12. Division of Deuterium Experiments Management

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

The Division of Deuterium Experiments management was founded to establish a safety management system and to consolidate experimental apparatus related to the deuterium experiments. After the start of the deuterium experiment in LHD, the function of this division was shifted to the management of a 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 were (1) the establishment and improvement of manuals to operate LHD and peripheral devices safely during deuterium experiments, (2) check and improve regulations related to continuing the deuterium experiments safely, (3) an upgrade of LHD itself, its peripheral devices and the interlock systems for its safe operation during the deuterium experiments, (4) upgrade and optimization of heating devices and diagnostic systems for the deuterium experiments, (5) remodeling the LHD building and related facilities, and so on. These jobs are accomplished with the cooperation of the LHD board 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 of the National Institute for Fusion Science (NIFS) founded by local government bodies are carried out in this division. The publication of an annual report for radiation management of the LHD deuterium experiment is another important task of this division.

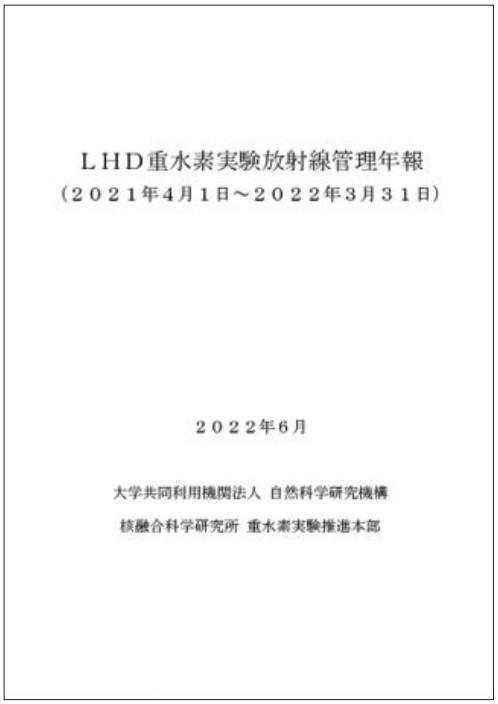
During the fiscal year of 2021, the Safety Evaluation Committee met once. The main topic of the committee was the evaluation of an annual report about radiation management in the deuterium experiment and an evaluation of the safety operation of the deuterium experiment in the experiment campaign of 2020.

Cooperation with the Safety Inspection Committee of the NIFS is an important task for the division of the deuterium experiments management. Environmental neutron dose monitoring at NIFS and tritium concentration monitoring in the water around the NIFS environment has been done by the committee since 2015. In 2021 FY, these monitoring activities were performed twice, as scheduled with the cooperation of the Division of Deuterium Experiments management.

(a)

(b)

(c)



Photographs of (a) environmental water sampling and (b) measuring the environmental radiation dose rate by the secretariat of the Safety Inspection Committee. (c) The front cover of the annual report on radiation management of the first LHD deuterium experiment (written in Japanese).

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