

6. Fusion Science Archives (FSA)

The Fusion Science Archives was established in 2005 to learn a lesson from the past fusion science archives preserved and to maintain collections of historical documents and materials that are related to fusion research in Japan. These activities are important from the viewpoint of the historical evaluation of fusion research, its social accountability and making references for seeking the future direction.

Since then historical materials on fusion research and/or organizations related to fusion research have been collected and preserved at FSA. They are stored in acid-free folders and boxes. The total number of registered items is now about 25,371. Most of those catalogues are available to the public through the internet in a hierarchical structure and can be accessed by the use of an electronic retrieval system.

Following collaborative works are performed this fiscal year along this line:

- **Collaborative Activities at NIFS Fusion Science Archives (NIFS FSA), S. Kubo *et al.***

The purpose of this collaboration is to arrange and promote the total archival activities under the NIFS collaboration framework. More than 50 people from universities and research institutions have joined this collaboration research. Interview to H. Momota was carried out to clarify and evaluate the so-called R-Project that was planned but was never realized. The record is edited, proofread by both interviewee and interviewer and finally published as NIFS Archives ID:200-05-01. Online-opening of the catalog database using a commercial cloud server provided by InfoCom Co. is continuously running. About 1,700 items among total number of 25,371 are open through Internet now. The number of registration has been increasing steadily. The first network meeting in this fiscal year of the natural science archives under the research institutions of SOKENDAI framework was held at KEK on August 4th. Workshop style meeting was held at NIFS in December 3rd and 4th, 2015, which was a joint meeting of the two networks for the natural science archives and the fusion science archives. The main purpose of the meeting was to discuss on the role of archival activities in universities. A panel discussion were held in the first day of the workshop. Panelers are S. Nishiyama (Kyoto Univ.), S. Hotta (Nagoya Univ.), S. Morimoto (Univ. Tokyo) and S. Yagu (Sokendai). They discussed the issues and prospects of archives in the university. Special lectures were given by A.

Asonuma (Nagoya Univ.) entitled “Social base of the research universities in USA”. Topics related to the archival activity are as follows:

- A. Kubota (Hiroshima Univ.), “Treatment of historical material in Research Institute for Radiation Biology and Medicine”.
- H. Ezawa (Gakushuin Univ.) and Y. Hushimi (Sokendai), “Publish of Koji Hushimi Collection”
- T. Nomotobori (Nat. Inst. Polar Research), “Archives of Antarctic Snowmobile”
- S. Matsuda (Tokyo Inst. Tech), “Evolution of Fusion Technology –Archives of Negative Ion Beam”

- **Collection of Historical Materials on Fusion Research in Japan by Oral History Method, C. Namba *et al.***

FSA has tried to collect and preserve any available materials so as to fulfill any request from any view point of fusion science archive, but never complete. Oral histories through interviews with fusion researchers who played important roles in the past may supplement the incompleteness.

The record of oral history of Y. Ichikawa was completed and published as a FSA documents. Proofreading and editing the oral history record of M. Yoshikawa are almost completed and will be printed soon. Interview to H. Momota was carried out to clarify and evaluate the so-called R-Project that was planned but was never realized. The record is now under proofreading.

- **Studies on History of Nuclear Fusion Research at the Dawn Stage, T. Amemiya (CST, Nihon Univ.), *et al.***

Hayakawa and Kimura's articles discussed the historical facts of plasma physics and nuclear fusion research in Japan in detail in the 1960s based on the historical materials. Although many papers and articles on history of nuclear fusion in Japan frequently are written citing several texts from their article as secondary sources, there still remain a lot of historical facts which were not covered in previous studies. One of such uncovered points is the origin of the A-B plan and its relation to the establishment of the Institute of Plasma Physics (IPP) which emerged and resulted from the discussion of future plan of nuclear fusion research in Japan. This point was featured this fiscal year. The A-B plan was

proposed and discussed in Kakuyugo Senmonbukai (the Special Panel on Nuclear Fusion Research) between 1958 and 1959. The A-plan aimed at training and shape of the new theory (mainly basic research of plasma physics); the B-plan at introduction and makeup of the middle size device already in operation abroad.

As a result of this collaborative research in this fiscal year, new historical interpretations of the relationship between the A-B plan and IPP were found by historical documents that are filed in NIFS FSA.

The following studies are planned in next fiscal year: (i) On the discussion of establishment of IPP in Kakuyugo Tokubetsu Iinkai and (ii) Effort of nuclear fusion community in Japan toward the Second United Nations Conference on the Peaceful Uses of Atomic Energy.

- **Consideration on History of Compact Helical System Based on Historical Documents,** K. Matsuoka *et al.*

In the course of compiling the history of CHS, the specific feature of the project became evident, that is the project was scarcely review & checked by the Scientific Committee of the Institute of Plasma Physics of Nagoya University under which CHS should have been controlled if it had been a normal project. The study clarified following points:

1. In the Scientific Committee the number of researchers who were familiar with helical plasma was only 10 percent of the members.
2. The situation of helical plasma in the world was that ATF and W7-AS that opened a new era of helical plasma research would soon be operational. It was necessary to start quickly the new helical plasma project in Japan, too. IPP might not be able to wait the discussion at the Scientific Committee and the Steering Committee.
3. The top-down character of coming new institute did not seem to affect what the members of the Scientific Committee said.

- **Archival Studies on Collaborations in Heliotron Studies at Kyoto University,** T.Mizuuchi(IAE, Kyoto Univ.) *et al.*

This archival study is focused on the fusion oriented high temperature plasma experiments performed in the series of Heliotron devices at Kyoto University. After the POP experiment in Heliotron E (Kyoto Univ.), the Helical-Heliotron concept is now in its parameter expansion phase and a lot of remarkable results have been obtained through the LHD project in NIFS. On the other hand, a new generation of the heliotron concept, Helical- Axis Heliotron configuration, was proposed and has been experimentally examined its basic ideas through the Heliotron

J project in Kyoto Univ. Comprehensive and systematic collection of the research materials on each heliotron device, including the materials about technical notes in the R&D phase of machine construction and of control sequences, the minutes of experimental meetings/discussions at each stage are pursued under the collaboration program. In addition to collecting these documents, finding image video records in the very early phase of the Heliotron E experiment making a digital library of photographic slides of experimental devices and presentations in the Heliotron E era, restoring the raw data of Heliotron E experiments (including some program files for data analyses) into a set of hard-disk (HD) have been performed. The minutes of weekly meetings for experimental group, (Project Heliotron E Committee Meeting, since FY1980 are also started to be converted into electric files.

(Kubo, S.)