§25. Activities on ITER Collaboration

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ITER has made strong progress. The ITER organization (IO) is now moving into the phase of global procurement and manufacturing. Many contracts (30 PA) have been signed with industries in all ITER members to build elements of the machine or site installations. The project baseline on its schedule is under discussion in ITER council. They are going to make a phased approach to the completion of ITER construction and the target date for First Plasma by the end of 2018, maintaining operation with Deuterium and Tritium fuels in 2026. Our ITER Research Coordinating Group has been promoting research activities coordinated with the ITER project, cooperating with the ITER Collaboration Committee, which consists of NIFS specialists in various physics and technology fields. Our activities on ITER collaboration would play an important role in making active researches to build a DEMO reactor in fusion community.

The most important task in our group is to collaborate with the International Tokamak Physics Activity (ITPA). The ITPA continues the tokamak physics R&D activities that have been conducted on an international level for many years resulting in achievement of a broad physics basis useful for all fusion programs, for the ITER design, and for general tokamak research worldwide. The ITPA meetings are divided into seven groups (Transport and Confinement Physics; Energetic Particles; Edge Pedestal Physics; SOL and Divertor Physics; MHD Stability; Integrated Operation Scenarios; Diagnostics). In 2008, memberships of these topical groups have been renewed and 13 members from NIFS are listed. Each group meeting is planned to hold two times every year. We regard the ITPA meetings as workshops on physics issues related to ITER and on comprehensive understanding of toroidal plasmas. Therefore, we are strongly promoting NIFS scientists' participation and presentation in the ITPA meetings. The numbers of participants and presentations from NIFS in the 2009 fiscal year are summarized in Tables 1 and 2. The total participants amount to 23 persons and there were as many as 22 presentations. The travel expenses for six participants in the ITPA meetings held abroad were supported with the budget for ITER collaboration.

In order to discuss how to advance the ITPA activity, we held an informal meeting on ITPA collaboration of NIFS researchers in July 2009. Activities of each group including the CWGM (Coordinated Working Group Meeting) in helical community were reported and we discussed the situation of our activities in the ITPA meetings. There, it was pointed out that we needed to make a clear vision of ITPA collaboration from NIFS. The ITER collaboration is described in a long-range-plan of NIFS. Experimental data on burning plasma in ITER are of great importance in realizing a helical reactor. We should contribute to the systematization of academic research (science) in toroidal plasmas. In addition, we should have a report meeting just after ITPA meetings and share information about the topics in each ITPA group meeting.

As a new plan of integrating physics and technology for fusion, we held a global meeting, in particular, for young scientists, for understanding each other in various field of fusion science, in cooperation with Fusion Energy Forum. This subject was of great concern in realizing a DEMO reactor. There were participants more than 60 persons including NIFS researchers. The purpose of this meeting is to overview a Technology Readiness Level (TRL) for each element technology in realizing a DEMO reactor, as possible as early, for example, until 2030. The presentations range from plasma confinement to blanket cooling material in fusion science and technology. There were many questions and discussions and we could have a common understanding that it is very important to advance elementary researches and technologies, seeing through into DEMO reactor.

Topical Group	Date (Place)	Participants (Presentations)
Diagnostics	20-24 April (St.Petersburg)	2 (2)
Energetic Particles	21-24 April (Daejeon)	2 (2)
SOL and Divertor	5-8 May (FOM)	1 (2)
Energetic Particles	24-25 Sept. (Kyiv)	6 (3)
Pedestal and Edge	5-7 Oct. (PPPL)	1 (1)
Diagnostics	12-16 Oct. (Pohang)	2 (2)
Integrated Operation Scenarios	20-23 Oct. (Frascati)	1 (1)
SOL and Divertor	14-17 Dec. (San Diego)	2 (3)
Total		17 (16)

Table 1. ITPA Meetings in 2009.

Topical Group	Date (Place)	Participants (Presentations)
MHD Stability	8-12 March (Toki)	5 (5)
Transport and Confinement Physics	22-25 March (Culham)	1 (1)
Total		6 (6)

Table 2. ITPA Meetings in 2010.