design Activities in the period between IC-12 and December 1997. The project has focused on completing the Final Design Report, Cost Review and Safety Analysis (FDR), and the related documentation in time for the ITER review process and submission of the FDR to IC-13 in February 1998.

One important element of the work was the completion, by the ITER Parties' industries, of costing studies of some 80 "procurement packages", each representing a potential real procurement contract for an ITER component. The results, after analysis and evaluation by the JCT, provide the basic information for the ITER Project cost.

A draft of the ITER Physics Basis document has been prepared through the framework of the Expert Groups and ITER Physics Committee. The ITER Physics Assessment for the FDR is based on the information in this document which is also planned for publication in the IAEA *Nuclear Fusion* journal.

Following consideration of the Director's Status Report, MAC also reviewed the Task Status Summary, dealt with Joint Fund matters, approved the schedule of ITER meetings and discussed other issues.

*Participants in the Meeting*

## Task Status Summary

The task status as of 10 December 1997 is summarized as follows: 72% of Technology R&D Task Agreements (498 Task Agreements out of 690) and 73% of the Design Task Agreements (434 out of 591) have been completed. This statistic includes all tasks of the 93 ETAs and the tasks of which a final report had been submitted officially by the HTs and which have been under assessment by the JCT. It is expected that, additionally, a large number of final reports will be submitted for JCT assessment in the near future.

MAC took note of the ITER task status summary and new Task Agreements the credits of which are less than 500 IUA or equivalent. MAC also reviewed and supported the new Task Agreements and the modification of the Task Agreements supported earlier.

MAC, recognizing the present status of the contribution by the Parties, recommended that the ITER Council encourage each Party to make its best effort to maintain equal contribution to the EDA.

## Joint Fund

Taking into account that the Joint Fund Rules give to the ITER Council the responsibility for the assets remaining at the end of the EDA, MAC endorsed for consideration by the ITER Council the Director's framework proposals for treatment of ITER Joint Fund Assets at the end of the EDA. The substance of these proposals is the following:

Should the ITER EDA Agreement be extended beyond 21 July 1998, all current aspects of the ITER framework would continue to apply and the issue would be deferred until the revised end date of the EDA. Should the Agreement terminate, the disposition of Joint Fund assets should be treated by the ITER Council. The appropriate approach would depend on the Council's view of possible future ITER-related activities. In the event of a simple liquidation of ITER activities a reasonable response recognizing the principle of equality of the Parties should be given. In the event that the ITER Council considers it prudent to enable a more structured winding-up of the EDA and/or some possible future ITER-related joint activities, the Council may wish to provide for this by proposing an alternative provisional disposition of the assets which would better match the possible structure of activities envisaged.

## Proposed Schedule of ITER Meetings

MAC reviewed and supported the schedule of Technical Meetings and Workshops proposed by the Director (see list below).

### ITER MEETINGS

11-13 February	Diagnostics Technical Meeting	San Diego
23-27 March	6th Technical Meeting on Quality	San Diego
12-16 May	ITER Safety Technical Meeting	San Diego

### ITER PHYSICS MEETINGS

11-13 February	Diagnostics Expert Group Workshop (EGW)	San Diego
19-20 February	5th Energetic Particles, Heating and Current Drive EGW	Naka
April or May	Disruption, Plasma Control & MHD EGW	To be decided
20-25 April	Confinement Modelling & Database EGW and Confinement and Transport EGW	Princeton
23-25 April	Confinement and Transport EGW	Princeton
25-27 May	Joint Divertor Physics and Divertor Modelling & Database EGW	San Diego

MAC decided that the MAC-14 Meeting will be held on 8 and 9 July 1998 in Vienna.

## Nomination of New MAC Secretary

The replacement of the MAC Secretary was announced; Dr. Toshio Hirayama was replaced by Dr. Yukitoshi Miura. MAC expressed its appreciation to Dr. Hirayama for his efficient services to the Committee.



## ITER AT THE INTERNATIONAL CONFERENCE ON FUSION REACTOR MATERIALS

by Drs. G. Kalinin, V. Barabash and R. Matera, Garching ITER Joint Work Site

The Eighth International Conference on Fusion Reactor Materials (ICFRM-8) was held in Sendai, Japan, on 26-31 October 1997.



Referring to the background of the ICFRM-8 logo, Prof. T. Kondo, the General Chairman of the Conference, said in his introductory speech:

*"This is just a brush drawn red circle. The circle is drawn in a quick single stroke by a calligraphy artist. This red circle resembles a plasma with disruptions in the tokamak doughnut. At the same time, this is a symbol of 'perfection' by which old philosophers of the traditional 'Zen' Buddhism used to show their devotion to philosophical principles. The fusion materials community is similarly devoted to the challenge of 'perfection' of a safe, economic and environmentally acceptable fusion power system."*

The Conference on Fusion Reactor Materials takes place every two years starting from 1984, and deals with the most recent results of materials research for fusion reactor components. The previous conference was held at Obninsk (Russia) in 1995 (see ITER EDA Newsletter, Vol. 4, No. 11).

The Eighth Conference was managed jointly by Tohoku University and the organizing committee of ICFRM-8. The Conference was very well organized by the General Chairman Prof. T. Kondo and by the Executive Committee under the chairmanship of Prof. H. Matsui.

The ICFRM is focused on the whole spectrum of materials and technologies to be applied in fusion reactors and related facilities including:

- The understanding of the fundamental radiation effects specific to the fusion environment;
- The development of the engineering database on materials properties needed for the design of current fusion reactors (ITER, etc.);
- The development of high performance advanced materials with the potential of fulfilling the requirements of future fusion energy systems.

The total number of conference participants was over 500, representing 24 countries. In total, 594 invited, oral and poster papers were presented at the Conference.

The presentations were grouped under the following topics:

- Design and Materials,
- Next Fusion Device, e.g., ITER,
- Irradiation Facility and Technology, e.g., IFMIF,
- International Collaboration Program and Materials R&D Strategies,
- Damage Production and Accumulation,
- Breeding Blanket Materials, Design and Technology,
- Plasma Facing Materials and High Heat Flux Materials,
- Low Activation Materials and Other Structural Materials,
- Materials Database,
- Materials Issues for ICF and Other Alternative Concepts,
- Technology and Knowledge Sharing,
- Dielectrics, Insulators, Windows and Optics,
- Magnets and Superconducting Materials,
- Materials Processing, Fabrication, Inspection and Maintenance.

Three sessions were devoted to the ITER materials. These were the oral session "Design-Materials Interface and ITER", the poster session "ITER, Irradiation Facility and Technology" and the discussion session "ITER and Beyond". A large ITER mock-up provided by JAERI was displayed at the center of the main lobby throughout the Conference.

Three invited presentations were given by the ITER Team. The survey of the present status and future prospects of the ITER project was presented by the ITER Director Dr. R. Aymar in the plenary session.

Additional details of the design and material selection for the ITER in-vessel components were presented by Dr. K. Ioki, Head of the ITER JCT Blanket and Vacuum Vessel Division. The progress in developing carbon fibre composites for the ITER plasma facing components was reported by Dr. V. Barabash. Other material aspects of the ITER in-vessel components design and their manufacturing were presented by R. Matera, G. Kalinin and S. Tanaka, members of the Materials Group, ITER Garching JWS.

A feature of the Eighth Conference was a series of discussion sessions on topics of special interest. During the discussion session "ITER and Beyond" the current status of the materials selection (316SS, Cu alloys, Be, W, CFC, Inconel, insulators, cryogenic materials, etc.) for ITER, structural design criteria and advanced fabrication technologies were widely discussed among the materials community. During the discussion materials scientists not involved directly in the ITER activity had the possibility to obtain more information on the materials selection process in the ITER project and, on the other hand, the opinions of the independent materials experts were useful in supporting the current ITER materials selection. Finally, general agreement of the materials selection for ITER was reached.

The results of the comprehensive materials R&D program in support of the ITER design were extensively reported by representatives of the ITER Home Teams. Papers reflecting the state-of-the-art on structural, plasma facing and functional materials were presented at the Conference. The ITER R&D achievements are significant and the main ITER design options are supported by the R&D results.

The proceedings of the Conference will be published in a special volume of the Journal of Nuclear Materials. A record of discussions sessions will also be included in the Conference proceedings.

Several Workshops accompanied the Conference. These were:

- JA/US Workshop on High Efficiency Cooling Systems,
- CARET Symposium on Diffusion in Materials,
- IEA/US-Japan Workshop on Ceramic Breeder Blanket Interaction,
- IEA Workshop on Beryllium (attended by representatives of ITER Materials Group),
- IEA/JUPITER Workshop on SiC/SiC,
- IEA Workshop on Refractory Metals (attended by representatives of ITER Materials Group),
- US/Russian Federation Bilateral Planning and Review Meeting,
- JUPITER Executive Committee Meeting,
- JUPITER Workshop on Modelling and Theory,
- US/Japan Progress Meeting on JAERI/DOE Program,
- IFMIF Users Meeting,
- IEA Workshop on V Alloys for Fusion (attended by representatives of ITER Materials Group),
- IEA Workshop on Low Activation Ferritic Steel,
- IEA Annex-II Working Group Meeting,
- IFMIF Sub-Committee Meeting,
- IEA Fusion Materials Executive Committee Meeting.



The participants enjoyed the traditional Japanese hospitality, including the extraordinary Japanese food and sake.

There is an old Japanese tradition of celebrating some important events or starting an important business by opening a wooden barrel of sake and preparing a toast. On the photograph: S. Mori (Japan), E. Bloom (USA), J.P. Quan (China), K. Ehrlich (Germany), L. Ryabev (Russia), and R. Aymar (ITER Director) are seemingly enjoying their participation in this traditional ceremony at the ICFRM-8 banquet.

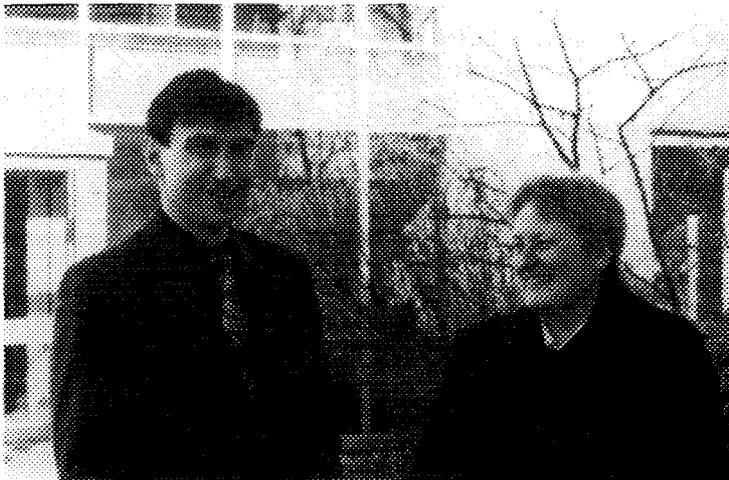


## WORK WITH PLEASURE

by V. Rozov, VHTP from Russia at ITER Garching JWS

I am lucky. I have managed, despite a curved trajectory, to come to the very science which corresponds to my original intentions - thermonuclear engineering. Strangely enough, taking into consideration the ancient belief that "Man supposes, God proposes". But one should remember that it was during those good old times in Russia, when it was possible to see plans getting materialized. Anyway, after graduating from Moscow State Technical University I arrived at the Research and Development Institute of Power Engineering (ENTEK), Moscow, rather close to the desired destination.

Having been deeply involved in nuclear engineering at ENTEK, one day it occurred to me that I was on the plane to Munich, descending onto the landscape which seemed to be artificially painted, neatly and methodically. I have to confess that immediately after landing I was seized by vague doubts as to the proper direction of my future activity. As I saw it then, the weather in Bavaria in July was simply too nice for successful work. However, having been introduced to some of my new colleagues, I was forced to get acquainted with my future job. From the very beginning I had so many questions and the job problems were multiplied by my awful English. Just for the record, it was my first trip abroad and my first experience in speaking English workwise. In this situation, I was saved, in particular, by the kind help of Dr. Filippo Elio, whose enthusiasm and cordiality served as a clear international language.



*Victor Rozov with Reinhilde ("Hilli") Weinfurter*

The best way to learn something is to be forced to use it. There was no time to learn the MAC system, or Unix or net tools. It still is a great riddle for me - what was the main reason to make a choice in favour of MACs here? It was the least difficulty for me to change the usual platform (after PC). But I can't help noticing that most of the applications for MAC have a too intelligent interface in comparison with real thinking capability. So, I am forced not to forget to use manual settings (whenever and if I manage to find them) as much as possible. It is a fact that the computer does not work as we think, but as we order, but I prefer to have a more distinct capability to order!

I'd like to emphasise that there is one problem, which, obviously, could not be solved by own accord of the Visiting Home Team Personnel (VHTP). I mean, the problem of settling down, regulated by German law, local rules and procedures - passport, medical insurance, visa, etc. Any attempt to understand the required procedure provokes even more questions. But it is well known that in order to ask a proper question it is necessary to know a priori the bigger part of the answer. The seamy side of the "Deutsche Ordnung" is the enormous volume of regulations (in comparison with Russia, where a relatively moderate volume of regulations provokes a creative approach from the citizens on the one hand, and from the authorities on the other, usually resulting in the red tape). The following example could serve as an apotheosis of the difference between Russia and Germany in this matter and may be the better illustration. As far as I remember, in Russia the printed Traffic Rules, for driving as well as for trial, consist of about 25 pages which should be learned by heart (and this is indeed a requirement of practice). As far as I recently heard, in Germany a convenient manual is available for driving. But God save you of not finding yourself in a questionable situation, because the full set of Traffic Rules in Germany is a huge folio, despite almost equal practical meaning of the contents. But this is only a particular example. For an aboriginal the problem of following the "Deutsche Ordnung" is alleviated by the habits and customs, but for an "uncultivated" foreigner it is simply a hard thing to deal with. Anyhow, the core of the problem, namely the relations with local authorities, could be considered as being hopeless and unsolvable without host administrative support.

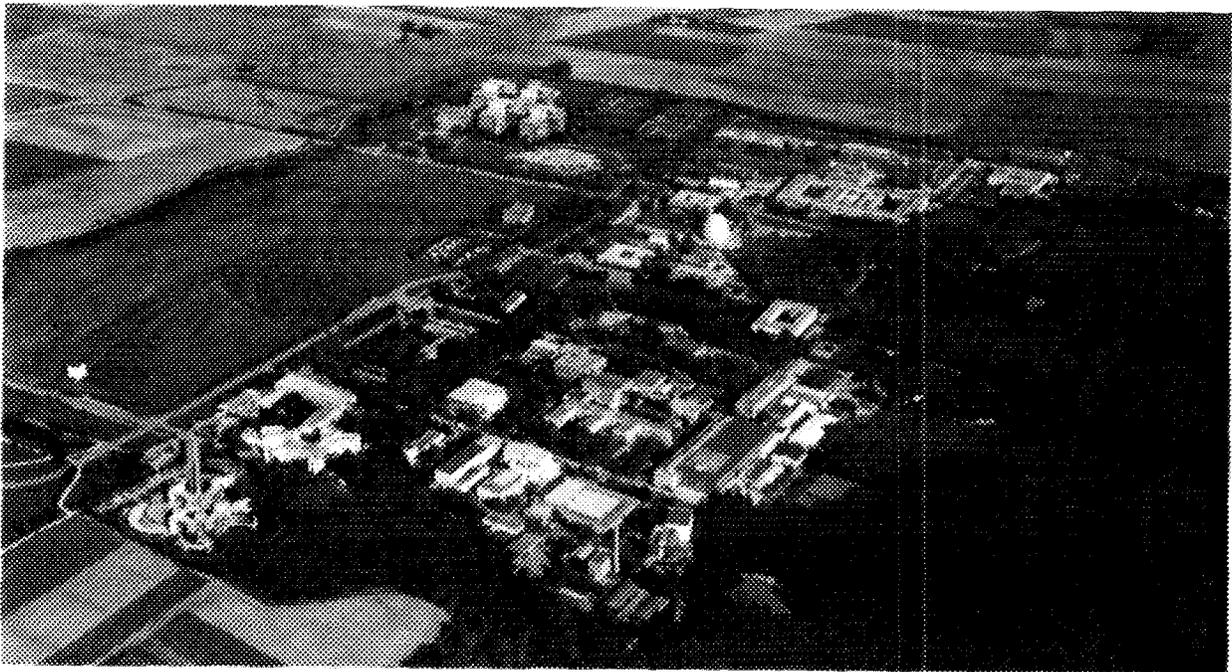
Despite having had in advance all the information on the arrangements for my living and working at Garching, I was pleasantly surprised not to experience any shortage in administrative and social support. Everything was pre-arranged. Only a few months after my arrival, I formed the habit of feeling "no problems" -

everywhere and any time, in the streets, at the apartment, at the office. In this connection, I can't do without directing warm words to Mrs. Weinfurter's address, whose help (like visa formalities, medical insurance, as well as in many other aspects) was really priceless. And finally her usual way to try her best should be emphasized.

Habits are the second nature, say the Russians. Nothing surprising that I have been confronted with quite a different mentality and the necessity to lead a different mode of life. It is difficult to judge preferences, but, frankly speaking, I would advise every Russian to take a look of Germany. Despite the fact that in my case the impressions as a whole were corresponding to my earlier imaginations, it is still better to have a look once rather than to hear even seven times. Maybe the daily life here is not so "interesting" as in Russia nowadays, but it is well known what a wise ancient Chinese used to say about an interesting life in interesting times.

The main reason for me to enjoy being at Garching is, probably, the perfect conditions for plunging into pure work. Only missing my family is a drawback to be put on the other side of the scales. Nevertheless, there is a severe joke about that one man can really manage with only one deal simultaneously: work or woman (at least in Russia). Anyhow, being here is a lucky opportunity to combine the useful with pleasure. The Garching ITER JWS and its close surroundings have their own charms, and, in addition, being so close to great Munich is an asset.

I am looking forward to the moment when the accumulated mass of reports and memos will reach the critical size required to start the construction of ITER. I hope that at least our grandchildren will have an opportunity to see an exhibit of the real ITER at the Deutsches Museum in Munich as well as in some other museums. It does not matter where the first fusion reactor will be constructed and under which abbreviation. But our common concern should be to save at least the character "I" in this abbreviation. Despite all modern electronic tools for information exchange, nothing could substitute personal contacts.



*Bird's View of the Garching Research Center, the core of which is the Max Planck Institute for Plasma Physics (IPP). On this photograph a part of the ITER Building is still under construction.*

Items to be considered for inclusion in the ITER Newsletter should be submitted to B. Kouvochinnikov, ITER Office, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria, or Facsimile: +43 1 237762, or e-mail: c.basaldella@iaea.org (phone +43 1 206026392).

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