Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Nonlinear Wave Chaos and the Random Coupling Model[1] MIN ZHOU, Electrical and Computer Engineering Department, University of Maryland, College Park, EDWARD OTT, THOMAS M. ANTONSEN, STEVEN ANLAGE, ECE and Physics Departments, University of Maryland, College Park — The Random Coupling Model (RCM) has been shown to successfully predict the statistical properties of linear wave chaotic cavities in the highly over-moded regime. It is of interest to extend the RCM to strongly nonlinear systems. To introduce nonlinearity, an active nonlinear circuit is connected to two ports of the wave chaotic -bowtie cavity. The active nonlinear circuit consists of a frequency multiplier, an amplifier and several passive filters. It acts to double the input frequency in the range from 3.5 GHz to 5 GHz, and operates for microwaves going in only one direction. Measurements are taken between two additional ports of the cavity and we measure the statistics of the second harmonic voltage over an ensemble of realizations of the scattering system. We developed an RCM-based model of this system as two chaotic cavities coupled by means of a nonlinear transfer function. The harmonics received at the output are predicted to be the product of three statistical quantities that describe the three elements correspondingly. Statistical results from simulation, RCM-based modeling, and direct experimental measurements will be compared.

[1]ONR under Grant No. N000141512134, AFOSR under COE Grant FA9550-15-1-0171,0 and the Maryland Center for Nanophysics and Advanced Materials.

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Date submitted: 28 Feb 2017 Electronic form version 1.4