

Low-cost, Light-weight, Passive Hearing Protector

Technology #18005

Applications

This technology can be used in making passive hearing protection device for personnel working in high-noise operational environments such as:

- aircraft and helicopter cockpits
- carrier decks
- weapon training
- combat
- mining and metal industry

Problem Addressed

High intensity noise exposure can severely damage hearing. Conventional earplugs attenuate all sound irrespective of frequency reducing operational capability of the person concerned. On the contrary, state-of-the-art active noise canceling circuitry requires additional power supply. The complex design of these noise-canceling headphones leads to higher manufacturing cost compared to the passive devices.

Technology

This technology uses acoustic meta-materials to create a passive hearing protection device that can attenuate incoming acoustic pressure waves in specific frequency range. Unlike in traditional passive hearing protection devices, the acoustic transmission coefficient in the invented design decreases with an increase in the incoming sound pressure level by utilizing a water droplet in the transmitting channel. The enhanced interaction of the acoustic wave and the meta-materials makes the size of the device few centimeters that weighs in tens of grams.

Advantages

- Compact size
- Light weight
- Low cost
- No additional power supply

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Ear, Nose, & Throat

Intellectual Property:

Systems, apparatus, and methods for hearing protection
PCT

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Systems, apparatus, and methods for hearing protection
Issued US Patent

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External Links:

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<http://web.mit.edu/nanophotonics/index.htm>