

Ventilating Sound Barrier with Helmholtz Resonator

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We realized sound barrier for the first time based on acoustic metamaterial and demonstrated acoustic sound blocking which has wide non-pass band range. Ventilating sound barrier effect was observed in our 2-dimensional B-NG slab consisting of Helmholtz resonators. Our work has relevance to sound isolating windows.

These are the basic ideas for ventilating sound barrier using B-NG slab. With Helmholtz resonator, we could fabricate the 2-dimensional invisible sound barrier. Because of effective bulk modulus is imaginary. We can get sound barrier effect from slab with Helmholtz resonator. Evanescent wave of electromagnetic wave through good conductor is similar with B-ng slab with Helmholtz resonator. This system's Effective bulk modulus has non-pass band frequency range which is between 350Hz and 490Hz as shown in Fig.1.

In conclusion, from this research, controlling noise level is possible by using B-NG slab. Our Helmholtz resonator based ventilating sound barrier is useful for decreasing and blocking noise from all kinds of sound source. Helmholtz resonator has been researched for one century. From this fact, we can make more detail result with data of others. Acoustic metamaterials have great potential to making application for the ordinary life and scientific region such as sound absorbing wall and ventilation duct for air conditioner of buildings

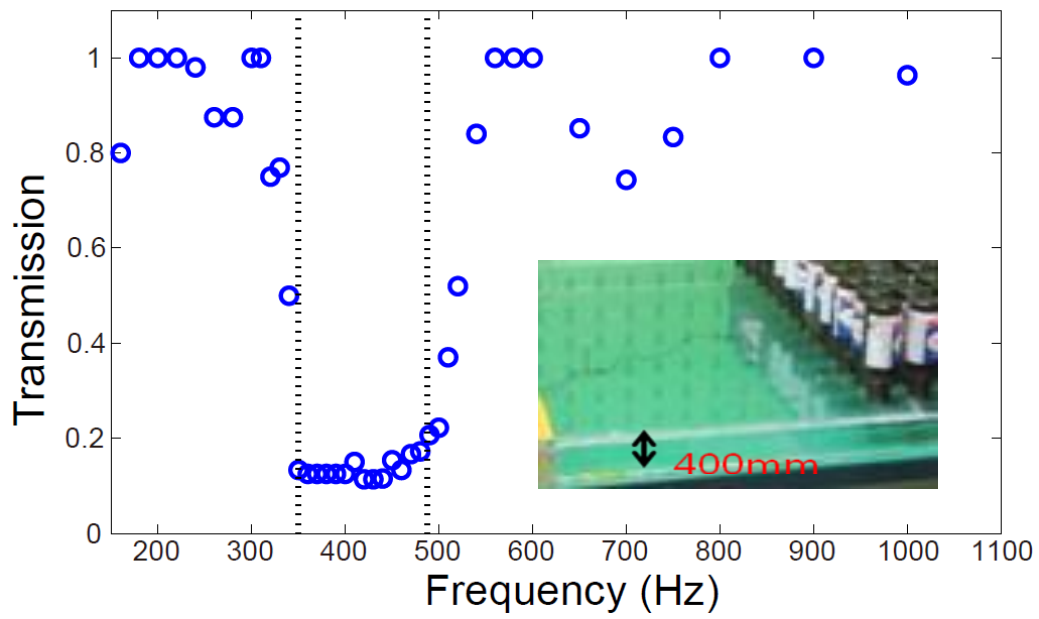


Fig.1. Experimental data with 40mm height duct.

References

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