

Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Experimental Characterization of Three-Wave Coupling in Dipole Plasma Turbulence¹ MEL ABLER, MICHAEL MAUEL, Columbia University — Plasmas confined by a strong dipole field exhibit interchange turbulence, which previous experiments have shown respond locally to active feedback [1]. On the Collisionless Terrella Experiment (CTX), this turbulence is characterized by low frequency, low order, quasi-coherent modes with time-varying and intermittent spectral dynamics. We apply bicoherence analysis [2] using both short time fourier transforms and wavelets as basis functions to study nonlinear three-wave coupling and the resulting energy transfer between scales in the naturally occurring turbulence, as well as during active feedback and driven wave scenarios. The drive/feedback system can both amplify and suppress local turbulent fluctuations. During feedback we observe enhancements to the time-averaged bicoherence, while on shorter timescales the bicoherence changes rapidly with variations in fluctuation intensity. [1] Roberts, Mauel, and Worstell, Phys Plasmas (2015). [2] Grierson, Worstell, and Mauel, Phys Plasmas (2009).

¹Supported by NSF-DOE Partnership for Plasma Science Grants DOE-DE-FG02-00ER54585 and NSF-PHY-1201896.

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Date submitted: 02 Jul 2019

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