History of Nuclear Fusion Research in Japan

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History of nuclear fusion research in Japan is summarized in the form of flow chart from the dawn to the present. The flow chart is categorized from the viewpoint of plasma confinement, engineering, international relation, organization and budget. In the mid-1950s, experimental and theoretical studies started at several universities, Japan Atomic Energy Research Institute (JAERI, now Japan Atomic Energy Agency /JAEA) and so on. Japan Atomic Energy Commission (JAEC), and Science Council of Japan (SCJ) organized “expert committee on fusion” in April 1958 and “special committee on fusion” in April 1959, respectively. Scientists who got together from various fields established a voluntary association of fusion research community, Kakuyugo Kondankai, where Nobel Prize winner Hideki Yukawa was nominated as a chairperson in February 1958.

Fusion research in Japan was nearly ten years behind the western countries. Lively discussion was made on the research strategy, which is known as historic name of “AB-dispute.” The two committees agreed to start fusion research from the basics, putting emphasis on understanding basic plasma physics, finding new ideas and cultivating scientists (A-plan). As a result, Institute of Plasma Physics, Nagoya University was established in 1961. On the other hand, there was an agreement among the government and the scientists that B-plan, which is to promote fusion research by constructing a medium-sized machine comparable to those in western countries, should be executed sooner or later. Then the B-plan was started at JAERI in mid-1960s. In this way, dualistic fusion research framework in Japan was established, where academic researches were promoted under the Ministry of Education and the national project of fusion energy development was promoted under the Science and Technology Agency. This structure had lasted more than 30 years till 2001, when two ministries were merged into a single ministry, the Ministry of Education, Culture, Sports, Science and Technology (MEXT).