

# Transmission enhancement through symmetric diffusive slabs: effects of the losses and of the symmetry breaking

Elie Chéron, Simon Félix, Vincent Pagneux

Laboratoire d'Acoustique de l'Université du Maine, UMR CNRS 6613  
Av. O. Messiaen  
72085 LE MANS Cedex 9, France

In a recent paper we report on a significant and broadband enhancement of the transmission through an opaque barrier when placed between symmetric diffusive slabs [1]. In order to inspect if this phenomenon might be observed experimentally, we raise the questions of the robustness of the observed enhancement to absorption and symmetry defects. Introducing losses, we first adapt the scaling model of [1] from the conservative case to the non-conservative one. We show that, while decreasing, the enhancement is still observed and it is mainly driven by the absorption length of the media. The sensitivity of this phenomenon to symmetry defects is then investigated by associating the deterioration of the enhancement with the positions of the symmetry defects that could be particularly interesting for non-destructive testing applications. We also propose a probabilistic model to estimate the conductance of a medium with a number of randomly distributed defects.

[1] E. Chéron, S. Félix, V. Pagneux, Broadband-Enhanced Transmission through Symmetric Diffusive Slabs, *Phys. Rev. Lett.* **122** (12), 125501 (2019)