

Overview of the First Deuterium Experiment in LHD

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In the first deuterium (D) experiment, LHD established one of the most important milestones towards the realization of the helical fusion reactor, ion temperature T_i of ~ 10 keV. This is the highest record among stellarator/heliotron devices. Clear reduction of the ion thermal diffusivity in both core and edge regions in D discharge from hydrogen (H) was identified, indicating the effect of the isotope mass. This experimental result was supported by the initial results from gyrokinetic simulations including multi-species of ion. By measuring the neutron flux from D plasma, energetic particle (EP) behavior trapped in the helical ripple could directly be estimated, which is quite important for heliotron devices, because demonstration of the EP confinement is essential to realize the burning condition. Precise measurement of the tritium exhaust demonstrated the tritium mass balance including the evacuation system.

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Author: Dr MORISAKI, Tomohiro (National Institute for Fusion Science)

Presenter: Dr MORISAKI, Tomohiro (National Institute for Fusion Science)

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