Abstract Submitted
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A unique predator-prey system of coupled turbulence, drive, and sheared ExB flow in the pedestal of high performance DIII-D plasmas[1] K. BARADA, T.L. RHODES, W.A. PEEBLES, L. ZENG, UCLA, K.H. BURRELL, L. BARDOCZI, XI CHEN, GA — A unique, long-lived predator-prey oscillation regime (3-12 energy confinement times) is observed to replace coherent edge harmonic oscillations in recent low-torque quiescent high confinement (QH) mode plasmas. The physics of this system has been revealed through simultaneous measurements of local density turbulence ñ, ExB velocity V, and ExB shear V' at eight pedestal locations using Doppler backscattering. ExB velocity being poloidally and toroidally symmetric is found to be driven by pressure gradient and not by ñ. The phase space of V' and ñ exhibits the characteristics of a predator-prey cycle with V' (predator) lagging ñ (prey). It is the time-lag in the evolution of V at different pedestal locations which has been found to dictate V' evolution. ñ increases while V' decreases and when V' increases, ñ is suppressed. Observations of oscillations in edge transport relevant parameters indicate a potentially significant contribution of this mechanism to pedestal transport regulation.

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