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# LHDにおける閉ダイバータ実験２
# Closed helical divertor experiment in LHD 2

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In the Large Helical Device (LHD), study of divertor particle control has been conducted with a helical divertor magnetic structure which exists naturally in the heliotron-type magnetic configuration to explore operation scenarios in a heliotron-type fusion reactor. In LHD, to control the fueled particles and impurities, the closure of the helical diveror has been conducted.

For the examination of the baffle structure, it was partially installed in the torus inboard side divertor in two out of ten toroidal sections in 2010 [1]. Comparison of the neutral particle pressure in the divertor with the baffle structure and with the existing open divertor showed that the neutral pressure in the former divertor was 10 times higher than that in the open divertor, and the baffle structure efficiently compresses fueled particles in the divertor [2-4].

In 2012 the baffle structure and the in-vessel cryo-pump were installed in the torus inboard side divertor in 6 toroidal sections. As the result, total number of the toroidal section in which the divertor was closure became 8 as shown in Fig. 1. The cryo-pump was newly developed and was installed under the dome structure [5]. Figure 2 shows the CCD camera view of a torus inboard side with Hα filter and the results of the numerical simulation. Figure 2(a) and (c) is before the installation of the baffle structure and the pump, and (b) and (d) is after the installation. The difference of the Hα emission distribution between before and after the installation was qualitatively reproduced by the simulation. The difference is caused by the change of the ion source distribution which is caused by the baffle structure. In the 2012 experiment campaign, the cryo-pump in a toroidal section was activated and examined its performance and effect on plasma discharge. The effect was observed in low density ECH discharges. In the 2013 experiment campaign, the cryo-pump in other 3 toroidal sections was activated, and a new closed divertor was installed in a toroidal section.

In this presentation, the effects of the closed divertor will be shown and discussed.

[1] S. Masuzaki et al, Fusion Eng. Des. **85** (2010) 940.
[2] S. Masuzaki et al, Plasma Fus. Res. **6** (2011) 1202007.
[3] S. Masuzaki et al, J. Nucl. Mater. **438** (2013) S133.
[4] T. Morisaki et al, Nucl. Fusion **53** (2013) 063014.
[5] M. Shoji et al, Plasma Fus. Res. **7** (2012) 2405145.

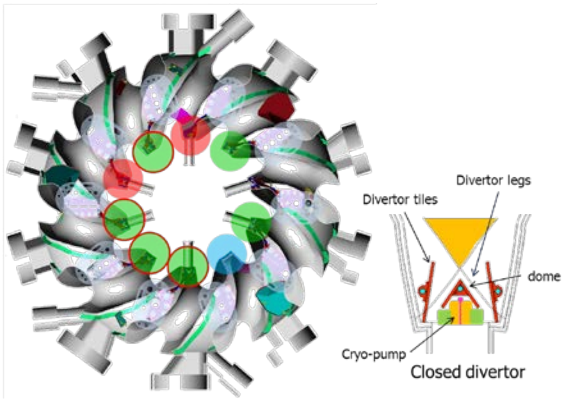


Fig. 1. Progress of the divertor closure in LHD. Red: test baffle structure (2010). Green: Closed divertor (2012). Blue: Closed divertor (2013). Green with red line: cryo-pump is activated in 2013.

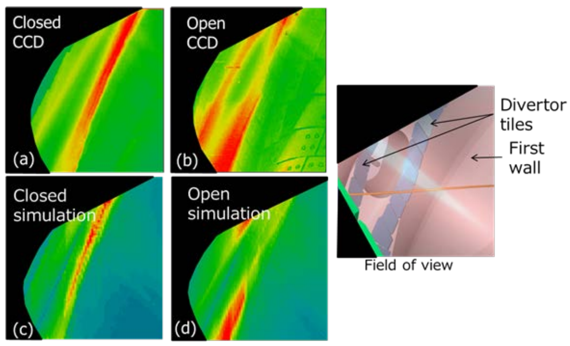


Fig. 2. Comparisons of Hα emission at the torus inboard side divertor. (a) and (b): experiment. (c) and (d) numerical simulation.