

Abstract Submitted
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Tracking Inductive Flux Usage to Evaluate Flux Pumping in the Hybrid Scenario in DIII-D¹ N.Z. TAYLOR, ORAU, T.C. LUCE, R.J. LA HAYE, C.C. PETTY, GA, R. NAZIKIAN, PPPL — In hybrid scenarios the presence of amplitude modulation of tearing modes by nonaxisymmetric instabilities (usually $m/n=3/2$ by ELMs) is necessary for the redistribution of magnetic poloidal flux (flux pumping) to be observed. The physical mechanism through which the poloidal flux is redistributed (current profile anomalously broadened) is not well understood. The evolution of normalized flux states is used to track the rate at which poloidal flux is provided by the coils, and the rate it is converted to kinetic energy in the plasma. In DIII-D hybrid discharges there is a measured deficit in the rate of change in the flux states indicating that poloidal flux is being consumed at a higher rate than it is being provided by the coils. This unexpected deficit disappears when the tearing mode is suppressed with electron cyclotron current drive (ECCD) and increases with the level of flux pumping present. One explanation for the deficit could be that the beneficial tearing mode facilitates the conversion of toroidal to poloidal magnetic flux.

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