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Distinctive dependence of RMP-ELM coupling on plasma shape, and its optimization for robust ELM control in KSTAR[1] Y.M. JEON, Y. IN, National Fusion Research Institute, J.-K. PARK, Princeton Plasma Physics Laboratory, JAY H. KIM, National Fusion Research Institute, J.-W. AHN, Oak Ridge National Laboratory, G.Y. PARK, H.S. HAN, S.W. YOON, National Fusion Research Institute, KSTAR TEAM — In recent KSTAR experiments, a critical dependence of RMP-ELM coupling on plasma shape was found to be as important as q_{95}. In application of low-n RMPs, small variations of lower triangularity (δ_{Lower}) made dramatic changes on RMP coupling. Specifically, as δ_{Lower} increases, the coupling to plasma core appears weakened, while the edge coupling gets strengthened effectively for ELM suppression. So far, such δ_{Lower} dependence window for RMP-ELM suppression is surprisingly narrow ($\Delta\delta_{\mathrm{Lower}}$ =0.08), while the other shape dependence is unclear. In 2017, a further investigation reveals that such a strict condition can be relaxed by allowing a small up-down asymmetry on plasma shape. Applying this new optimized plasma shape made substantial improvements on the reliability and robustness of RMP-ELM control. As results, the ELM suppressions were successfully demonstrated in a wide range of q_{95} (4.0-6.4 for n=1 and 3.3-3.8 for n=2 RMPs) even with a fixed RMP phasing, achieving a record-long sustainment of ELM-suppression (>30sec).

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