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Testing Wave Chaos Statistical Predictions in Scaled Electromagnetic Cavities[1] BO XIAO, THOMAS ANTONSEN, EDWARD OTT, Univ of Maryland-College Park, ZACHARY DRIKAS, JESUS GIL GIL, U.S. Naval Research Laboratory, STEVEN ANLAGE, Univ of Maryland-College Park — Predicting the induced voltage at locations inside a complex enclosure subject to an incident electromagnetic wave is a focus in many fields such as electromagnetic compatibility and telecommunication. Real life enclosures are usually ray-chaotic and the exact solution of the fields heavily depends on the geometry details and is very sensitive to small changes. Thus a statistical approach is more appropriate. Random Coupling Model (RCM) predicts the statistical properties of the waves inside a ray-chaotic enclosure, which has been widely discussed and accepted. Testing RCM in a network of cavities coupled through apertures is a new frontier of RCM but is difficult to demonstrate in experiment due to the size of the large structures. Here we present a novel scaled cavity experimental setup to study the statistical properties of waves in a network of cavities connected by apertures. We scale down the structure to a manageable size, then scale up the frequency and the conductivity of the walls so that the normalized loss is the same compared to the full-size structure. Our current setup can host a scaled-down cubic volume with 450 wavelengths on each dimension, equivalent to a house in full scale. We present the experimental setup and some studies on a single scaled cavity, which is the first step towards more complicated networks.

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