

ACOUSTICS2008/834

Localization and Mesoscopics in Structures and Rooms I

Richard Weaver

Dept. of Physics, University of Illinois, Urbana, IL 61801, USA

Diffuse field methods such as reverberation room acoustics and statistical energy analysis predict wave energy flow in complex structures. They are predicated on an incorrect assumption of incoherence. The consequent failures of otherwise successful theories are occasionally striking. The most noteworthy amongst these are related to Anderson - and other kinds of - localization. Residual coherence manifests also in time-reversal invariance and Green's function retrieval in field-field correlations. It is sometimes possible in special cases to make ad hoc corrections to the diffuse field theories. It would be preferable, however, to augment them with more a fundamental quantitative theory applicable to a wide variety of systems.

This talk reviews mesoscopic phenomena such as weak Anderson localization, modal echoes, Anderson localization, Thouless localization, and Greens function retrieval. It sets out the phenomena and concepts behind the new theory to be presented in "Localization and Mesoscopics in Structures and Rooms II" at a later session.