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Multi-scale interaction between magnetic island, plasma flow and turbulence in HL-2A ohmic plasmas MIN JIANG, W.L. ZHONG, Southwestern Institute of Physics, Y. XU, Southwest Jiaotong University, Z.B. SHI, W. CHEN, X.T. DING, X.Q. JI, Z.C. YANG, P.W. SHI, J. CHENG, Y. LIU, Q.W. YANG, M. XU, Southwestern Institute of Physics, HL-2A TEAM — Improved understanding of multi-scale physics such as interaction between tearing modes with plasma flows and turbulence can lead to improved control of plasma performance, and thus, have important implication for ITER. The radial profiles of perpendicular flows and density fluctuations in the presence of the m/n=2/1 magnetic island were firstly measured in the HL-2A ohmic plasmas by hopping the work frequency of the Doppler backward scattering (DBS) reflectometer system along with a two-dimensional electron cyclotron emission imaging (ECEI) diagnostic identifying the island locations. It has been observed that across the O-point cut the perpendicular flow is quite small at the center of the island and strongly enhanced around the boundary of the island, resulting in a large increase of the flow shear at the island boundary, while across the X-point cut the flow is almost flat in the whole island region. Meanwhile it was found that the density fluctuations are generally weakened inside the island. The results indicate that the perpendicular flow, flow fluctuation and the density fluctuation level were all modulated by the naturally rotating tearing mode across the whole island region.

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