Magnetic flux pumping in high performance, stationary plasmas with tearing modes

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Abstract

Analysis of the change in the magnetic field pitch angles during edge localized mode (ELM) events in high performance, stationary plasmas on the DIII–D tokamak shows rapid (< 1 ms) broadening of the current density profile, but only when a $m/n = 3/2$ tearing mode is present. This observation of poloidal magnetic flux pumping explains an important feature of this scenario, which is the anomalous broadening of the current density profile that beneficially maintains the safety factor above unity and forestalls the sawtooth instability.

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