Spatiotemporal changes in the pressure-driven current densities on DIII-D due to magnetic islands

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Abstract.

Using direct analysis of the motional Stark effect (MSE) signals, an explicit measurement of the "missing" bootstrap current density around the island location of a neoclassical tearing mode (NTM) is made for the first time. When the NTM is suppressed using co-electron cyclotron current drive, the measured changes in the current profile that restore the bootstrap current are also directly found from the MSE measurements. Additionally, direct analysis of helical perturbations in the MSE signals during slowly rotating "quasi-stationary" modes shows the first explicit measurement of the deficit in the toroidal current density in the island O-point.

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