

Abstract Submitted
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First demonstration of full suppression of type-I ELMs using n=4 RMP in EAST¹ YOUWEN SUN, Institute of plasma physics, Chinese Academy of Sciences — Full suppression of Edge Localized Mode (ELM) by using ITER relevant $n = 4$ resonant magnetic perturbation (RMP) is achieved for the first time in the type-I ELMy H-mode operational window with $q_{95} \leq 3.7$ in the EAST tokamak with tungsten divertor. Different from previous observations using low n ($n = 1$ and 2) RMPs in higher $q_{95} (\geq 4)$ window, plasma confinement in this case does not drop during the transition from mitigation to full ELM suppression. Meanwhile, tungsten concentration is significantly reduced during ELM suppression. ELM suppression using $n = 3$ RMP is also achieved in a similar window with $q_{95} \sim 3.7$ and $\beta_N \sim 2$. Strong density pump-out is observed during full ELM suppression with high n (3 and 4) RMPs. There are windows for both plasma density and q_{95} to access full ELM suppression with high n RMPs. RMP spectrum also plays an important role to access ELM suppression. Footprint splitting in the heat flux on the divertor is observed for the first time in EAST. Detailed understanding of the 3D physics during ELM suppression will be presented. These results expand physics understanding and potential effectiveness of RMP for reliably controlling ELMs in future burning plasma devices such as ITER.

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