

8. Fusion Science Archives

Main activities in the fiscal year of 2009 are divided into 5 works; (I) to make steady progress in collection and registration of database, and in construction of cross-searching system on the basis of EAD (Encoded Archival Description), (II) to attend workshops and seminars to acquire advanced and useful knowledge related to archives, (III) to conduct interviews to pioneers and/or prominent researchers of nuclear fusion research, (IV) to begin to describe history until foundation of inter-university institutes consisting of SOKENDAI (The Graduate University for Advanced Studies) by focusing largely on big sciences, (V) to present achievements of NIFS Fusion Science Archives (FSA) at various society meetings to disseminate importance of archives. These activities are closely related to the SOKENDAI project "History of Inter-University Institutes and Archives". The summary is as follows.

(I) NIFS collaboration researches of this fiscal year consist of 7 research subjects aiming to promote above-mentioned tasks as follows; 1) "Study on History of Fusion Research Based on Archives" by K. Matsuoka, 2) "Construction of Electronic Finding Aids for Fusion Science Archives Database" by C. Namba, 3) "Effects of Monbusho's Grant-in-Aid in Promoting Nuclear Fusion Research in Japan" by H. Obayashi, 4) "Compilation of Chronology Based on NIFS Fusion Science Archives" by K. Kimura, 5) "Archival Studies on Devices of Fusion Science" by T. Kuroda, 6) "Archival Studies on Development of Heliotron Devices" by T. Mizuuchi, 7) "Archival Studies on History of IAEA Fusion Energy Conference" by E. Uematsu. While database of the early phase of fusion research have primarily been promoted, LHD cryogenics database that are rather new have been collected for three years. In this fiscal year almost all of the database were successfully registered under collaboration, of which details are described in this annual report.

NIFS, SOKENDAI, High Energy Accelerator Research Organization (KEK), Institute of Molecular Science (IMS), National Institute for Physiological Sciences (NIPS), National Astronomical Observatory of Japan (NAO) and National Institute of Polar Research (NIPR), which are inter-university institutes belonging to SOKENDAI, cooperated closely to construct their database. In addition to these activities, substantial efforts have been continued to enlighten staff of other inter-university

institutes on importance of archives. Our activities were also stimulated by Management Act of Archives that passed the Congress on July 1. This means all institutes and universities have to promote construction of their database sooner or later. On Aug. 26 about 10 people from NIFS, KEK, IMS, NIPS and Tsukuba University of Technology visited National Museum of Japanese History at Sakura-city to make the staff join in with us. The museum is one of inter-university institutes in SOKENDAI and belongs to National Institutes for the Humanities.

The above activities could not be made without cooperation with other institutes that was provided by the SOKENDAI project. In this respect SOKENDAI project played an essential role. NIFS FSA should continue to keep close ties with other institutes.

The total number of database registered in NIFS FSA (Fusion Science Archives) amounted to about 21,000. The documents were newly added from Ryohei Itatani, Prof. Emeritus of Kyoto University, on Jan. 7 2010. Unfortunately he deceased not long after. NIFS FSA was provided with documents from K. Matsuoka who retired in March 2010.

The retrieval of finding aids on the basis of EAD has been promoted under the collaboration with National Institute of Japanese Literature (NIJL), KEK and IMS. The cross-searching among the institutes has been realized on the internet. This is one of the goals of the above-mentioned SOKENDAI project. NIFS FSA provided this system with about 5,000 database in March 2010. In addition to the database belonging to inter-university institutes of SOKENDAI, the database of Yukawa Hall Archival Library, Tomonaga Memorial Room and The Sakata Memorial Archival Library, of which construction was led by Prof. Y. Takaiwa of Tsukuba University of Technology, joined the retrieval system. It can be said that this is the most advanced retrieval system in the field of natural sciences.

(II) We attended the following meetings of societies related to archives to get useful information and to accumulate advanced knowledge: The Japan Society for Archival Science (JSAS) in April 2009 at Gakushuin University, The Records Management Society of Japan in May at Minami-Aoyama Kaikan in Tokyo, The 4th Archive Recording Seminar in July in Tokyo, Workshop on Management Act of Archives held by JSAS in October in Gakushuin University, Seminar held by Nippon

Omni-Management Association in October in Tokyo, The 2009 Scientific Information Open Summit/The 11th Library Fair & Forum in November in Yokohama-city, Workshop on archives held by NIJL and JSAS in Jan. 2010 at NIJL.

(III) Interview to Dr. Tihiro Ohkawa, the former vice president of GA, was conducted, by T. Amemiya (Nihon University), K. Kimura, C. Namba and K. Matsuoka on the early phase of fusion research in GA on October 18 and 19 at Dr. Ohkawa's house. This interview was proposed by colleague of Nihon University and details are described in this annual report. We could get a number of lessons from the interview. As an example, he pointed out that fusion machines in Japan were rather oriented to engineering. This means that in some cases the main attention has been paid on machine construction itself. The most important thing is to clarify physics mechanisms of confinement and heating. Completion of experimental machine is just prerequisite for this purpose. The transcription in Japanese is to be issued from Nihon University.

(IV) Because the fiscal year of 2009 is the last year of medium-term plan, the SOKENDAI project also fits to face the last year. To describe history, that is, to clarify why inter-university institutes were founded, is the main goal of the SOKENDAI project "History of Inter-University Institutes and Archives", where archival database is utilized as evidence. For this purpose general meetings were held many times, that is, on June 22 in Tokyo, Sept. 18 in Tokyo, Oct. 23, 24 in Kyoto, on Dec. 3 in Tokyo, on Dec. 21 in Tokyo and on Jan. 29 in Tokyo. As a result of intensive discussions histories on foundation of NIFS, KEK, NIPS, IMS and NAO were described on the basis of historical documents. The achievement was published as the printed material from SOKENDAI including the present status on progress of archives of SOKENDAI, NIFS, KEK, IMS, NIPS, NAO and NIPR. On Jan. 14, 15 SOKENDAI held the debriefing session on all projects. The summary of the project "History of Inter-University Institutes and Archives" ranging for 6 years was reported by K. Matsuoka, of which presentation was issued as a booklet from SOKENDAI. In the history until foundation of NIFS the following events were included: start of fusion research in USA, UK and former Soviet Union, A-B plan, foundation of IPP Nagoya University on the basis of recommendation of Science Council of Japan, struggle toward establishment of confinement research in IPP, min. B as a guiding principle of toroidal confinement shown by Ohkawa's octopole experiment, progress in tokamaks led by Artsimovich, Ohkawa and Yoshikawa's comments to strategy of IPP, start of JFT-2 tokamak project on the basis of the proposal of Atomic Energy Commission of Japan, start of JIPP-1 stellarator and CCT experiments in IPP as toroidal

confinement researches, JIPP T-II stellarator/tokamak and Reacting plasma projects as main projects of 2nd and 3rd research plans, respectively, in IPP, discussions on future plan of universities' fusion researches in Science Council of Ministry of Education where four candidates, i.e. advanced tokamak, helical system, linear machine and inertia fusion, were discussed, resulting in adoption of helical system as the next step that leads to LHD in NIFS. To discuss nuclear fusion history as one of science histories Mr. M. Ishigaki of The University of Tokyo visited NIFS on Oct.27.

(V) Achievements of collaboration researches were presented 1) at Japan Oral History Association in September 2009 in Sapporo-city, 2) at the autumn meeting of the Physical Society of Japan in September 2009 at Kumamoto-city, 3) at the annual meeting of the Japan Society of Plasma Science and Nuclear Fusion Research in December 2009 in Kyoto-city, 4) at the 5th symposium on "Innovation of Technology in Japan" in December in Tokyo held by National Museum of Nature and Science and supported by the grant-in-aid scientific research, 5) at the annual meeting of the Physical Society of Japan in March 2010 at Okayama-city.

In the meetings mentioned above, the followings were presented, respectively: 1) "The First Decade in KEK through the Interviews with Collaboration Researchers of Nagoya University" by K. Kimura, 2) "Studies on History of International Exchange of Nuclear Fusion in Japan -Japanese activity for an invitation of the fifth Conference on Plasma Physics and Controlled Nuclear Fusion Research to Japan-" by T. Amemiya, 3) "Construction of Electronic Finding Aids based on Encoded Archival Description for Archival Database" by C. Namba, 4) "History and Engineering Aspect of Optimized Helical System with Modular Coil" by K. Matsuoka, 5) "Studies on history of Fusion Energy Conference -Survey of conference report about Second Conference on Plasma Physics and Controlled Nuclear Fusion Research-" by T. Amemiya.

Relating to the program "Innovation of Technology in Japan", the following refereed papers have been published. "Technology innovation in fusion research (I) -confinement device-" by Y. Itoh (Hitach Ltd.) et al. and "Development of high power microwave oscillating tube for fusion research" by K. Hayashi (Toshiba Corporation), both of which were published in 2009 and 2010, respectively, in the journal of Japan Society of Plasma Science and Nuclear Fusion. "History and Engineering Aspect of Optimized Helical System with Modular Coil" by K. Matsuoka was published, in December 2009, in the proceedings of the international symposium on "Innovation of Technology in Japan".

(Matsuoka, K.)