

Abstract Submitted
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Multi-mode Plasma Response to Resonant Magnetic Perturbations and its Application in Controlling Edge Localized Modes¹ SHUAI GU, Oak Ridge Associated Universities, YOUWEN SUN, NAN CHU, Institute of Plasma Physics, CAS, YUEQIANG LIU, General Atomics, TONGHUI SHI, HUIHUI WANG, Institute of Plasma Physics, CAS — It has been demonstrated in recent years that multi-mode plasma response to resonant magnetic perturbations (RMPs) plays important role in controlling edge localized modes (ELMs). Therefore, in order to understand the mechanism of ELM control, it is necessary to extract the multi-mode plasma response to RMP fields and illustrate its role in ELM control. In this work, a new technique for multi-mode plasma response extraction is presented, as well as a new criterion to identify modes that related to edge localized mode control. This technique extracts modes by separating the full poloidal cross-section structure from the phase difference between upper and lower RMP coils using singular value decomposition. The phase difference dependence of extracted modes are compared to the effect of ELM control using both $n = 2$ and $n = 3$ RMP in wide q95 operating regimes. It shows that the mode with highest resonant plasma response near the pedestal top is strongly correlated with ELM mitigation or suppression, even if the mode is not the dominant one in plasma response.

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