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Roles played by the Pioneers, from the Archives of the Fusion Energy Research and Development

核融合エネルギー開発のアーカイブによる先駆者の果たした役割(1)

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Documents left by Prof. K.Yamamoto and Prof. S.Mori have been kept in JAERI stock yard. The past three years were devoted to register and filing of these documents for the convenience of future study on the Japanese fusion research initiation and after. In total 900 documents, booklet or file, are registered as archives. Although the fusion program is huge and therefore, has been conducted as a national program in organized and systematic manners, the author noticed through these works, how significantly a few leaders played a big role in planning and implementing a large step in the fusion program. How smart they developed a consensus of the fusion community, stimulate public interests and obtain political supports, and led to a national fusion policy is worthy of emphasis.

1. Introduction

Knowing that there had been a lot of documents left by the initiator of fusion activities in the Japan Atomic Energy Research Institute (JAERI), Prof. K.Yamamoto and Prof. S.Mori, both former vice president of JAERI, yet the archive work had not been conducted due to a lack of manpower until about five years ago. Meantime, the NIFS had organized an archive office and started to register key person's documents systematically. Upon advice of NIFS in many ways, the JAEA (successor of JAERI) followed the same style arrangement starting from 2011[1]. As a result, 431 documents for Prof. K.Yamamoto and 469 documents for Prof. S.Mori has been registered and filed (Fig.1 and Fig.2).

Through these works the documents let the author to focus on a few key individuals who played a significant role in making a large step of the fusion programs in Japan.

2. Initial Stage Buildup of Japanese Fusion Program---Prof. H.Yukawa's initiative

It was back to about 1957 when the second international meeting on peaceful use of atomic energy was held in Geneva [2]. Initiative and leadership by Prof. H.Yukawa, the first Nobel winner in Japan was significant. After resignation of the member of the Japan Atomic Energy Commission (JAEC), he continued to be the chairman of the Forum on the Fusion Reaction under



Fig. 1 Filing style in carton boxes



Fig. 2 Registered documents are filed in carton boxes and stocked in archive shelf

JAEC. Recognizing the necessity of promotion of fusion and the status of research in Japan (budget JAERI 0.5M¥, Universities 5M¥), he consulted with leaders of relevant scientific fields, and organized a substantial meeting on Oct. 5, 1957) and about 20 scientific leaders participated and discussed how to organize and start activities, budget flows, investigation of fusion researchers and accumulation of their opinions. Starting from this meeting, he had been actively engaged in fusion research start up until he submitted a report “On the promotion of nuclear fusion” to the Chairman of JAEC on Oct. 5, 1960[2,3].

3. Start of the Fusion Technology Study in Japan

Owing to pioneering efforts of leaders to promote fusion research, the study on plasma generation and confinement were implemented in many universities and organizations in 1960s. However, these studies were oriented to tackle near term handling of plasmas and the start of study on fusion reactors from the technological side had to await until late 60s when Prof. S.Mori, head of the fusion research group in JAERI organized an ad hoc study group on fusion reactors. It includes experts on neutronics in the blanket, materials, radiation damage, tritium generation, SC magnet, thermo-hydro dynamics, reactor structure, and plasma confinement, and made a first report in 1970 [4](Fig.3). It was only mid 40s in his age. Triggered by this comprehensive reactor study, interests on the fusion reactor technology penetrated into fission scientists and the need to have a standing design center was recognized. In 1973, in JAERI such a design group was formally organized and the Fusion Reactor Research Committee was organized under the chairmanship of JAERI president. In parallel, key reactor technology R&Ds plasma heating systems, and superconducting magnet started in the same year, and the neutron irradiation facility (FNS) and tritium handling facility (TPL) were built a little later.

These comprehensive activities stimulated university researchers who had interests in fusion technologies, and encouraged to establish various committees on fusion reactors such as in the Science Council of Japan, and in the Atomic Energy Society of Japan in 1973. In both committees, Prof. S.Mori played a leading role. Concerning the scope of the development of fusion materials, discussion among top 8 leaders were influential in 1982.

4. Summary

Fusion energy requires a long and wide range development scientifically and technologically and a huge relevant human resources and organizations. However, the archive documents teaches us that

there were persistent and continued efforts by a few leaders to direct researchers and energies interests into a national lever scientific programs.

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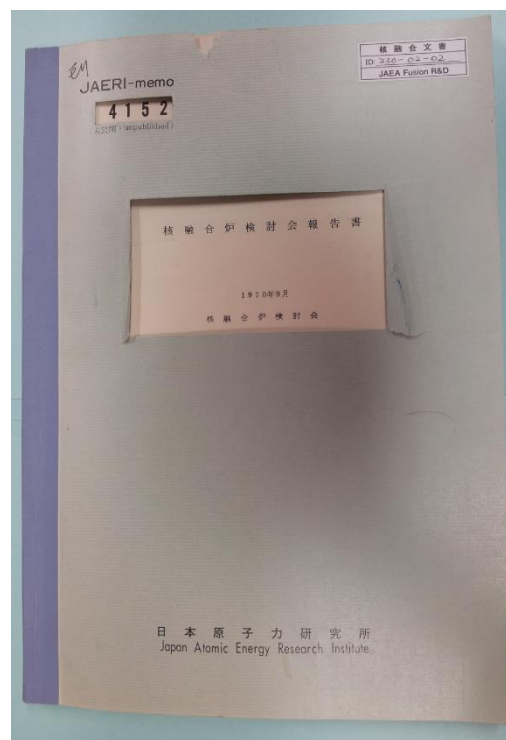


Fig. 3 The first report on the fusion reactor study