MEASUREMENT OF PLASMA BOUNDARY DISPLACEMENT BY n = 2 MAGNETIC PERTURBATIONS USING IMAGING BEAM EMISSION SPECTROSCOPY

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Abstract. Imaging beam emission spectroscopy has been used to study the displacement of the plasma boundary in ELMing H-mode discharges with a 10 Hz rotating $n = 2$ external magnetic field perturbation in DIII-D. The rotating magnetic field creates a helical displacement of the beam emission profile of ~2 cm on the low field side midplane which rotates with the applied RMP. This shift in the beam emission profile is due primarily to a shift in the electron density profile, which is independently measured to be 1.9 cm on the low field side midplane. These boundary displacements exceed calculations for the displacement of the stable and unstable manifolds formed by the interaction of the magnetic perturbation with the divertor separatrix by a factor of 4–5, suggesting that the vacuum field model doesn't correctly model the effect of the magnetic perturbations even near the separatrix. The measured displacements are suggestive of a non-resonant kink response.