NINETEENTH FUSION ENERGY CONFERENCE

SESSION FT/2

Thursday, 17 October 2002, at 8:30

Chair: Yuanxi WAN (China)

SESSION FT/2: Engineering Design

Paper IAEA-CN94/FT/2-3 (presented by M. Wanner)

Discussion

K. Yamazaki: You talked about a 5 MW NBI heating plan in the first stage that will be upgraded to 20 MW in the second stage. Would you please let us know the second stage schedule.

M. Wanner: At present only stage I of NBI (5 MW) is approved and the corresponding budget is available. The design is a rebuild of beamlines used at ASDEX Upgrade and allows an upgrade to 20 MW. The application for financial support has been submitted. Approval is still pending.

Yuanxi Wan: Can you tell us what the construction schedule is?

M. Wanner: Due to the difficult delivery situation related to the supply of the coils and the stoppage of work at some subcontractors, the consequences for the project schedule are at present difficult to assess. In any case the delay will be more than one year.

Paper IAEA-CN94/FT/2-4 (presented by B.E. Nelson)

Discussion

M. Wanner: The shell forms a robust structure for the non-planar coils. How is the shrinkage of the coils during cooldown to LN2 temperature handled?

B.E. Nelson: We expect the coil windings and shell structure to contract uniformly during cooldown to 80 K. However, we have included clamps to preload the windings against the structure to ensure that there will be no gaps. We have also tested the composite copper/epoxy windings and found them to have a low compression modulus, which results in low thermal stress during operation. Further testing is planned to confirm this result.

Paper IAEA-CN94/FT/2-5 (presented by S. Ishida)

Discussion

B. Coppi: Why did you choose 18 toroidal coils rather than a higher number to ease the ripple problem?

S. Ishida: The number of TF coils is chosen taking into account the accessibility of the tangential beamlines for current drive. Ripple loss of beam ions is calculated to be sufficiently reduced with adjusted arrangements of ferritic steel for a wide range of the toroidal field B_T = 2.0–3.8 T.

Paper IAEA-CN94/FT/2-6 (presented by D.M. Meade)

Discussion

R.J. Buttery: It seems attempts to stabilize RWMs at low rotation have met with little success. Do you have plans to introduce momentum injection?

D.M. Meade: The feedback stabilization system proposed for FIRE should work even at zero rotation, according to theory. Unfortunately, present experiments at high beta have significant rotation so that it has not been possible to test the theory. It is also anticipated that reactor plasmas will have low rotation. Therefore it is important to establish techniques for RWM stabilization at low rotation.