

## §2. ST Experiments at the University of Tokyo Node of All-Japan ST Research Program

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All-Japan ST Research Program is supported by NIFS Bi-Directional Collaboration. Under this program, innovative research is carried out emphasizing the ultra-high beta regime and ultra-long pulse regime by forming a nation-wide network of spherical tokamak (ST) research.

The TST-2 spherical tokamak at the University of Tokyo is presently the largest ST device in Japan, with  $R = 0.38$  m and  $a = 0.25$  m (aspect ratio  $R/a = 1.5$ ). It has already achieved toroidal magnetic fields of up to 0.3 T and plasma currents of up to 0.14 MA. TST-2 was relocated to the new Kashiwa Campus of the University of Tokyo in Fiscal Year 2004, and experimental research using RF waves are being carried out. In FY2005, a new device UTST with similar dimensions as TST-2, aimed at forming an ultra-high beta ST plasma utilizing the rapid heating associated with plasma merging and maintaining the high beta state by external heating, was constructed.

Tokamak research at Japanese universities was reorganized to perform creative research using unique ST devices under a nation-wide network, and is the first project supported by NIFS Bi-Directional Collaboration. The NIFS Bi-Directional Collaboration Promotion Subcommittee was established formally in the field of ST research, and started its activity in FY2006. The Super SINET ST Network is an indispensable infrastructure to support this activity.

The purpose of this collaboration is to establish a

nation-wide ST research network to carry out the All-Japan ST Research Program, and to establish a central node at the University of Tokyo. The main roles of the University of Tokyo node is formation of ultra-high beta ST plasma by plasma merging, and heating and current drive research using radiofrequency waves. Under this collaboration, a node of Super SINET ST Network is established at the Kashiwa Campus of the University of Tokyo. This network is necessary for efficiently performing analysis of TST-2 and UTST data, remote experimental participation, as well as large-scale computation.

Under this collaboration, Super SINET was extended from the University of Tokyo Institute for Solid State Physics on the Kashiwa Campus to the Transdisciplinary Sciences Experimental Building of the Graduate School of Frontier Sciences, thus establishing a node of ST Network at the University of Tokyo Kashiwa Campus. The Super SINET router was installed in the Transdisciplinary Sciences Research Building, and the terminal was installed in the TST-2 Control Room in the Transdisciplinary Sciences Experimental Building. The Super SINET connection between the University of Tokyo and NIFS is already being utilized for remote analysis of LHD experimental data obtained under LHD Project Collaboration.

A node of Super SINET ST Network was established at the University of Tokyo Kashiwa Campus in order to carry out activities of the All-Japan ST Research Program. A Super SINET router and a terminal were installed in the Transdisciplinary Sciences Research Building and Experimental Building, respectively, and its use has started.

In the future, connections to other nodes of All-Japan ST Research Program, such as Kyushu University, Kyoto University, and JAEA will be made, and effective use of the ST Network will be made. More concretely, this will enable efficient execution of experimental data analysis of TST-2 and UTST devices at Kashiwa Campus, remote participation to experiments on these devices, remote participation to experiments on devices at other locations, and massive computations.

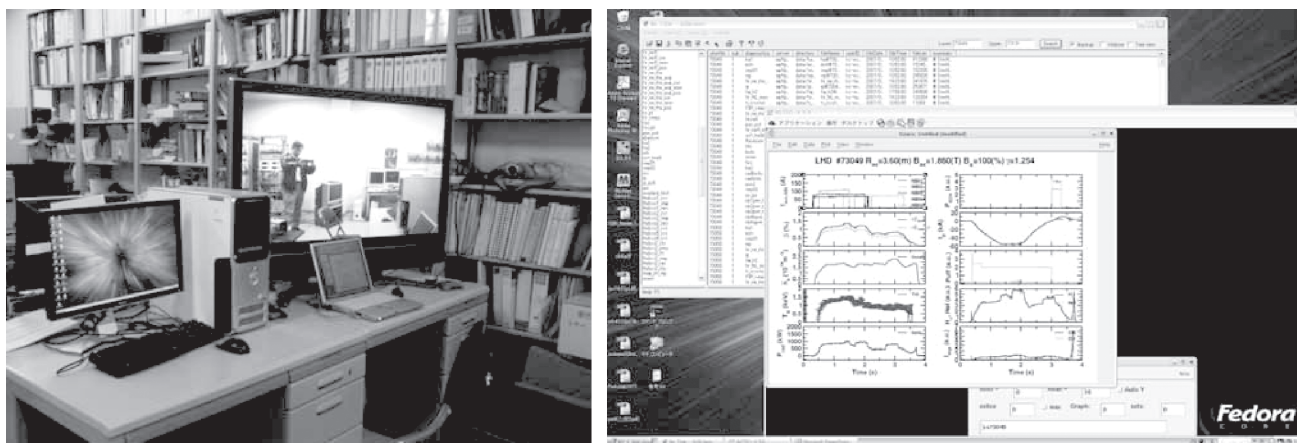


Fig. 1. Terminal for Super SINET connection, installed in the TST-2 Control Room in the University of Tokyo Kashiwa Campus (left). LHD experimental data displayed for remote analysis (right).