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Role of turbulence mode velocity shear in Triggering the L-H Transition.[1] ZHENG YAN, University of Wisconsin, Madison, GEORGE MCKEE, MATT KRIETE, University of Wisconsin - Madison, PUNIT GOHIL, General Atomics, LOTHAR SCHMITZ, University of California, Los Angeles, CHRISTOPHER HOLLAND, University of California, San Diego, SHAUN HASKEY, BRIAN GRIERSON, Princeton Plasma Physics Laboratory, TERRY RHODES, University of California, Los Angeles, CRAIG PETTY, General Atomics — Comprehensive 2D edge turbulence and flow measurements across the L-H transition on DIII-D exhibit two poloidally counter-propagating bands of low-k density fluctuations for plasmas that have lower power thresholds in ITER-similar-shape discharges with near zero external torque injection. The velocities of either mode do not individually match the mean ErB velocity measured with CER, and the mode velocity shear is much larger than the mean ErB velocity shear. The Reynolds stress inferred from Beam Emission Spectrocopy data consistently increases approaching the L-H transition in the presence of these dual modes. These observations are consistent with previous theoretical gyrokinetic simulations that, in the absence of toroidal ion rotation, the intrinsic diamagnetic drift wave phase velocity shear adds to the ion pressure gradient ErB velocity shear component and becomes important for turbulence stabilization. These observations are important for developing a predictive capability for the L-H transition power threshold in burning plasmas.

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