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Progress of KSTAR high βN operation by optimizing fast-ion confinement JISUNG KANG, SANGHEE HAHN, HYUNSUN HAN, JINIL CHUNG, JUNGHEE KIM, TONGNYEOL RHEE, BYUNGHO PARK, JAEMIN KWON, Natl Fusion Res Inst — Over the past several years, KSTAR has successfully performed the high beta steady-state experiments with beam heating at relatively low Greenwald fraction regime. This study reports the recent results on KSTAR high βN experiment results aiming long-pulse βN ~3. Owing to relatively long fast-ion slowing time characteristics, optimizing fast-ion confinement was the key reaching high beta operation at KSTAR. Based on database on fast-ion related MHD mode control experiments, it is found that the plasma performance degradation is often accompanied by Alfvénic activities and tearing modes. Numerical investigation with TRANSP / NOVA / Kick-model performed, so that the impact of the mode on plasma performance is analyzed. The q profile of the highest βN is evaluated, and the future prospects are shown with near-term heating upgrade.

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