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Pedestal Response to Resonant Magnetic Perturbations in DIII-D H-mode Plasmas[1] R. NAZIKIAN, PPPL, P.B. SNYDER, T.E. EVANS, T.H. OSBORNE, GA — A detailed analysis of resonant magnetic perturbations (RMPs) applied to low collisionality DIII-D H-mode plasmas with ITER Similar Shape (ISS) and for a broad range of edge magnetic safety factor (q_{95}) reveals a systematic reduction in the pedestal pressure relative to the pre-RMP level in ELM suppressed and ELM mitigated discharges. The reduction in the pedestal pressure for ELM mitigated discharges coincides with the reduction in the pedestal density induced by the pumpout effect of the RMP. This is consistent with theoretical predictions for the onset of ELMs based on the kink-peeling mode as the limiting instability in these plasmas. At lower density, the collisionality (bootstrap current) decreases (increases) at fixed pressure, increasing the drive for the kink-peeling mode, thereby reducing the pressure for ELM onset. The pedestal pressure further decreases in plasmas with ELM suppression, indicating that the pedestal is below the limit for the mode onset. These results suggest that pedestal optimization in RMP H-mode plasmas will benefit from the development of methods that mitigate the density pumpout effect of RMPs in ISS plasmas.

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