

Preliminary consideration on integrated machine structure for next CFETR

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The next step China MFE facility should bridge the gap toward DEMO, based on the scientific and technical achievements from ITER

It has been well accepted by ITER parties that, ITER is so important for MFE. If it fails, it will kill MFE. It is schemed to be put into operation in 2019 and D-T operation in 2027.

ITER

The reference for next facility and milestone for MFE development.

Present tokamaks, e.g., EAST, HL-2A@M and other tokamaks all over the world.



A facility to bridge the gaps between ITER and DEMO, satellite tokamaks, or IFMIF as BA, Japan or a CTF, or FNSF, or here, we call it CFETR?

DEMO

The last step before FE realization

FPP
The FE realization

DEMO is the latest step toward final realization of FE. Lots of gaps from present tokamak and ITER to DEMO have been realized.

Plasma physics,

Reactor operation and control

Heat removal

Neutron

Materials

Tritium self-efficiency

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If all test tasks are integrated into the next facility in China, e.g., FETR, the facility will be flexible enough to conduct various tests

Discharge scenarios, heating and current drive, α -particles heating and transport, etc.

Plasma physics,

Reactor operation and control

Heat removal

Neutron

Materials

Tritium self-efficiency

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Replacement and maintenance for components, disruption mitigation, measurement compatible with reactor, pellet pacing, ELM mitigation, in-vessel sensors, etc

Divertor, SOL, heat sink in blanket, etc.

Neutron irradiation on components and to environment.

It is broadly accepted, that the material is a big issue for next generation tokamaks.

The considerations on integrated machine structure for CFETR should be concentrated on the flexibility.

High reliability of the component,

Low risk,

Low cost,

High efficiency,

High duty factor,

.....

The fusion community has agreed that all parties must do the best to secure ITER success, both ITER construction and operation

ITER is so important for FE, needing mutual efforts from parties.

- ITER has been relied on so much by the governments and public;
- ITER has been launched 26 years before;
- ITER had been approved to construct by the governments of parties 5 years before;
- The actual design of ITER has been changed so much after the construction approval;
- The commissioning of ITER has been prolonged;
- The budget of ITER encounters large problem;
- The administration...
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ITER is a hard nut. Then how about a fusion reactor?

发件人: Villers Frantz EXT
发送时间: 2012-01-03 23:01:56
收件人: Jokinen Tommi; Bak Joo-Shik; Lipa Manfred; Riccardo Valeria; Tillack Mark; Qiang Li; Marcello Losasso; alexey.makhankov@niiefa.spb.su; SafronovValery; Lee Jeong Bae; JourdanThierry; Grosman Andre
抄送: Villers Frantz EXT; Jokinen Tommi
主题: Status January 3 - Blanket PDR Chit Merging Activities

Dear Andre,

Here is a status on Chit Merging Activities.

Chits have been all merged following panel members emails.

There is still a few remaining items as described below.

We currently have (after merging)

15 Chits of Category 1, 34 Chits of Category 2, 22 Chits of Category 3, 2 Chits with no Categories (#58 and #102)

Remaining Items:

- 1- Chit 29 merging (+43) → André
- 2- Merging Issue between Chit 113 merging (5+11) Mark and Merged Chits 113, 114 è waiting confirmation from Andre
- 3- Can we merge additional chits? → André
- 4- Can we consider the list final? → André

Completed

1. Merged chits concerning attachment and bolting between VV, SB and FW. 9-16-19-20-40-62-70-74-75-77-84-85-87-101-110 (Manfred)
2. Merged chits concerning NHF EU FW panel 52-55-99 (Manfred)
3. Merge Chits for R&D Activities 73-78 (Marcello)
4. Rewriting of Chit 63 (Marcello)
5. Dropped Chits 3, 25, 61, 67, 68, 76, 82, 86, 98, 107 (Frantz)
6. Chit 38 merging (with 44) Valeria
7. Chit 26+32+72 by JS
8. Chit 12 merging (+14,21,31,35,37,49) è waiting confirmation Chit 21 from Brad
9. Chit 30 merging (+34) Marcello
10. Chit 73 merging (+78,80,97) Marcello
11. Chit 8 merging (+50) Valery
12. FW Be tiles 13--50-53-79-81 (Manfred)
13. Chit 6 merging (+7,10,23,24,64) Jean Jacques
14. Chit 15 merging with other diagnostics issues Jean Jacques
15. Chit 28+33+41 by Jean Jacques (for welding inspection)

**ITER blanket PDR,
11.29-12.2, 2011**

Thank you,

Even today, no one disagrees that ITER still has lots of issues for the component design, emerging from the physics design, interfaces between components, material, fabrication, budget, manpower, nuclear license, etc.

Summary

- It is of importance for Chinese fusion community to get ready for next step consideration, by the support from governments.
- We need do our best to secure the success of ITER, and especially for the operation of ITER.
- As CFETR is to bridge the gap between ITER and DEMO via physics, technical and engineering experiments, the integrated machine structure should be designed as flexible as it can be.
- It needs more resources to continue the design of CFETR, but now it needs to be clarified, based on its mission and physics design,
 - What is it?
 - How large is its size?
 - How does it operate?
 - When is it, under the background of ITER?
 - Where is it?