

Observation of the L-H confinement bifurcation triggered by a turbulence-driven shear flow in DIII-D

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Abstract. Comprehensive 2D turbulence and turbulent eddy flow velocity measurements demonstrate a rapidly increasing turbulence-driven shear flow that develops ~100 microseconds prior to the Low-confinement (L-mode) to High-confinement (H-mode) transition and appear to trigger it. These changes are localized to a narrow layer 1-2 cm inside the magnetic boundary. Increasing heating power leads to increased turbulence amplitude, higher inferred Reynolds stress, increased energy transfer from turbulence to the radially sheared poloidal flow, and increased edge flow shear that suppresses turbulence and triggers the transition.

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