

Changes in density fluctuations as a result of resonant magnetic perturbations correlate with the density inverse scale length

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Abstract

In this paper we show that the changes in ion-scale density fluctuations \tilde{n}/n induced by resonant magnetic perturbations (RMPs) exhibit the same trends as modifications to the inverse density scale length, a/L_n in the pedestal area. In a series of ITER Similar Shape (ISS) H-mode discharges in DIII-D, the $n = 3$ even parity RMP-coil current is varied from 4 kA up to 6.2 kA. The application of $n = 3$ RMPs results in an increase of a/L_n in the plasma core and a reduction in the pedestal area. Comparing the changes in a/L_n with the changes in density ion-scale fluctuations \tilde{n}/n shows that at $\Psi_N = 0.95$, the \tilde{n}/n follow the trends in a/L_n . This is suggestive that the changes in \tilde{n}/n are due to changes in the underlying density gradient rather than due to the RMPs directly in ISS H-mode discharges in DIII-D.

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