"We must give thoughts again to this statement by Acad. Kurchatov, which may be regarded as his will. On the occasion of this commemorating symposium, I would like to appeal strongly to the scientists and peoples all over the world to accept the responsibility for the use of science and technology for the benefit of mankind."

"It is a dream of mankind to secure environmentally friendly energy resources, featuring strong safety, and allowing practically endless use. It is an objective that must be attained without fail, if the world is to maintain sustained growth and to accomplish prosperity. Nuclear fusion, which has no restraint in resources and has the least effect on the environment, is a potential power production technology of great significance for the realization of this dream. We can say that ITER is a project which symbolically demonstrates the significance of the partnership between Japan and Russia in the field of science and technology."

"In Russia, Acad. Velikhov, President of the Russian Research Center "Kurchatov Institute", and staff members of this Institute, have been the central figures in the research and development of ITER. Above all, the Tokamak system, used in ITER, was developed in this Kurchatov Institute. In designing the ITER device, a superconducting coil manufactured by Russia was incorporated in test facilities in Japan, and the feasibility of a Toroidal Field Coil for ITER was verified. It was a brilliant achievement of the cooperation between Japanese and Russian scientists, being part of ITER's history."

"Japan strongly hopes that the ITER device will be constructed in Rokkasho Mura, Aomori Prefecture. If the technology developed in Russia eventually would blossom in Japan, it would be the best result of the Japan-Russia cooperation. We look forward to inviting ITER to Rokkasho Mura, and to working with researchers from Russia and other parts of the world in the ITER project."

MEETING OF THE ITPA TOPIC GROUP ON SOL AND DIVERTOR PHYSICS

by Drs. B. Lipschultz and N. Asakura

The most recent meeting of the Scrape-Off Layer (SOL) and Divertor Physics Group of the International Tokamak Physics Activity (ITPA) was held in Lausanne, Switzerland, on October 21-23, 2002 at the CRPP/EFL laboratory. The meeting was hosted by Dr. R. Pitts of that laboratory, with the help of other laboratory staff. There were 23 participants. The meeting format was slightly changed from that of the previous meeting (February 25-27, 2002) in so far that more time was allowed for discussions, thus making the meeting more productive.
There were 28 detailed presentations over two and a half days falling into three primary areas:

- the physics of ELMs and their effects;
- radial transport and wall recycling;
- materials issues (T codeposition, use of W for tiles, etc.).

Those presentations might be summarized as follows:

ELMs and disruptions: ELMs were shown to strongly affect the SOL density and temperature profiles leading to particle deposition on the first-wall (DIII-D). Fast measurements of the divertor ELM energy pulse (duration longer than MHD time scale, and triangle waveform) in JET indicate reduction in power loading predictions for ITER. During disruptions (thermal quench), power balance studies cannot explain exhausted plasma energy (JET). In addition, the JET divertor disruption energy deposition (< 10%) is much lower than other experiments (AUG and DIII-D). These results suggested that part of power loss reached to the first wall. Better measurements of radial transport during ELMs and disruptions are planned and are required for prediction of the heat load level on first wall in ITER (see meeting summary).

Radial transport studies: An initial comparison of SOL plasma profile in DIII-D and C-MOD L-mode plasmas using dimensionless scaling showed that the two experiments had similar normalized Te and ne profiles at the outer SOL. The analysis of radial transport coefficients D_{eff} and V_{eff} also showed essentially the same scaled transport even though the neutral penetration is significantly different near the separatrix. Data has been collected at JET for similar comparisons. Data collection from other tokamaks is being planned.

An initial comparison of the separatrix density profiles from JET and AUG were compared with the goal of better predicting the seperatrix density in future tokamaks. The pedestal profiles appear to follow a similar scaling – $(n\nabla T/T\nabla n) \sim 2$. which would have important implications for predicting pedestal behavior. Profiles from other tokamaks are being collected.

T retention: Estimations of T-retention, behind the plasma facing components such as louvers (in JET) were shown to be very variable (a factor of 40), but still imply too large a T inventory in ITER where carbon is used at the divertor target tiles. The selection of C in a BPX divertor will be reviewed based on these results and the JET disruption power loading. Amelioration/removal techniques must be emphasized as well. Long pulse (200s) operation in Tore Supra indicated that 60% of the injected gas was absorbed at the wall and limiter at the start, and drops as a function of time. The result suggested that wall retention limit was 600 s. This evaluation has important implications for density control and T inventory as well as the JET louver results. New results on He bubble formation in W stirred considerable interest.

Other areas: Detlev Reiter presented a study of the effect of including radiation transport in 2D edge plasma transport codes. This has not been fully implemented yet. But the effect is very strong, reducing the degree of detachment. The inclusion of line broadening mechanisms (Zeeman splitting) should reduce this effect.

The discussions emphasized what all experiments could provide on ELM characteristics, ranging from characteristic energy deposition times and profiles to dependence on pedestal characteristics. The excitement of a variety of experiments contributing data extended to radial transport measurements as well. At one point the participants came to the issues of the choice of first-wall materials, both the wall itself and the divertor. There was a strong mandate to review the ITER materials choices in view of the new knowledge of ELMs, disruptions and general radial transport. This topic has been chosen for being emphasized at the next meeting.

The next meeting is scheduled to take place immediately after the Thirtieth International Conference on Controlled Fusion and Plasma Physics in St Petersburg (July 2003) and another one in Japan sometime in November or December 2003.

Participants in the Meeting

N. Asakura (Japan), G. Counsell (EU), G. Federici (ITER), W. Fundamenski (EU), P. Ghendrih (EU), A. Kallenbach (EU), G. Kirnev (RF), A. Kirschner (EU), S. Krashenninkov (US), A. Kukushkin (ITER), A. Leonard (US), B. Lipschultz (US), T. Loarer (EU), A. Loarte (EU), A. Mahdavi (US), G. Matthews (EU), V. Philipps (EU), R. Pitts (EU), G. Porter (US), D. Reiter (EU), M. Shimada (ITER), S. Takamura (Japan), D. Whyte (US).

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