Abstract Submitted
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Universal Impedance, Admittance and Scattering Fluctuations in Quantum-chaotic Systems SAMEER HEMMADY, University of Maryland — We experimentally investigate fluctuations in the eigenvalues of the impedance, admittance and scattering matrices of wave chaotic systems using a microwave analog of a quantum chaotic infinite square well potential. We consider a 2-D, time-reversal symmetric chaotic microwave resonator driven by two non-ideally coupled ports. The system-specific coupling effects are removed using the measured radiation impedance matrix ($\overleftrightarrow{Z}_{Rad}$) [1] of the two ports. A normalized impedance matrix ($\overleftrightarrow{z}$) is thus obtained, and the Probability Density Function (PDF) of its eigenvalues is predicted to be universal depending only on the cavity loss. We observe remarkable agreement between the statistical properties of $\overleftrightarrow{z}$ and $\overleftrightarrow{y} = \overleftrightarrow{z}^{-1}$ for all degrees of loss, which is in accordance with [1, 2] and Random Matrix Theory (RMT). We compare the joint PDF of the eigenphases of the normalized scattering matrix ($\overleftrightarrow{s}$) with that obtained from RMT for varying degrees of loss. We study the joint PDF of the eigenvalues of $\overleftrightarrow{s}\overleftrightarrow{s}^{\dagger}$ and find good agreement with [3]. [1] X. Zheng, *et al.,* – Electromagnetics (in press); condmat/0408317; S. Hemmady, *et al.*, Phys. Rev. Lett. **94**, 014102 (2005).[2] Y. V. Fyodorov, *et al.*,– condmat/0507016.[3] P. W. Brouwer and C. W. J Beenakker – PRB **55**, 4695 (1997). Work supported by DOD MURI AFOSR Grant F496200110374, DURIP Grants FA95500410295 and FA95500510240.

Sameer Hemmady
University of Maryland

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