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Mutually Exclusive Relation between High Pedestal and Large-Radius Internal Transport Barrier in High Betap Scenario on DIII-D[1] SIYE DING, JINPING QIAN, JUAN HUANG, XIANZU GONG, TIANYANG XIA, CHENGKANG PAN, GUOQIANG LI, QILONG REN, WENFENG GUO, ASIPP, ANDREA GAROFALO, GA, CHRIS HOLCOMB, LLNL, JOSEPH MCCLENAGHAN, ORNL — Statistical analysis of experimental data from DIII-D high betap plasmas implies that a natural boundary exists hindering the plasma to simultaneously achieve high pedestal (electron temperature and density) and strong large-radius internal transport barrier (ITB) . In the previous study, we revealed a betap threshold about 1.9 for the formation of large-radius ITB in both Te and ne channels. With strong gas puffing, we observed higher betap threshold (about 2.2) for the formation of ne-ITB that may be due to (1) the higher edge density and pedestal height and therefore high local bootstrap current; (2) the penetration of edge inductive current and turbulence. Meanwhile, the betap threshold for the formation of Te-ITB doesn't change. The observed mutually exclusive relation in experiments is important because sustaining a large-radius ITB is favorable for developing high betap scenario with optimized confinement and stability.

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