6. SNET Collaborate Research

NIFS is promoting the "Fusion Virtual Laboratory Initiative" to integrate fusion experiments and research environments in Japan using SNET, and is remotely collecting and storing data from plasma experiment devices such as QUEST at Kyushu University, GAMMA-10 at Tsukuba University, and TST-2 at the University of Tokyo.

In addition, NIFS is working with the ITER Remote Experimentation Center (REC) for the ITER project, which is an international collaboration, on the demonstration of the remote participation, the storage of large amounts of data, and with National Institute of Informatics (NII) on research related to the transfer of large amounts of data over long distances across national boundaries.

Research Highlights

The amount of data collection of TST-2 decreased to 40 GB in FY2020 compared to 96 GB in FY2019. This is due to a decrease in experimental opportunities due to COVID-19 countermeasures. In order to prevent noise around the device, a prototype of a trigger isolation circuit was developed and the circuit was examined under the following conditions: battery operation, short delay time, and positive logic TTL input/output.

In GAMMA-10, all the data are transferred to the LABCOM system through SNET after the experiment. In FY2020, data other than those collected by CAMAC system, such as oscilloscope measurement data, ADC measurement data for individual measurements, and high-speed camera data, were transferred to LABCOM system. 16 channels of Doppler reflectometer data have been added this year. The data from this system is directly transferred to LABCOM, and can be easily read out by the LabVIEW program.

The data acquired by the high-speed PXI digitizer in the QUEST experiment is remotely stored in the NIFS storage system, which provides a mechanism for sharing and redistribution to research institutes across the country. In addition, these collection systems can now be remotely monitored and controlled via the web to reflect the digitizer.

In the REC, LHD experimental data is used for the demonstration experiment for the remote participation for ITER project. The connection method between the computing resource and the experimental database, data format, storage method, backup, security, etc. were studied.

In collaboration with NII, we conducted a long-distance and multi-point data transfer experiment in anticipa-

tion of sharing measurement data of experimental fusion reactors in international joint research. This time, we connected the route around the world between NIFS and QST by L2VPN, and conducted a file transfer experiment using MMCFTP (Massively Multi-Connection File Transfer Protocol) developed by NII.

(M. Emoto)