

# 5. Fusion Science Archives (FSA)

The Fusion Science Archives was established in 2005 to learn lessons from the past fusion science archives preserved and to maintain collections of historical documents and materials that are related to fusion research in Japan.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 future directions.

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 approximately 25,400. 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.

The following collaborative works are performed this fiscal year along this line:

- **Establishment and Evolution of the Inter-University Research Institute Corporation System (NIFS16KVXV010)** K. Matsuoka (NIFS, FSA) *et al.*

Fusion research at inter-university research institute should be basic and academic taking the realization of fusion energy into consideration as Hideki Yukawa pointed out in the 1950s. Research at IPP Nagoya University was not based on this guideline because of the following reasons. 1) Basic plasma experiments in 1960s at IPP Nagoya University were excellent, but not useful for fusion energy. 2) JIPP T-II of stellarator/tokamak hybrid type, the principal machine of the second term program, was the strongest machine having magnetic field of 3 Tesla. To cope with the tilting force of TF coil, it was equipped with shear panels that severely hindered diagnostics essential for academic research without serious discussion on what was the academic purpose of JIPP T-II.

- **Archives of the Historical Material related to the Plasma Spectroscopy (NIFS17KVXV0011)**

N. Yamaguchi (Comprehensive Research Organization for Science and Society (CROSS)) *et al.*

Workshops called “Plasma Elementary Process workshop” or “Spectroscopy workshop” have been held as a collaboration research of Institute of Plasma Physics, Nagoya University (IPP) and NIFS from 1969 to the present. The editing work of the history of the these workshops is continued from last fiscal year. The agenda and reports of each workshop are piled up as an annex of the history.

- **Studies on History of Activities of Researchers at the dawn stage of Fusion Research in Japan (NIFS17KVXV012)** T. Amemiya (CST, Nihon Univ.) *et al.*

The History of Science Group of CST, Nihon University investigated the history of fusion research in Japan from the 1950s to the 1960s. In this collaborative work, the focus is placed on the individual researchers or the organizations that have led research in the dawn of fusion in Japan utilizing the historical documents in the NIFS FSA and the KEK archives office. The subjects specifically investigated in this fiscal year are as follows: (i) On the drafting and postponing of the B-plan by the Special Panel on Nuclear Fusion Research (Kakuyugo Senmonbukai), (ii) On the background about drafting of Institute of Plasma Physics based on letters between Kodi Husimi and Eiichi Kawasaki, and (iii) On the efforts to address the Atomic Energy by Japanese Physicists at the dawn of the nuclear age in Japan.

- **Development of a Cooperating System of Archives Finding Aids and Technical Terms Databases as a Supporting Tool (NIFS16KVXV013)** Y. Takaiwa (KEK, Archives Office) *et al.*

The aim of this work was to prepare dictionaries of technical terms, proper nouns of important persons or a project’s name and to relate them to the the catalog database of archived materials. This fiscal year, identifying the technical terms, proper nouns to be picked up, and searching the mechanism to relate them are tried. Regarding the collection of the technical terms, the glossary which collected the columns appeared in the *Journal of Plasma and Fusion Research* is identified to be an adequate starting point. The collection of proper nouns is covered by other collaborative works (NIFS17KVXV014). Furthermore, it is identified that establishment of the mechanism to relate them to the present catalog database requires too much work under the present collaboration framework.

- **Making name authority data about persons, groups, and organizations appearing in FSAD, related to fusion science in Japan (NIFS17KVXV014)** H. Gotoh (The Kyoto University Museum) *et al.*

FSA accepts various materials related to the fusion science history. It picks up essential information from materials, organizes it, and stores it in the database. The archives catalog created in such a way is provided to the users of interest. Researchers or research groups on fusion science and their mutual relations are not clear for the user only from the catalog. The purpose of this research is to clarify the method of accumulating and sorting the directories of those who have committed to fusion science. Issues found during last year and progress for resolving these issues during this year were the following: (1) Realized the standard electrical database of the researchers on fusion science from its early stage to the present is missing. In total 1,300 researchers are registered from the directory of “KAKUYUGO (HANNOH) KONDANKAI” *etc.* and compared with other databases to confirm the validity. (2) Identified the existence of important elements that are not included in the standard authorized

database. Tried to find the relations or interactions between other researchers and research groups, but found it requires a more efficient method and much more effort. (3) Need to find the method to modify the existing databases of authority records in library world. The method of the authority control will be examined.

- **Archival Studies on Collaborations in Heliotron Studies at Kyoto University (NIFS17KVXV015)**

T. Mizuuchi (Kyoto Univ.) *et al.*

The activity of the archives of this fiscal year focused on the materials related to the development of the plasma experimental devices in contrast to the FSA activity in NIFS mainly on the fusion researchers and research organization. In this regard, the archives activity are promoted on the development of the series of Heliotron devices originated from Kyoto University. The range of objects of the archives is extended to the researchers, research group, and their activity which led the Heliotron development.

- **Investigation and Analysis of Historical Materials on Startup and Development Phase of Fusion Technology Research in Japan (NIFS17KVXV016)** H. Yoshida (Nippon Advanced Technology) *et al.*

The startup and development phase of the fusion technology research in Japan was investigated from the view point of Japan Atomic Energy Research Institute (JAERI) and the Institute of Plasma Physics, Nagoya University (IPPJ) under the collaboration with FSA. Following the interview with Shigeru MORI last year about the origin and the background of the fusion reactor technology research in JAERI, he suggested that there had not been close relationship between those in JAERI and in IPPJ and universities. In this year the cooperation with Shiori ISHINO (Prof. Emeritus, Univ. Tokyo) has began about the investigation of the origin and the background of the material research development in universities. With this three year collaboration project, we have fixed the concept to investigate the startup and development phase of the fusion reactor engineering research in Japan. This collaboration will be succeeded as a new theme in the next year.

- **History of the early days of Nuclear Fusion Research Group in Japan (NIFS17KVXV017)**

C. Namba (NIFS FSA) *et al.*

The organization “Nuclear Fusion Research Group of Japan” (KAKUYUGO KONDANKAI) was established in 1958. Dr. H. Yukawa was the first president of this organization. This KAKUYUGO KONDANKAI continued to perform an important role in the research and development in fusion science in Japan as a voluntary organization for researchers until it became “The Japan Society of Plasma Science and Nuclear Fusion Research” in 1983. The theme of this work is to clarify the establishment process of the KAKUYUGO KONDANKAI and how organized researchers and how planned to promote the fusion development research. KAKUYUGO KONDANKAI was formed as a researcher’s voluntary organization to promote plasma physics which is the base of fusion science independent but derived from “Assembly for Nuclear Fusion Reactions” (KAKUYUGO HANNOH KONDANKAI) established under Science Technology Agency.

- **Collaborative Activities at NIFS Fusion Science Archives (NIFS FSA) (NIFS17KVXV018)**

S. Kubo (NIFS, FSA) *et al.*

The purpose of this collaboration is to arrange and promote the general archival activities under the NIFS collaboration framework. More than 50 researchers from universities and research institutions have joined this collaboration research. Ten collaboration programs were approved and performed as a NIFS general collaboration (NIFS17KVXV010-019). One workshop type collaboration (NIFS18KKG003) is approved and performed as a second Archives in Natural Science Workshop in January 2019 at NIFS.

- **Construction of Digital Library of Husimi Kodi Archives (NIFS18KVXV019)** H. Iguchi (NIFS, FSA) *et al.*

Historical documents left by Kodi Husimi, the first director of Institute of Plasma Physics, Nagoya University, are the most important property of the NIFS Archives. Many documents are more than 50 years old, and their paper quality is seriously degraded. We are promoting digitalization of these documents. It is necessary not only for permanent preservation of the historically useful documents but also for opening the documents for public use. About 600 documents among a total of more than 5,000 Husimi documents are now preserved as PDF files. The job is just getting started and continuous work is necessary.

- **Studies of archival activities in research institutes from various points of view (NIFS18KKG003)**

E. Kikutani (KEK, Archives Office) *et al.*

Archives activities in the Inter-University Research Institute Corporation of mainly in the natural sciences have been studied for more than ten years. During this process, the importance of the theoretical and technical methods of collection, preservation, registration, cataloging, and archiving are re-realized. The information exchange among the organizations for archives is also important. Workshops for discussing the archives in the field of natural sciences have been held twice a year for these few years. The workshop held under the support of NIFS collaboration in this fiscal year focussed on the “Official Document Management Law”.

(S. Kubo)