

Activities of Rokkasho Research Center

At Rokkasho village in Aomori prefecture, under construction are the facilities of International Fusion Energy Research Center (IFERC), consisting of Computer Simulation Center (CSC) and other two centers, and of International Fusion Materials Irradiation Facility–Engineering Validation Engineering Design Activities (IFMIF-EVEDA). The roles of the Rokkasho Research Center of NIFS are to collaborate in the cooperation among those activities, NIFS and universities at various aspects like the start up of CSC intended to operate the super computer in the early days of 2012, and to promote the cooperation.

The mission and scope of CSC are to establish a Centre of Excellence (COE) for the simulation and modeling of ITER, of the Advanced Superconducting Tokamak (AST) and other fusion experiments like LHD, and for the design of future fusion power plants, in particular DEMO, and the computer resources shall be externally accessible, with sufficient transmission rate to Europe including the ITER site, to allow an efficient remote use of the facilities.

Simulation research in CSC will cover areas of fusion science and technology, which need modeling and high performance computing. This will include theory, simulations and experiment analyses of ITER, AST and other fusion experiments.

Areas of simulation research are:

- Plasma core simulation of fusion reactor;
- First principle simulations;
- Numerical approach for physics and technology of plasma-wall interaction and of plasma facing components (including relevant material research);
- Development of structural and functional materials;
- Neutronics calculation for fusion reactors.

The integration of all aspects (plasma + hardware) into fusion power plant simulators for DEMO, which will be tested in ITER, AST and other fusion experiments (i.e., Integrated Modeling), is the ultimate goal.

Projects on topical areas may be carried out entirely as joint projects or within one party (EU/JA). For joint projects, responsible top scientists from the EU and JA would be appointed to coordinate the simulation/modeling activities as topical area leaders;

- Special campaigns could be scheduled, which would require planning of the computer resources allocations, so that a sufficient share of the CPU time is allocated to the scientists on site;
- Workshops and summer schools could be organized at the CSC;
- Resources would be allocated according to the scientific and technical merits of the proposals, and their promise to advance fusion R&D, subject to a fair and equitable sharing between the two Parties.

The staff of the Rokkasho Research Centers acts as the member of both IFERC-PC (Project Committee) and IFERC SWG (Special Working Group)-1. Up to now, 6 meetings of IFERC-PC and 8 meetings of IFERC-CSC SWG-1 have been held. Especially, in 2009 fiscal year, 4th meeting of IFERC SWG-1 (June 4th, 2009, in Tokyo with TV conference), 5th meeting of IFERC-PC (October 7th-8th, 2009, in IPP Garching with TV conference), 5th meeting of IFERC SWG-1 (November 25th-26th, 2009, in Tokyo with TV conference), 6th meeting of IFERC SWG-1 (February 16th-17th, 2010, in Garching with TV conference), and 6th meeting of IFERC-PC (March 10th-11th, 2009, in NIFS) have been held.

Through those meetings and additional several meetings, IFERC project steadily proceeds. Also, the activities of the sub-cluster on modeling and simulation in the fusion forum to gather and summarize the opinions of the simulation researches of nuclear fusion are strongly linked to the above activities.

A new super-computer system, whose performance might be 1PF class, will be operated in the early days of 2012. This super-computer system will lead to the progress of the various types of nuclear fusion simulations and related theories.

In addition, the Rokkasho Research Center performs communication works with the organization related to ITER-BA, Aomori prefectural office, and Rokkasho village office, and publicity works to have villagers understand the research of the nuclear fusion. The latter includes the regular exhibition on NIFS and the special exhibition on NIFS once per year.

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