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High-Resolution Measurement of the Turbulent Frequency-Wavenumber Power Spectrum in a Laboratory Magnetosphere[1] T.M. QIAN, M.E. MAUEL, Columbia University — In a laboratory magnetosphere, plasma is confined by a strong dipole magnet, where interchange and entropy mode turbulence can be studied and controlled in near steady-state conditions[2]. Whole-plasma imaging shows turbulence dominated by long wavelength modes having chaotic amplitudes and phases[3]. Here, we report for the first time, high-resolution measurement of the frequency-wavenumber power spectrum by applying the method of Capon[4] to simultaneous multi-point measurement of electrostatic entropy modes using an array of floating potential probes. Unlike previously reported measurements in which ensemble correlation between two probes detected only the dominant wavenumber, Capon's "maximum likelihood method" uses all available probes to produce a frequency-wavenumber spectrum, showing the existence of modes propagating in *both* electron and ion magnetic drift directions. We also discuss the wider application of this technique to laboratory and magnetospheric plasmas with simultaneous multi-point measurements.

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[2]Garnier, *et al.*, *Phys Plasmas*, **24**, 012506 (2017).
[3]Grierson, *et al.*, *Phys Plasmas*, **16**, 055902 (2009).
[4]Capon, *Proc. IEEE*, **57**, 1408 (1969).

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