

§21. Comparison between Various Fusion Reactor Designs and Discussion on Critical Issues

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In an ITER era a feasibility study on a DEMO reactor would be quite important, so as to promote a fusion energy development. Especially comparison between various fusion reactor designs and identification of critical issues for the DEMO should be intensively discussed, in order to realize a fusion reactor as soon as reasonably achievable. Here we have organized a workshop on these issues in two times, in collaborating with an activity "System integration study on blanket maintenance for helical reactors" organized by Prof. A. Sagara.

1. 1st workshop on July 18

The recent progress of FFHR study has been presented, and critical issues in helical reactors have been discussed.

@ Participants

Tohoku Univ. 4	JAEA 2
CRIEPI 2	Univ. of Tokyo 3
Kyoto Univ. 1	Osaka Univ. 1
Kyushu Univ. 3	Kyushu Tokai Univ. 1
NIFS 37	

@ Program

- Overview and 3D CAD design; A.Sagara
- Magnetic structure and Selective Alpha-Ash Removal A.A.Shishkin
- Design of split helical coils; N.Yanagi
- Neutronics in 3D helical design: T.Tanaka
- Flibe-V alloy blanket design; T.Muroga
- Tritium recovery system; S.Fukada (Kyushu Univ.)
- System code in helical system; T.Goto (U of Tokyo)
- Engineering evaluation and cost model; Y.Kozaki
- Super Dense Core Ignition; N.Ohyabu
- Self-ignition control; O.Mitarai(Kyushu Tokai Univ.)
- Design on Fueling; R.Sakamoto
- External heating system design; O.Kaneko
- Impurity control; Yuri Igitkhanov
- Design of Magnetic Energy Dump; K.Takahata
- Optimization of SC support structure; S.Imagawa
- SC magnet design; T.Mito
- Design of cryogenic support post; H.Tamura
- FFHR power supply system design; H.Chikaraishi
- Evaluation of FFHR energy balance; S.Yamada

2. 2nd workshop on December 20

Several reactor concepts such as helical, tokamak (including ST) and laser have been reviewed and common features have been clarified. In addition a recent affair on a DEMO reactor design activity in a Broader Approach Project has been introduced and the contribution to this activity has been discussed. Especially It was announced that the EU/JP workshop will start for the BA DEMO design activity in 2007, so as to promote information exchange and identification on the critical issues.

@ Participants

Tohoku Univ. 2	JAEA 1
CRIEPI 2	Univ. of Tokyo 3
Nagoya Univ. 3	Osaka Univ. 3
Kyushu Univ. 1	NIFS 31

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[Helical reactor FFHR design]

- Overview and 3D CAD design: A.Sagara
- Design of cryogenic support post: H.Tamura
- Neutronics in 3D helical design; T.Tanaka
- Design assisting with Virtual Reality; Mizuguchi
- Diverter Design: Masuzaki
- Design of split helical coils; N.Yanagi
- Helical Reactor System and Core Analysis; Higashiyama (Nagoya U)
- Optimization of SC support structure; S.Imagawa
- SC magnet design; T.Mito
- Development of indirect-cooled SC conductor; K. Takahata
- HTS Magnet Design Option; T.Hemmi
- Engineering evaluation and cost model; Y.Kozaki
- Selective Alpha-Ash Removal, A.A.Shishkin
- Impurity control; Yuri Igitkhanov

[Tokamak and Laser reactor designs]

- Tokamak demo reactor SlimSC; Tobita (JAEA)
- Tokamak design demoCREST; Asaoka, (CRIEPI)
- ST reactor design; Nagayama
- Conceptual design of KOYO-F and the future issue; Norimatsu (Osaka Univ)
- First ignition IFE design using solid wall; Y. Ogawa (U of Tokyo)
- Fusion reactor design and tritium; Nishikawa (Kyushu Univ.)

[BA DEMO reactor design]

- Discussions on DEMO reactor design activity at the Broader Approach project