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Gyrokinetic Simulation of Lorentzian Pulse Generation and Anomalous Transport in a Magnetized Temperature Filament R. SYDORA, University of Alberta, Canada, J. MAGGS, G. MORALES, B. VAN COMPERNOLLE , UCLA — 3D gyrokinetic particle simulations with self-consistent electrostatic and electromagnetic fields have been carried out for plasma conditions similar to those in the Large Plasma Device (LAPD) temperature filament experiments at UCLA. The observed electron temperature gradient-driven drift-Alfven fluctuations closely match the eigenmodes predicted by linear theory and in the nonlinear regime the spatio-temporal pattern of the electric potential and density fluctuations (spiral-like) also agree with experiments. The temporal behavior of the electric potential, magnetic field and temperature fluctuations at fixed spatial position contain non-sinusoidal pulses which are fit with a Lorentzian shape. These are consistent with an exponential frequency spectrum in the broadband turbulence as has also been found in the LAPD and other experiments. The temperature pulses were found to be approximately four times narrower than the electric and magnetic field pulses. A permutation entropy analysis (J. Maggs, G. Morales, PPCF, 55, 085015 (2013)) was also performed confirming that the underlying dynamics is chaotic rather than stochastic.

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