

§29. Summary of Fifteenth International Toki Conference (ITC-15)

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The Fifteenth International Toki Conference (ITC-15) was held at “Ceratopia-Toki” in Toki-city, Gifu, Japan during December 6-9, 2005, with the theme “Fusion and Advanced Technology”. In the conference, 137 researchers from 12 countries throughout the world participated, and valuable presentations and fruitful discussions were held throughout the week. The number of participants from each country was found as follows: the United States (10), China (10), Germany (5), India (4), Russian Federation (3), Korea (2), France (2), Austria (1), Slovakia (1), Italy (1), Ukraine (1), and Japan (97).

The International Toki Conference (ITC), which is series of conferences dedicated to the discussions and presentations of research activities related to fusion science, was initiated in 1989 and has been held annually since then for commemorating the foundation of the National Institute for Fusion Science (NIFS). Toki-city, which is located in the central area of Japan and famous for pottery industry with 1300-year traditions, has been serving as the hosting city of the conference.

The ITC-15 focused on the science and engineering issues related to fusion experimental devices, fusion reactor designs and related advanced technologies. The topics specified on superconducting fusion devices, superconducting magnets and conductors, cryogenics, fusion reactor designs, and advanced technologies related to fusion reactors.

The conference consisted of three plenary presentations, 23 invited talks, 12 contributed oral presentations, and 76 poster presentations. Prof. Koichi Kitazawa, Executive Director of the Japan Science and Technology Agency gave the first plenary presentation with the title “Twenty Years since the Discovery of High Temperature Superconductivity”. Twenty years have passed and it was emphasized that the HTS application is proceeding into the practical stage to fulfill the dream in the future. The second keynote speech was presented by Prof. Osamu Motojima, Director General of NIFS with the title “Progress of Plasma Experiments and Superconducting Technology in LHD”. Outstanding results of the plasma experiments in the Large Helical Device (LHD) were clarified along with the engineering features of the large-scale superconducting magnet system. The third keynote speech was given by Prof. Peter Komarek, Director of the Institute for Technical Physics (ITP) of the Forschungszentrum Karlsruhe (FZK) with the title “Potential and Desire for HTS Application in Thermonuclear Fusion”. The tasks of applying HTS to fusion reactors were addressed after the present studies were reviewed regarding the development of the

superconducting technologies for nuclear fusion devices. It was also proposed that now is the time to start the application of HTS to fusion reactors because it requires a long-term research.

In the invited talks, the latest results of engineering research of the world projects were discussed by the representative researchers in each laboratory regarding the superconducting fusion experimental devices, such as Tore Supra, TRIAM-1M, Wendelstein 7-X, EAST, KSTAR, SST-1 and LHD. Moreover, 23 invited talks were presented on the latest technological developments on ITER, reactor design studies of such as FFHR, HELIAS, ARIES, VECTOR and KOYO, high magnetic field superconducting magnets, advanced metallic superconductors, HTS wire developments, and the applied superconductivity and cryogenic research activities in the world projects. Furthermore, regarding the theme of the conference, 12 contributed oral presentations and 76 poster presentations were given, accompanied by extensive discussions. The Proceedings of ITC-15 are going to be published as the special issue of Fusion Engineering and Design.

ITC-15 was organized by NIFS partly as an internal collaboration program of the National Institutes of Natural Sciences (NINS) with the support of Toki-city, Gifu-prefecture, the Japan Society of Plasma Science and Nuclear Fusion Research, the Cryogenic Association of Japan, the Fusion Engineering Division of the Atomic Energy Society of Japan. The conference was also supported by the Ministry of Education, Culture, Sports, Science and Technology, as well as by the Fusion Science Association.

The chair of the international organizing committee of ITC-15 was Prof. Osamu Motojima, and the chair of the scientific program committee was Prof. Akio Sagara. Prof. Toshiyuki Mito served the chair of the local organizing committee, Prof. Shinsaku Imagawa, the chair of the conference secretariat.

We wish to express our gratitude to all participants of ITC-15 for wonderful presentations and fruitful discussions. We would like to say many thanks to a lot of people who cooperated for holding the conference.