

## THE QUIESCENT DOUBLE BARRIER REGIME IN DIII-D

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**Abstract—** The Quiescent Double Barrier (QDB) regime is a high performance regime recently identified in DIII-D and characterized by a double transport barrier structure (core and edge) that can be maintained for several seconds, often limited only by the pulse length capabilities of the DIII-D hardware. The QDB regime has been sustained for up to  $25 \tau_E$  with fusion performance of up to  $\beta_N H_{89} \approx 7$ . The edge barrier is ELM-free, but modulated by low frequency MHD activity that allows density control via an external cryopump. The core barrier is similar to those seen in previous internal transport barrier experiments, but is maintained without complete stabilization of turbulence. Instead, the turbulence correlation lengths become very short so as to minimize the transport length scales. The two barriers are separated by a region of high transport that is a consequence of a zero crossing in the  $E \times B$  shearing rate. These discharges typically possess highly peaked density profiles. This has several implications: narrow bootstrap current profile, reduced beta limit and increased impurity retention. We will report on studies of each of these issues.