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Quantifying Volume Changing Perturbations to a Wave Chaotic System[1] BINIYAM TADDESE, Department of Electrical & Computer Engineering, University of Maryland, College Park, MD 20742-3285, USA, GABRIELE GRADONI, Department of Physics, University of Maryland, College Park, MD 20742-4111, USA, FRANCO MOGLIE, Dip. di Ingegneria dell'Informazione, Università Politecnica delle Marche, Ancona, Italy, THOMAS ANTONSEN, EDWARD OTT, STEVEN ANLAGE, Department of Physics, University of Maryland, College Park, MD 20742-4111, USA — The Loschmidt Echo and Fidelity decay are used to measure perturbations on a quantum wave chaotic system. We extended these concepts to classical waves to detect perturbations. [1]. In this work, we show that volume changing perturbations to a classical wave chaotic cavity can be quantified with a sub-wavelength sensitivity. This is demonstrated both numerically and experimentally. A wave chaotic quasi-1D star graph model [2], was initially used to show the results. The quantification of electrical-volume changing perturbations to a one cubic meter aluminum box will be demonstrated experimentally; the experimental results are also supported by a finite difference time domain simulation of the box. Finally, the approach to quantify these perturbations will be shown to apply to a generic wave chaotic system by using a time domain version of our Random Coupling Model.

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