

Abstract Submitted
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Asymmetric SOL Current in Vertically Displaced Plasma¹ J.D. CABRERA, G.A. NAVRATIL, J.M. HANSON, Columbia U — Experiments at the DIII-D tokamak demonstrate a non-monotonic relationship between measured scrape-off layer (SOL) currents and vertical displacement event (VDE) rates with SOL currents becoming largely $n=1$ dominant as plasma is displaced by the plasma control system (PCS) at faster rates. The DIII-D PCS is used to displace the magnetic axis $\sim 10x$ slower than the intrinsic growth time of similar instabilities in lower single-null plasmas. Low order ($n \leq 2$) mode decomposition is done on toroidally spaced current monitors to attain measures of asymmetry in SOL current. Normalized to peak $n=0$ response, a 2-4x increase is seen in peak $n=1$ response in plasmas displaced by the PCS versus previous VDE instabilities observed when vertical control is disabled. Previous inquiry shows VDE asymmetry characterized by SOL current fraction and geometric parameters of tokamak plasmas[1]. We note that, of plasmas displaced by the PCS, short displacement time scales near the limit of the PCS temporal control appear to result in larger $n=1/n=2$ asymmetries. [1] Fitzpatrick 2011 Nucl. Fus. 51 053007.

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