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**LH Transition and rotation studies under non-axisymmetric magnetic fields in KSTAR** WON-HA KO, Y. IN, H.S. HAHN, J.W. JUHN, J. KIM, J.H. LEE, Y.M. JEON, J. SEOL, NFRI, Daejeon, Korea, P. DIAMOND, CMTFO and CASS, University of California in San Diego, USA, K. IDA, NIFS, Toki, Japan, S.W. YOON, Y.K. OH, NFRI, Daejeon, Korea, H. PRAK, UNIST, Ulsan, Korea — A thorough study of LH transition under the influence of non-axisymmetric field (NF) has been conducted in KSTAR. It shows that LH power threshold depends on the resonant NFs and the line-averaged density-LH power threshold curve agrees well with the power law scaling [Martin, JOP(2008)] as the resonant NF ( $\delta B/B^{n=1}$ ) applied up to  $2.7 \times 10^{-4}$  in KSTAR which has a low intrinsic error field. However, LH power threshold is independent of non-resonant NFs with  $n=1$  and  $n=2$  which reduced only toroidal rotation by 30% in L-mode. The rotation pedestal during LH transition with both co- and counter-NBI heating appears saturated at a critical level of edge rotation [Ko, NF (2015)] which is dependent of LH power threshold. However, the core rotation increased with the stored energy in the co-NBI with and without NFs while it is saturated in counter-NBI plasma. In co-NBI heated H-mode, the pedestal width of rotation is 5 cm with wide that of ion temperature (2 cm). On the other hand, in counter-NBI heated H-mode, the rotation pedestal width (2 cm) appeared as similar as that of ion temperature. The newly diagnosed results of rotation in KSTAR seemingly pose a variety of physics questions.

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