

Impact screening of resonant magnetic perturbations in 3D edge plasma transport simulations for DIII-D

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Abstract. The impact of resonant magnetic perturbations (RMPs) on the plasma edge can be analyzed in detail by three dimensional computer simulations, which take the underlying magnetic field structure as input. Previously, the “vacuum approximation” has been used to calculate the magnetic field structure although plasma response effects may result in a screening or amplification of the external perturbations. Simulation results for an ITER similar shape plasma at the DIII-D tokamak are presented for both cases: the full vacuum perturbation field and an ad hoc screening case. It is shown that the RMP induced helical patterns in the plasma edge and on the divertor target shrink once screening is taken into account. However, a flat temperature profile is still found in the “open field line domain” inside the separatrix, while a density pump out is compensated.