EIGHTEENTH FUSION ENERGY CONFERENCE

SESSION OV6/ITER

Thursday, 5 October 2000, at 2:05 p.m.

Chair: R. PARKER (USA)

SESSION OV6/ITER: ITER (provided by E. TADA, Japan)

Paper IAEA-CN77/OV6/1 (presented by M. Huguet)

DISCUSSION

G.S. LEE: The ITER-FEAT TF magnet is now wedged. How do you close the casing (either welding or bolting)? If you do welding, how you could maintain accuracy of wedge region?

M. HUGUET: The TF coil cases are closed by welding. Mechanical accuracy is achieved by machining the cases after welding.

M. KIKUCHI: You showed 2 types of design options, INCOLOY option and Ti+SS option. When will you decide the option for real construction?

M. HUGUET: R&D is underway to evaluate the double jacket option. The choice between the two options will be made when all R&D data is available. It should be noted that the choice has no impact on the other components of the tokamak.

Paper IAEA-CN77/ITER/1 (presented by Y. Shimomura)

DISCUSSION

D. HILL: What are the main activities that will occur during the time between ITER starts operating and you begin D/T experiments some years later? It will seem that the public will expect to know if ITER works rather soon.

Y. SHIMOMURA: In the forth year, we plan to have DT burning experiments. We will have to confirm the machine capability and reliability before the DT burning experiments. This will increase the efficiency of DT operations and therefore these first three years without DT is a reasonably short period.

R. GOLDSTON: Many people feel that a practical tokamak fusion reactor must have a beta-normal of at least 3.5 at high current. Can ITER support the power level that this might entail (say 1.2 GW) and is there a good system possible for feedback stabilization of the Resistive Wall Mode? These could either be as part of the base project or as an upgrade potential.

Y. SHIMOMURA: As I showed in my talk, beta-normal of 3.5 can be tested with 500 MW of fusion power and 9-10 MA of plasma current. Therefore 1.2 GW is not needed. For the Resistive Wall Mode, we have a set of saddle coils outside of the vessel and a set of sensors inside of the vessel.

M. KIKUCHI: I have the same question as R. Goldston. You said the Resistive Wall Mode control system is fast enough. But, you did not show any simulation results. Do you have any simulation to stabilize the Resistive Wall Mode? Experiments on Resistive Wall Modes show that stabilization is not so easy.

Y. SHIMOMURA: We have only a preliminary estimation. The loops give 10 GJ/20 kA with a frequency of 2 Hz. If necessary, the current and/or the frequency can be increased because the maximum current is 100-150 kA. I know the difficulty in the present experiments and we need more work especially in experiments.

Paper IAEA-CN77/ITER/2 (R) (presented by A. Loarte)

DISCUSSION

D. HILL: It appears that details of the divertor design for ITER are being driven by modeling. How have these predictions been benchmarked against machines such as ASDEX-U, DIII-D, C-MOD and other machines? Or, is it largely determined by data from JET only?

A. LOARTE: B2-EIRENE predictions have been compared with data from DIII-D, C-MOD, JT-60, TCV as well as for JET and ASDEX-U. For the specific issues of the ITER divertor geometric optimization, the benchmark relies mainly on JET (with the MKIIA and MKII Gas Box Divertors) and ASDEX-U with Divertor II. This is due to the fact that these divertors are the closest ones to the ITER divertor geometry and already show the physics effects which have been followed to provide the physics basis for the optimization of the ITER divertor design.

F. WAGNER: The energy peeled all by an ELM probably depends on the edge pressure gradient and the pedestal width D. When you rephrase DWELM into these terms how large is D for ITER?

A. LOARTE: At this stage, it is not possible to answer precisely this question because the extent of the region peeled by the ELM is considerably larger than D and we do not know the size scaling of the ELM affected region and D. However, we have checked which is the effect of assuming that the ratio of ELM affected region to D is size independent on the predicted ELM size and found that is small (of the order of 10 ~ 20 %).

Paper IAEA-CN77/ITER/4 (presented by H. Tsuji)

DISCUSSION

G. S. LEE: Concerning the experimental value of $n\tau$ for coupling loss in CS Insert Coil, Inner Module, or Outer Module, it has scattered values. Could you give any reason of this?

H. TSUJI: There should be more than one reason. The major reason could be due to the fact that the decoupling between strands was different depending on the layer numbers.

Paper IAEA-CN77/ITER/5 (presented by K. Ioki)

DISCUSSION

G. S. LEE: How do you leak-check and repair the VV?

K. IOKI: We have no space for access to repair the outer surface of the inboard vacuum vessel in the current design because the repair probability is extremely small. If access is required, we would need more space.