

5. Japan-Korean Fusion Collaboration Programs

NIFS and National Fusion Research Center (NFRC) in Korea have collaborated in several areas on fusion research. Its aim is principally to progress the KSTAR project whose first plasma is scheduled in the mid of 2008. The human resource development programs for ITER project and future reactor design work are also an important items of the international collaboration.

I. KSTAR Collaboration

This project consists of collaborations of diagnostic systems and plasma heating systems for KSTAR project which was successfully carried out in 2006.

1) Radio Frequency (RF) Heating System

NIFS continued collaboration and experts exchange for joint development of long pulse relevant technologies in areas such as transmitter, transmission components and instrumentation & control. One Korean researcher joined LHD ICRF heating experiment. The CW high power transmitter development for KSTAR and LHD was discussed. Collaboration on KSTAR antenna test and LHD plasma experiment of next year was also discussed.

Workshop on Physics of Wave Heating and Current Drive was held in Korea. Technical and theoretical issues were discussed by participants in the following institutes; Kyoto University, Kyushu University, NIFS and JAEA in Japan, and KAERI, NFRC, and POSTECH in Korea.

2) Diagnostic Systems

NIFS and NFRC discussed for the collaboration of diagnostics system, and agreed that collaboration activities in diagnostics area should be continued and enhanced.

2-1 Bolometer System

(1) Resistive bolometer detectors (12 channels) were calibrated using HeNe laser in Japan. (2) Mid-plane resistive bolometer array was designed in Japan and some parts were purchased. (3) Preliminary design was made of KSTAR imaging bolometer in Japan. (4) Phoenix IR camera for KSTAR was tested on LHD in NIFS. (5) Prototype imaging bolometer for KSTAR was designed for testing on JT-60U.

2-2 Edge Thomson Scattering System

(Polychromators)

APD detectors and preamplifiers were purchased to meet KSTAR requests. It continued to discuss filter combination.

2-3 ECE System

Heterodyne IF system using MIC technology has been developed at KASTEC in Japan. This system has a better S/N ratio than the traditional one made of a waveguide circuit. NIFS proposed to apply a multiplexer filter to divide the upper and lower frequency bands of ECE. The time schedule of the installation of the ECE instruments were discussed.

II. Human Resource Development

1) Summary of personnel exchanges in FY2006.

The total number of people exchanged from Japan to Korea was 54 and that of from Korea to Japan was 27 respectively.

2) Workshops of various field were held in each countries.

The 3rd Japan-Korea Seminar on advanced diagnostics for steady-state fusion plasma was held from Aug. 31 to Sep. 3, 2006 in Sendai/Matsushima. The host was Tohoku University (Prof. Sasao). The purpose of this seminar was 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 50 participants, mainly graduate students from Korea and Japan participated in this seminar.

Other workshops and international conferences on Plasma-Fusion Physics, Fusion Engineering, Theory and ITER Technology were held in both countries.

3) Dispatch

Researchers were dispatched for collaboration research works of following fields in each countries.

3-1 Plasma-Fusion Physics (Japan→Korea)

- 1) Diverter Stabilization on Tandem Mirrors
- 2) Integration and a joint development of NIFS and KAERI database system interfaces

3-2 Fusion Engineering (Korea→Japan)

- 1) Tritium behavior on the surface of materials

3-3 ITER Technology (Korea→Japan)

- 1) Technical Discussion on Tritium Storage Bed
- 2) Joint Experiment on Heat Load of FW

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