Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

The Entropy and Complexity of Drift waves in a LAPTAG Plasma Physics Experiment[1] HENRY BIRGE-LEE, North Hollywood H.S., WALTER GEKELMAN, PATRICK PRIBYL, University of California, Los Angeles, JOE WISE, Wildwood Academy, CAMI KATZ, Harvard Westlake H.S., BOB BAKER, University H.S. (ret), KEN MARMIE, Roosevelt Middle H.S., SAM THOMAS, John Marshall H.S., SAMUEL BUCKLEY-BONNANO, Harvard Westlake H.S. — Drift waves grow from noise on a density gradient in a narrow (dia = 3 cm, L = 1.5 m) magnetized (B_{oz} = 160G) plasma column. A two-dimensional probe drive measured fluctuations in the plasma column in a plane transverse to the background magnetic field. Correlation techniques determined that the fluctuations were that of electrostatic drift waves. The time series data was used to generate the Bandt-Pompe/Shannon entropy, H, and Jensen-Shannon complexity, C_{JS}. C-H diagrams can be used to tell the difference between deterministic chaos, random noise and stochastic processes and simple waves, which makes it a powerful tool in nonlinear dynamics. The C-H diagram in this experiment, reveal that the combination of drift waves and other background fluctuations is a deterministically chaotic system. The PDF of the time series, the wave spectra the spatial dependence of the entropy wave complexity will be presented. LAPTAG is a university-high school alliance outreach program, which has been in existence for over 20 years.

[1]Work done at BaPSF at UCLA and supported by NSF and DOE.

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Date submitted: 21 Jul 2015 Electronic form version 1.4