

IFERC Newsletter



IFERC-N-2013-5, 28 May 2013

International Fusion Energy Research Centre, Rokkasho, Aomori 039-3212, Japan

Meetings

4th Technical Coordination Meeting of DEMO Design Activities

The 4th Technical Coordination Meeting (TCM-4) of DEMO Design Activity (DDA) was held at IFERC in Rokkasho Japan on 4th-6th February 2013 with 53 participants (including 22 remote participants); 5 from IFERC-PT, 26 from JA home team, 21 from EU home team and a member of BA Project Committee. The progress for the DDA Phase two-A which was completed last December was shown at this meeting. In addition to the sessions on the DEMO design issues, a joint session with the DEMO R&D group was set up in this meeting to enhance mutual cooperation on the activities in IFERC.

Since the benchmark exercise showed a good agreement between the system codes, it was agreed to conduct, as a next step, DEMO modeling analyses to evaluate the important physics assumptions. In particular, the effect of edge pedestal on the bootstrap current fraction and improvement of current drive efficiency by electron cyclotron waves were studied for implementation in the system code.

Results of a divertor simulation using JA's SONIC code demonstrate the effects of seeding (Ne, Ar & Kr), the "longer leg" and radial transport. Two advanced divertor concepts, "super-X" and "snowflake", have been studied by JA and EU to compare possible benefits and disadvantages, taking into account design integration and engineering aspects from the outset. JA proposed an improved blanket concept with a mixed bed of Li₂TiO₃ and Be₁₂Ti pebbles. EU concentrated on blanket integration studies for four types of blankets (water- (WCLL) or helium-cooled liquid-metal breeder (HCLL),

helium-cooled pebble-bed breeder (HCPB), and dual-cooled liquid-metal breeder (DCLL)). Thermo-hydraulic & -mechanic analyses have been performed to validate the principal design parameters. A preliminary neutronic analysis showed that the TBR is only marginally above 1.0 and it will impact the allocation of parts of the machine for Heating & Current Drive and diagnostic systems. Critical design issues on the maintenance scheme have been studied by both of EU and JA and variety of schemes are proposed and compared. It was pointed out that all coolant needs to be tentatively removed during the maintenance, and therefore decay heat removal during the maintenance is a critical issue. EU has advanced further using virtual reality tools, the concept of vertical maintainability of large blanket sectors.

In the first stage of the Safety Research ("Stage-1", which lasted until March 2013, and was followed by Stage-2 for detailed study), JA carried out team organization, introduction and development of safety analysis codes, definition of source terms and energies in DEMO, and identification of accidental sequences.

In the joint session with the DEMO R&D group, an updated plan was proposed with 4 tasks for DDA and 8 tasks for R&D, in order to address the technical issues which were called for early resolution based on the peer review of DEMO R&D activity and the recent progress of DEMO design activity. This updated plan will accelerate and enhance the BA IFERC activity.

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