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**Understanding Turbulence using Active and Passive Multipoint Measurements in Laboratory Magnetospheres**[1] M.E. MAUEL, M.C. ABLER, T.M. QIAN, A. SAPERSTEIN, J.R. YAN, Columbia University — In a laboratory magnetosphere, plasma is confined by a strong dipole magnet, and interchange and entropy mode turbulence[2] can be studied and controlled in near steady-state conditions.[3] Turbulence is dominated by long wavelength modes exhibiting chaotic dynamics, intermitency, and an inverse spectral cascade. Here, we summarize recent results: (*i*) high-resolution measurement of the frequency-wavenumber power spectrum using Capon's "maximum likelihood method",[4] and (*ii*) direct measurement of the nonlinear coupling of interchange/entropy modes in a turbulent plasma through driven current injection at multiple locations and frequencies.[5] These observations well-characterize plasma turbulence over a broad band of wavelengths and frequencies. Finally, we also discuss the application of these techniques to space-based experiments and observations aimed to reveal the nature of heliospheric and magnetospheric plasma turbulence.

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[2]Garnier, *et al.*, *Phys Plasmas*, **24**, 012506 (2017).
[3]Roberts, *et al.*, *Phys Plasmas*, **22**, 055702 (2015).
[4]Qian, *et al.*, *Undergraduate Poster Session; This meeting.*
[5]Abler, *et al.*, *Poster Category 1.8; This meeting.*

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