§5. Archival Studies on Collaborations in Heliotron Studies at Kyoto University

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1. Introduction

"Fusion Science Archives" of National Institute for Fusion Science (NIFS) has promoted archival activities about the scientific studies in the field of nuclear fusion that have been performed at universities in Japan. As one of such activities supported by the NIFS Collaborative Research Program, this archival study is focused on the fusion oriented high temperature plasma experiments performed in the series of Heliotron devices at Kyoto University, which have been originally proposed and developed by the late professor emeritus of Kyoto University, UO Koji [1].

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 [2], was proposed by the Kyoto Univ. group and has been experimentally examined its basic ideas through the Heliotron J project [3] in Laboratory for Complex Energy Processes, Institute of Advanced Energy (IAE), Kyoto Univ. under the auspices of the NIFS Bilateral Collaborative Research Program.

2. Summary of Activities

The aim of this series of the archival study is to make comprehensive and systematic collection of the research materials on each heliotron device. In addition to the hardware, 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 also the targets.

Under the collaboration with "Fusion Science Archives", collection of scientific materials about heliotron devices is in progress. A present situation of a series of heliotron devices has been investigated and some documents of each device were confirmed. The minutes of technical meetings with the manufacturer in each device and the records of the malfunction in operation and countermeasure have been also added in the archive. The image video records in the very early phase of the Heliotron E experiment are also discovered. In addition to making a digital library of photographic slides of experimental devices and presentations in the Heliotron E era, we have re-stored the raw data of Heliotron E experiments (including some program files for data analyses) into a set of hard-disk (HD). The original data were recorded in reel-to-reel type 1/2-inch magnetic tapes (MT), about 1200 reels of MT in total. It is necessary to keep a lot of space to store these reels and, more importantly, it is not easy to maintain or ensure the tape reader system workable with a present-day computer system. Therefore, under the initiative of Laboratory for Complex Energy Processes, IAE, the data were converted to a set of HD from the MTs.

This year, we started to re-store the minutes of weekly meetings for experimental group, (Project Heliotron E Committee Meeting, since FY1980, Fig.1) into electric files of from the hard copies. Almost 1/4 of the file stock was re-stored as tiff image data. The electric files for the rest will be made on a year-by-year basis.

[1] K. Uo, in Kakuyugo-Kondankai (May, 1958).
[2] M. Wakatani, et al., 17th IAEA Fusion Energy Conf. (Yokohama, 1998) IAEA-CN-69/EX2/5.
M. Yokoyama, et al., Nucl. Fusion 40, 261 (2000).
[3] F. Sano, et al., J. Plasma Fusion Res. SERIES 3, 26 (2000). T. Obiki, et al., Nucl. Fusion 41, 833 (2001).

Fig. 1 Research Meeting Reports for Heliotron E