

Validation of Neoclassical Bootstrap Current Models in the Edge of an H-mode Plasma

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Abstract. Analysis of the observed dynamics of the current density and pressure profile near the plasma edge following an L-H transition in the DIII-D tokamak indicate the generation of a large non-inductive edge current coincident with a large increase in the pressure gradient. Detailed analysis of the equilibrium evolution following the transition indicates a large negative voltage pulse is generated near the edge and propagates inward. Modeling has shown that these observations are consistent with a narrow current density peak in the edge plasma induced by the large edge pressure gradient. Comparisons with bootstrap current predictions of neoclassical theory indicate very good quantitative agreement between the measured $E_{||}$ evolution and the prediction.

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