

6. Japan-Korea Fusion Collaboration Programs

In 2010, the IAEA conference of fusion energy division was firstly held in Korea, Daejeon in Oct. NIFS and National Fusion Research Institute (NFRI) in Korea have been collaborated in several areas on fusion research. Main aim is to progress the KSTAR project which first plasma was successfully achieved in 2008 and NBI, ICH and ECH heating experiments were started. The human resource development program for ITER project and future reactor design work is also an important item of this collaboration project.

I. KSTAR Collaboration

This project consists of collaborations of diagnostic systems and plasma heating systems for KSTAR project which was successfully carried out in 2010.

1. Plasma Heating System

NIFS continued collaboration and experts exchange for the plasma heating experiment in KSTAR and LHD, and the joint development of ICRF long pulse technologies. Two ICRF experts and one ECH expert visited KSTAR and joined plasma experiment and discussed experimental results and hardware development programs. One NBI expert also visited and joined first NBI heating experiment in KSTAR.

2. Diagnostic Systems

Four JA researchers visited NFRI during June, 2010, for the collaboration of diagnostics systems, and JA and KO agreed that collaboration activities in diagnostics area should be continued and enhanced.

2-1 Bolometer System

1) Resistive bolometer system

First result of the resistive bolometers in KSTAR was presented by Dr. Seo at the High Temperature Plasma Diagnostics Conference in USA and published in RSI paper. Electroformed grids provided by NIFS were installed on the aperture to reduce microwave influence on bolometer signal. Dr. Drapiko visited NFRI in October.

2) Imaging bolometer system

One KO researcher visited NIFS for 6 days to participate in foil calibration. A paper on the calibration of the imaging bolometers in KSTAR was presented at the High Temperature Plasma Diagnostics Conference and published in RSI paper. A paper on the upgrade of imaging bolometers on LHD was published by Dr. B. J. Peterson in Plasma Fusion Research. A paper on a comparison of Pt and Au foils was published by Dr. B. J. Peterson in Plasma Fusion Research. Design and fabrication work for the periscope, aperture camera, shield and machine integration was completed by JA and KO including integration design work at NFRI. Calibrated foil was transferred from NIFS to NFRI in April. Foil was installed in KSTAR in June. Dr. B. J. Peterson from NIFS visited NFRI in June for JA-KO diagnostic collaboration meeting. Dr. E. A. Drapiko visited NFRI in October to look at data and discuss tomography.

2-2 Edge Thomson Scattering System (Polychromators)

One JA expert visited NFRI in June to discuss the KSTAR Thomson scattering system. Two JA experts visited NFRI in August to participate in Thomson scattering experiments in KSTAR. Four KO experts visited NIFS in December to attend the 20th International Toki Conference, where the first results of the Thomson scattering in KSTAR was presented.

2-3 ECE System

Four JA experts visited NFRI in June to discuss the interface between a waveguide system prepared at NFRI and the heterodyne radiometer system ($f = 164 - 196$ GHz). Construction of the multi-channel IF system has been finished in JA. JA completed fabrication of a high frequency radiometer system ($f = 164 - 196$ GHz), and the system was transferred to NFRI before the 3rd plasma operation of KSTAR. One JA researcher visited NFRI to make adjustment of the IF system and participate in KSTAR experiments. Both JA and KO experts attended the 18th Topical Conference on High Temperature Plasma Diagnostics, where they had two poster presentations carried out under the Japan-Korea collaboration on KSTAR diagnostics.

II. Human Resource Development

1. Summary of personnel exchanges in FY2010.

The total number of researchers exchanged from Japan universities to Korea was 82 and the researchers from Korea to Japan was 56 respectively.

2. Seminar and workshops of various fields were held in each country.

- The 5th JA-KO Seminar on advanced diagnostics for steady-state fusion plasma was held from Aug. 26 to Aug. 29, 2010 in Kyushu University/Japan. The host was Kyushu University (Professor A. Mase). The purpose of this seminar is as follows: (1) to give young researchers and students of both countries a comprehensive knowledge of diagnostics for steady-state fusion plasmas, (2) to give them the opportunity to present their scientific results and (3) to help them to develop international friendships and collaborations. About 60 participants, mainly graduate students from JA and KO, participated in this seminar.

- 6th Korea-Japan Workshop on Fusion Material and Engineering Toward Next Generation of Fusion Devices

- Advanced Technology of Lasers for Understanding of Plasma Physics was held.

- Blanket technology and tritium behavior in fusion reactor was held.

- The Korea-Japan Small Workshop on the Collaboration between KAERI and Kyoto University was held.

- Theory and Simulation of Magnetic Fusion Plasmas was held.

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