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Turbulence and Zonal-Flow evolution at the L-to-H transition in Alcator C-Mod[1] ISTVAN CZIEGLER, UC San Diego, AMANDA HUBBARD, JERRY HUGHES, JAMES TERRY, MIT, GEORGE TYNAN, UC San Diego — Transitions of tokamak confinement regimes from low- to high-confinement are studied on Alcator C-Mod using gas-puff-imaging (GPI) with a focus on the interaction between the edge drift-turbulence and the local shear flow. Results will be presented on the evolution of the energy transfer rate and turbulence spreading, with the transfer rate reaching the estimated value of drift turbulence growth rate at the time the turbulent kinetic energy starts to drop, leading to an expected loss of turbulence power comparable to the observed changes. The above behavior is demonstrated across a series of experiments. Thus a lossless kinetic energy conversion mechanism is shown to both drive a zonal flow and be responsible for the initial reduction of turbulence fluctuation power, consequently mediating the transition into H-mode. The history of the energy transfer is compared with the evolution of the pressure pedestal for the purpose of developing microscopic models of thresholds between L-mode, limit-cycle-oscillating regimes and H-mode.

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Istvan Cziegler
UC San Diego

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