

ABSTRACT

A new high-performance confinement regime, combining discrete edge and core transport barriers, has been discovered in the DIII–D tokamak. Edge localized modes (ELMs) are replaced in the edge barrier by a steady oscillation that increases particle transport to allow sustained particle control, but without the usual ELM-induced pulsed divertor heat load. The core barrier is similar in character to internal transport barriers seen with a low (L) mode edge, without deterioration resulting from ELM activity near the edge. The barriers coexist without merging by virtue of a zero-crossing in the $E \times B$ shearing rate just inside the edge barrier. This low-shear layer results in a localized region of high transport.