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Behavior of poloidal rotation during transition of magnetic island dynamics in LHD[1] Y. NARUSHIMA, NIFS, F. CASTEJÓN, CIEMAT, S. SAKAKIBARA, K.Y. WATANABE, M. YOSHINUMA, H. FUNABA, S. OHDACHI, Y. SUZUKI, S. NISHIMURA, NIFS, C.C. HEGNA, UW-Madison, T. ESTRADA, F. MEDINA, D. LOPEZ-BRUNA, CIEMAT, M. YOKOYAMA, K. IDA, NIFS — In the LHD experiments, the growth or disappearance of the $n = 1$ magnetic island during a discharge has been observed. Generally, at low β and high ν, the plasma tends to make the island grow in width. However at sufficiently high β and/or low ν, the islands are suppressed. In TJ-II, large islands are suppressed or prevented to appear due to the positive electric fields created by the rational itself. Those ingredients point to the island dynamics be related to the poloidal rotation, which changes prior to the magnetic island transition. Thresholds of the poloidal rotation for each transition are different. The poloidal rotation for island suppression is smaller than that for island growth. The experimental result shows the existence of a hysteresis in the magnetic island transition dynamics. This result is consistent with a theoretical model based on the balance of electromagnetic and viscous torques at the rational surface.

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