

**DETERMINING SURFACE SCATTERING FROM  
GONIOMETER BASED DIFFUSION MEASUREMENTS**

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An Abstract of a Thesis Submitted to the Graduate

Faculty of Rensselaer Polytechnic Institute

in Partial Fulfillment of the

Requirements for the Degree of

MASTER OF SCIENCE IN ARCHITECTURAL SCIENCES

Major Subject: ARCHITECTURAL ACOUSTICS

The original of the complete thesis is on file  
in the Rensselaer Polytechnic Institute Library

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July 2009  
(For Graduation August 2009)

## ABSTRACT

The diffuseness of a space is an important aspect of how well it functions. Without proper quantification of material diffusive properties it is impossible to predict the performance of a space or the impact of a renovation. There are currently two methods to measure the diffusion / scattering of acoustical surfaces. The first is a reverberation chamber measurement and the second is an in situ measurement using a semicircular array of microphones called a goniometer. Each of these methods has advantages as well as drawbacks. The reverberation chamber method accounts for random incidence, but also, produces different results for materials of the same profile but different absorption. The goniometer measurement quantifies diffusion independently from absorption, but has limitations at low incident angles because the direct sound and reflected sound arrive at the receiver in close succession; this complicates attempts to resolve the relationship between the sounds. This research addresses the limitations of the goniometer. Using a control measurement to subtract the direct sound from the measurement, the direct sound and the reflection can be resolved individually. Through this method accurate diffusion properties can be assessed independently from absorption properties.