

§53. Overall Evaluation of Plasma Facing Materials for LHD

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In 1999, the helical divertor in LHD started to be in full use. Results of the studies on evaluation of the helical divertor and analyses have been reported in research meetings of this collaboration. Fruitful results in ITER-EDA, experiments in JT-60U, JFT-2M, TRAM-1M, laboratories in universities have been also reported and improve common understanding among people in the PSI community.

The first meeting was held on 12th and 13th in July at Hokkaido University, which was supported by members there. The number of the participants was around 50. From LHD, measurement and analyses of divertor plasmas were reported, in which helical magnetic divertor structure was confirmed based on the Langmuir probe data. Edge structure of magnetic configuration was reported for Heliotron J, too. The field configurations at the edge were reported and differences between tokamak and helical systems were discussed. High Z limiter experiments in TEXTOR, PWI studies in GAMMA-10 were reports from a view point of complex system of fusion experimental devices. On the other hand, laboratory studies are reported on transient gas release of hydrogen from graphite, comparison between particle reflection by carbon and tungsten, heat load test of plasma-spray coated tungsten materials, helium irradiation effects on tungsten, chemical processes of deuterium in boron films, studies on dust plasmas, new detecting method of tritium utilizing beta-induced X ray analyses etc. In the field of structure materials, recent progress in SiC/SiC materials were reported, and methodology of the material development was discussed seriously. Reports on the present status of new organizations were given from Fusion Engineering Research Center in NIFS and Wakasa-wan Research Center of Energy.

ITER collaboration in the fiscal year of 2000 was reported.

Four programs have been selected from 9 proposals. The aims and plans were reported briefly.

The second meeting was held at Naka site of JAERI, which was participated around 40. The program was arranged with a bit emphasis upon the JAERI works. The reports from JAERI were relating to experiments on W-shaped divertor in JT-60U, an experimental study on reduction of field ripple with insertion of ferritic steel in JFT-2M, tritium experiments in TPL, application of ion beam to silicon substrate for machining with high precision etc. Result of LHD experiments was also given for the third campaign, in which metal impurity reduction with graphite divertor was reported.

The third meeting was held at Research Institute for Applied Mechanics in Kyushu University on February 17 and 18 2000. Around 50 participated. Progresses in LHD, TRIAM, TEXTOR experiments were reported. Detail reports on edge plasma structure were given for LHD. An Ergodic layer in the periphery has big impacts on plasma flow, which is not usual in tokamak edges. Impacts of graphite divertor on plasma behavior was also discussed. A talk for present status of ITER PFC design was given. Recent progress in R & D of tungsten-CuCrZr bonding was reported. These were useful to make targets clear in laboratories of universities, and for designing advanced divertor in LHD. Participants had impression of steady progress in each institutions and laboratories through these reports and discussions.

Some announcements were given on the final conclusion of the ITER collaboration programs, on 14th PSI conference at Rosenheim, a plan to host the 15th PSI conference in Japan, plan of PSI-Net activities in the fiscal year of 2000.

As a whole, many activities and ideas are collected to these meetings with the LHD program as a one of the target, which enhances common understanding and problem definition in the PSI research field.