New approach to the control of particle recycling using divertor pumping in LHD

**Improved divertor pump in LHD**

- Low recycling state is obtained
- Access to lower density region is possible.
- RF wall conditioning is accelerated
- In high density plasmas, not only edge density but also core density are reduced in divertor pumping due to shallower pellet penetration.

High performance of divertor cryo-sorption pump is realized in LHD.
- 70 m$^3$/s close to the initial design target
- 58,000 Pa m$^3$ corresponds to 20 days of fuel amounts for high density experiments.

By strong divertor pumping, first time observations show that
- Low recycling state is obtained.
- Access to lower density region is possible.
- RF wall conditioning is accelerated.
- In high density plasmas, not only edge density but also core density are reduced in divertor pumping due to shallower pellet penetration. The short time gas puffing and steady divertor pumping likely will be a candidate for the dynamic control tool of edge density.

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