13. Division of Deuterium Experiments Management

The deuterium experiment has been carried out on LHD since March 7th, 2017. Objectives of the deuterium experiments are (1) to Achieve high-performance plasmas by confinement improvement and by the improved heating devices and other facilities, (2) to explore the isotope effect study, (3) to demonstrate the confinement capability of energetic particles (EPs) in the helical system and to explore confinement studies in toroidal plasmas, and (4) to proceed with the extended studies on Plasma-Material Interactions (PMI) with longer time scales.

The division of deuterium experiments management was founded to establish the safety management system and to consolidate experimental apparatus related to the deuterium experiments. After the start of the deuterium experiment on the LHD, the function of this division was shifted to the management of the safe and reliable operation of the deuterium experiment. Under this division, a taskforce named 'Deuterium Experiment Management Assistance Taskforce' was founded. The main jobs of the taskforce are (1) the establishment and improve manuals to operate LHD and peripheral devices safely during deuterium experiments, (2) check and improvement of the regulations related to proceeding with the deuterium experiments safely, (3) the upgrade of LHD, its peripheral devices and the interlock systems for the safe operation during the deuterium experiments, (4) upgrade and optimization of heating devices and diagnostic systems for the deuterium experiments, and (5) remodeling the LHD building and related facilities, and other matters. These jobs proceed with the cooperation of the LHD board meeting and the division of health and safety promotion. In addition, the necessary tasks related to the safety evaluation committee founded by NIFS and those related to the safety inspection committee for the National Institute for Fusion Science (NIFS) founded by local government bodies are advanced in this division. The publication of an annual report for the radiation management of the LHD deuterium experiment is another important task of this division.

During the fiscal year 2018, the safety evaluation committee met three times. The main topics of the committee are the evaluation of the annual report for radiation management in the deuterium experiment and the evaluation of the safety operation of the deuterium experiment in the experimental campaign of 2018. In addition, the reduction of night and weekend duty was discussed by the committee. The suggestion to increase the number of staff, who are engaged in this duty was made by the committee.

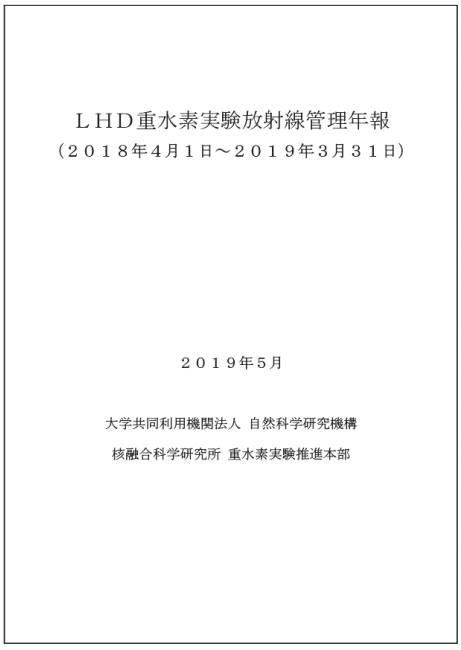
The cooperation with the safety inspection committee at NIFS is an important task for the division of the deuterium experiments management. The environmental neutron dose monitoring at NIFS and the tritium concentration monitoring in the environmental water around the NIFS has been performed by the committee since 2015. In FY 2017, these monitoring activities were performed twice as scheduled with the cooperation of the division of deuterium experiment management.

a)

b)

c)

d)



(a) Photographs at the environmental water sampling with the secretariat of the safety inspection committee. (b) The real-time radiation monitoring post where the cooperative environmental neutron monitoring is performed with the secretariat. (c) Additional neutron dosimeters placed by the secretariat of the safety inspection committee (left) and by the division of deuterium experiment management (right) near the radiation monitoring post for the cooperative environmental neutron monitoring with the secretariat. (d) The front cover of the annual report for the radiation management at the first LHD deuterium experiment (in Japanese).

(M. Osakabe)