Modification of the Current Profile in High Performance Plasmas Using Off-Axis Electron Cyclotron Current Drive in DIII-D

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Abstract. Off-axis electron cyclotron current drive (ECCD) has been demonstrated to maintain an advanced tokamak discharge with minimum safety factor >2, β = 3%, and a noninductive current fraction of ~90%. The ECCD is observed to produce strong negative central shear, which in turn acts to trigger improvements in all transport channels in the plasma core. The observed modification of the current density profile is consistent with a 1-1/2 D transport simulation. Furthermore, good agreement is found between motional Stark effect diagnostic signals predicted by the simulation and the experiment.

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