

6. Japan-Korea Fusion Collaboration Programs

NIFS and the National Fusion Research Institute (NFRI) have been collaborating in several areas of magnetic fusion research for 8 years. The main objective has been to support and advance the KSTAR experiment through the collaborative development of diagnostics and heating facilities. KSTAR successfully achieved its first plasma in 2008 and is advancing step by step each year. Another important aspect of this collaboration is human resource development for the ITER project and future reactor design work.

I. KSTAR collaboration

This collaboration consists of development projects for diagnostics and heating systems for the KSTAR experiment which were successfully completed during the 2011 Japanese fiscal year (JFY).

1. Plasma Heating Systems

The Korea-Japan workshop on the Physics and Technology of Heating and Current Drive was held in Kyoto University in Japan in the period of 6-8, December 2011. Many technical and theoretical issues were discussed by experts from various universities and institutes.

1-1 Radio Frequency Systems

Both Parties continued collaboration and exchange of personnel and technical knowledge for the development of ICRF and technologies, in particular information for a high power and CW transmitter development.

1-2 Microwave Systems

Both Parties continued the collaboration and exchange of personal and technical knowledge for the development of microwave technologies in fusion plasmas, in particular high power microwave transmission and the method of the estimation and the improvement of the transmission mode purity. NIFS researchers have proposed a new method of in-line measurement of the transmitted polarization and both parties have discussed an experimental setup to realize the in-line polarization monitor.

2. Diagnostic Systems

Six researchers from NIFS and Japanese universities visited NFRI in June of 2011 to discuss collaboration for the development of diagnostics for KSTAR.

2-1 Bolometer Systems

One NIFS expert visited NFRI in June of 2011 to discuss the bolometer diagnostics. Resistive bolometers provided by NIFS were operating during the 2011 campaign on KSTAR. The Phoenix IR camera and optical components for the imaging bolometer were shipped from Japan to NFRI and a NIFS researcher inspected it in February of 2012.

Imaging bolometer foil calibration data was analyzed by NIFS and Japanese university researchers. Preparations were made by NFRI researchers in consultation with NIFS researchers for the calibration and installation of the imaging bolometer and the imaging bolometer foil on KSTAR was upgraded.

2-2 Edge Thomson Scattering System

NIFS continues to loan NFRI a YAG laser. One NIFS researcher visited NFRI in June of 2011 to discuss the KSTAR Thomson scattering system. Two NIFS experts visited NFRI in August of 2011 to participate in calibration of KSTAR Thomson scattering system.

2-3 ECE System

Four Japanese experts visited NFRI in June to discuss the KSTAR ECE diagnostic with researchers from Korea. One Japanese researcher visited NFRI to test the performance of the ECE radiometer (G-band) and to take follow up measures for the next KSTAR campaign. Three Japanese researchers visited Postech and NFRI to collaborate on the development of advanced microwave devices for fusion plasma measurement.

2-4 Other Diagnostics

It was determined that NIFS and NFRI continue to discuss the measurement of KSTAR plasmas, modification of diagnostic systems for better performance and development of new diagnostic systems (CES, Neutron diagnostics). Two Japanese researchers visited KSTAR in November of 2011 to discuss neutron diagnostics.

II. Human Resource Development

The total number of researchers that were exchanged between Japan and Korea in JFY 2011 were 46 from Japan to Korea and 66 from Korea to Japan. Workshops of various fields were held in each country:

- 7th KO-JA Fusion Material and Engineering Toward the Next Generation of Fusion Devices
- Workshop on Theory and Simulation of Magnetic Fusion Plasmas
- 20th – 24th Technical Meetings on Superconducting Magnet
- 5th Workshop on ITER Diagnostics (JAEA) and KSTAR collaboration on Edge Thomson Scattering
- Workshop on ITER tritium systems
- Japan - Korea Blanket Workshop
- It was agreed that the 6th Japan-Korea Seminar on Advanced Diagnostics will be held on Jeju Island, Korea on August 22nd – 25th, 2012

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