

Acoustic Metamaterial: From Conception to Auralization

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Abstract

Metamaterials have become a very hot topic in scientific publications, especially in Acoustics. In 2018, nearly 3,000 publications can be already found about acoustic metamaterials (source: Google Scholar). But how many industrial applications? Not that much because they are often expensive and complex to produce. This work present the transfer of this technology through an absorbent metaporous that improves the acoustic performances at low frequencies. Its simple design has been optimized through finite element simulations using COMSOL Multiphysics®. We can then listen to the effect of metamaterials through an auralization study and understand the real advantage of this technology in very concrete situations.

Figures used in the abstract

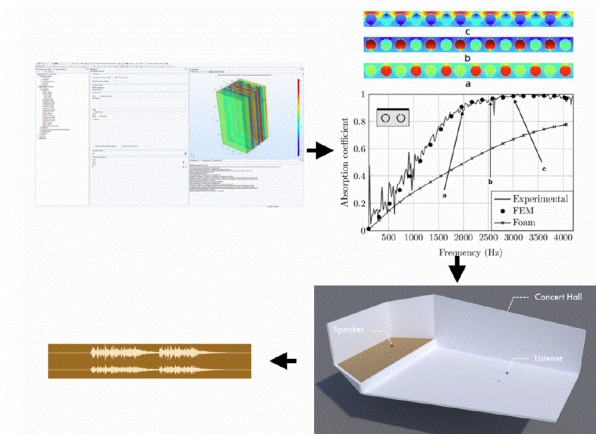


Figure 1: Example of the development process in the case of metaporous material used for sound absorption applications. The material is first designed with COMSOL Multiphysics® until it reaches the absorption coefficient goal. Then a ray tracing method allows us to compute the acoustic response of a room and listen the influence of different materials inside.