11. Division of Deuterium Experiments Management

The deuterium experiment has been carried out on LHD since March 7, 2017. Objectives of the deuterium experiments are (1) to realize 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 helical system and to explore their 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 the reliable operation of the deuterium experiment. Under this division, a taskforce named 'Deuterium experiment management assistance taskforce' was established. 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 improvement of the regulations related to proceeding with the deuterium experiments safely, (3) the upgrade of the LHD itself, its peripheral devices and the interlock systems for 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 proceeding with the cooperation with 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 proceeding 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 of 2019, the safety evaluation committee meeting was held three times. The main topic of the committee is the evaluation of the annual report for the radiation management at the deuterium experiment and the evaluation of the safety operation of the deuterium experiment in the experiment campaign of 2019. In addition, the prospect for the next three years of the deuterium experiment was discussed.

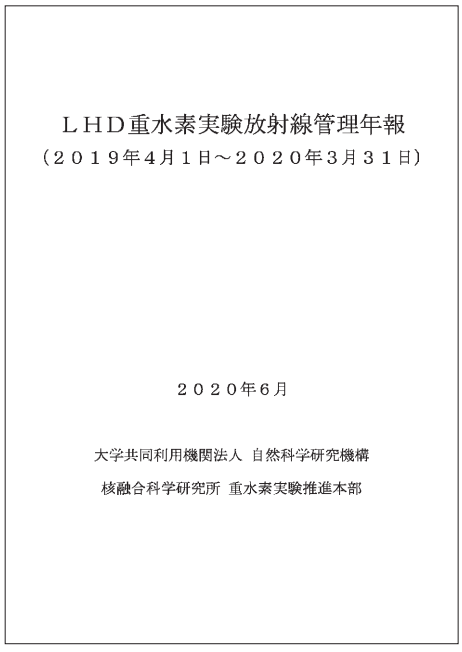
The cooperation of the safety inspection committee for NIFS, which is organized by the local government bodies, such as Gifu-prefecture, Toki-city, Tajimi-city, and Mizunami-city, is an important task for the division of the deuterium experiments management. The environmental neutron dose monitoring at NIFS and the tritium concentration monitoring in the environmental water around NIFS has been performed by the committee since 2015. In 2019 FY, these monitoring activities were performed twice as scheduled under the cooperation with the division of the deuterium experiment management.

a)

b)

c)

d)



(a) The 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 at 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 (written in Japanese).

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