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On the diffusion of sound energy in porous materials

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The sound intensity was used in the past to describe the surface properties of porous materials. Actually no extensive study used the same concepts to describe the properties of the energy flow inside the material. As known, the sound intensity has a twofold nature, that is an active part transferring the energy out of a point and a reactive one localizing the energy. These features are crucial in the development of the new model for the propagation of the energy inside porous materials developed in this work. In fact, by means of the intensimetric approach, it is shown that the one-dimensional transfer of sound energy can be fully described as a diffusion process. The role of the active and reactive sound intensities is outlined and specific parameters are defined to account for the material behaviour with respect to the transfer of the sound energy. Moreover the sinks of energy and the sources of reactivity in the material are derived and discussed.