Abstract Submitted
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Decoupling edge and core RMPs for ELM suppression in KSTAR[1] J.-K. PARK, Princeton Plasma Physics Laboratory, Y. M. JEON, Y. IN, National Fusion Research Institute, J.-W. AHN, Oak Ridge National Laboratory, G. Y. PARK, J. KIM, H. S. KIM, National Fusion Research Institute, N. C. LOGAN, Z. WANG, R. NAZIKIAN, Princeton Plasma Physics Laboratory, KSTAR RESEARCH TEAM — Resonant magnetic perturbations (RMPs) can suppress edge-localized-modes (ELMs) in tokamaks when carefully optimized, in particular for the resonant response in the edge pedestal while minimizing other unnecessary resonances or degradations in the core. KSTAR has been unique in testing these RMP decoupling and optimizing principles, by its 3 rows of in-vessel coils and independent n=1 control at each row. A recent experiment on a special subset of that multi-dimensional coil configuration space in KSTAR clearly suggests the importance of 3D MHD response to RMPs, as both IPEC and MARS codes were greatly successful in predicting ELM suppression windows whereas vacuum approximation was entirely misleading. The linear 3D MHD predictions were often surprisingly accurate in details, as validated by various dynamic RMP applications and ELM responses. This predictive RMP capability played an important role in guiding experiments later and finding non-standard RMPs, leading to the first demonstration of the n=1 ELM suppression without using the mid-plane coils and also the RMP ELM suppression in high $q_{95}>6$ in high-β KSTAR plasmas.

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Jong-Kyu Park
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