To achieve higher performance plasmas and to confirm technical advantage of a Heliotronconfiguration in designing a type future economical steady state fusion reactor, the National Institute for Fusion Science (NIFS) planned an experiment program using deuterium On March  $28^{\text{th}}$  in 2013, the NIFS plasmas. Agreement for Environmental signed the Conservation with local governments which include Toki-city, Tajimi-city, Mizunami-city and Gifu-prefecture. They also signed the agreement of operation of deuterium experiments on LHD.

These agreements are the achievement from the long and enormous efforts of mutual understanding with local governments and public activities to build a trustworthy relationship. In 2007, the Safety Assessment Committee of NIFS Deuterium Experiment consisting of outside members issued a report indicating that the Safety of LHD Deuterium measures for Experiment was considered reasonable and proper. After the nuclear accident at the Fukushima No.1 nuclear power plant, which was triggered by the tsunami caused by the Great East Japan Earth quake, the measures were reexamined. The Safety Assessment Committee reevaluated the measures and reported that the reexamined measures were reasonable and proper in Feb. 2012.

After the agreement for the Environmental Conservation was made with local governments in 2013, the preparation for the LHD deuterium On June  $21^{\text{st}}$  in 2013, experiment was started. a workshop was held at NIFS in order to share the basic idea of LHD deuterium experiments with the NIFS collaborators and to discuss its feasibility and its validity. Approximately, 20 researchers from universities and 55 researchers from NIFS attended this workshop. In the first session of the workshop, the basic plan and brief schedule for LHD deuterium experiment were explained. The policy for the radiation safety control was also explained in the session. In addition to them, following talks were presented in the workshop to show the plans for the upgrades of LHD hardware and to discuss the effective use of the deuterium experiments for the deep understanding of plasma physics and fusion reactor design.

- "An upgrade plan of LHD for peripheral plasma research and the plasma-wall interaction for the LHD deuterium experiments",
- "Upgrade of RF plasma heating devices for the LHD deuterium experiments"
- "A basic plan of the neutron diagnostic system for accurate evaluation of neutron production"
- "A new diagnostics approach for the evaluation of the hydrogen isotope fraction in the LHD plasmas by using microwaves
- "Isotope effect of plasma confinement in JT-60U H-mode plasmas"

To accelerate of the participation collaborators in universities to the LHD deuterium experiments, a symposium was also held in the annual conference of Japanese Society for Plasma and Fusion Science in 2013. The isotope effect of plasmas confinement was chosen as a main topic for the symposium since it is one of the key topics to explore at the LHD deuterium experiment and it is also necessary to extend the plasma parameter region to design a helical fusion reactor with high degree of accuracy. Followings were the title of talks presented in the symposium;

- "Progress of plasma confinement studies on LHD and a plan for diagnostic system upgrade for the deuterium experiment"
- "A proposal of diagnostic system to explore the accurate science on LHD"
- "Comments for LHD deuterium experiment from the viewpoint of ITER research project"
- "Comments on the isotope effect of plasma confinement from the theory"

In addition to the isotope effects, the other physics and engineering topics also be considered such as, high energy particle confinement physics and hydrogen isotope retention studies, as the main topics for the deuterium experiment. The investigation of necessary hardware for these topics was also started from 2013 under the collaboration frame work with researchers in universities.

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