

§1. Activities on ITER/BA Collaboration

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The ITER headquarters office building completed in September 2012 and the building-up of infrastructure in ITER site is progressing well. The CS conductor was improved and achieved the specified performance in examination of the test sample. A large fraction of Nb₃Sn strand for superconducting TF coils is already fabricated in each Domestic Agency. The ITER came into the full-scale manufacturing phase. The urgent issue in 2012 was to make the scenario on W divertor installation in ITER operation. Broader Approach (BA) Activity is also in progress. As for the Satellite Tokamak JT-60SA, 21 procurement arrangements have been signed and it corresponds to about 90% of the total procurement value for the construction of JT-60SA. The disassembly of JT-60U was completed in October 2012. In Rokksho site, high performance computer has been successfully operated and many simulation projects including fusion plasma, reactor materials and technology have been carried out. The world's highest-level facilities for research and development of fusion reactor components completed and collaboration experiment with university group started.

In this year, a big event reporting the results of ITER/BA activities has been held at Tokyo in November 2012. Our ITER/BA group members (Nakamura, Todo) joined in an executive committee and cooperate to make a plan of ITER/BA report meeting. People more than 400 persons came together in the main hall. Many technical experts and their colleagues participated in the meeting, because they presented the results developed in their corporations, which were related to the procurement activities for ITER/BA construction. It was a valuable opportunity for exchanging and sharing information between companies including our fusion community. This kind of event will be planned every year to get everyone to understand the status of ITER/BA projects.

As for ITER tungsten divertor strategy, ITER organization asked the ITPA group to make comments on installation of W divertor in the initial phase of ITER operation. Then plasma cluster group in the Fusion Forum had a meeting to discuss the ITER divertor strategy and to get common understanding in our community. Our experts also participated in this meeting and discussed critical issues on installation of W divertor in ITER.

We have a collaboration meeting to get information about ITER/BA activities in NIFS and to discuss the collaboration activities (participation in ITPA meetings and the ITER/BA related meetings), two times per year. The most important task in our group is to promote the participation in ITPA, in which the tokamak physics R&D activities are conducted for the ITER design/construction and for general tokamak research worldwide. The ITPA

meetings are composed of seven groups (Transport and Confinement Physics; Energetic Particles; Edge Pedestal Physics; SOL and Divertor Physics; MHD Stability; Integrated Operation Scenarios; Diagnostics). The numbers of participants and presentations from NIFS in the 2012 fiscal year are summarized in Table 1. The total participants amount to 7 persons and there were as many as 6 presentations. The travel expenses for 6 participants in the ITPA meetings were supported with the budget for ITER/BA collaboration.

We made an annual meeting on ITPA collaboration in February 2013 to share information about the topics in each ITPA group meeting and to advance the contribution from NIFS researchers. In this year, we invited the Japanese members of chairs and co-chairs of ITPA topical groups to make ITPA collaboration more active in NIFS. We have about 20 participants including three JAEA ITPA members. Research activities and plans of each topical group were reported, in particular, the details from the chairs of Edge Pedestal, Energetic Particles and Diagnostics Groups. We discussed how to progress our ITPA activities in NIFS. There are many unknown physical issues in toroidal plasma confinement such as L/H transition, which does not depend on the type of confinement device. Then it is very important to understand the physical mechanisms by measuring plasma parameters with high accuracy. Plasma diagnostics in LHD have excellent performances and are highly evaluated in the world. This high precision may contribute to understand unknown plasma physics.

At last, the main topics of our presentations in the ITPA meetings are listed as follow:

- Response of microturbulence in ELM suppressed H mode and comparison with gyrokinetic linear simulation in LHD
- Mitigation of Large-Amplitude ELMs by RMPs on LHD
- 3D MHD modeling of DIII-D H-mode plasmas
- Results of MEGA code for the JET alpha-driven TAE
- Radial profile of energetic ion driven GAM in LHD reversed shear plasmas

Topical Group	Date (Place)	Participants (Presentations)
Transport and Confinement Physics	2-5 April (Hefei)	2 (2)
Edge Pedestal	2-4 April (Hefei)	1 (1)
Energetic Particles	15-17 Oct. (San Diego)	2 (2)
Edge Pedestal	15-17 Oct. (San Diego)	1 (1)
SOL and Divertor	16-19 Jan. (Juelich)	1 (0)
Total		7 (6)

Table 1. ITPA Meetings in 2012/2013.