

# Technology Offer

## Laser Hearing Aid

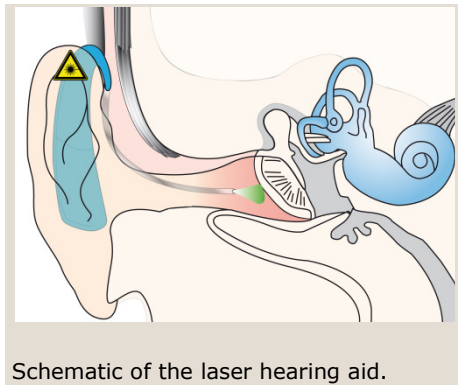
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### Challenge

An estimated 278 million people worldwide are living with disabling hearing impairment. This number is rising, mainly due to a growing global population and longer life expectation.



Schematic of the laser hearing aid.

Mechanical energy has been effectively used for hearing aids, either through acoustic amplification or vibration transmitted to the inner ear. However, hearing ability is dramatically reduced in noisy environments and for more complex sounds of daily life e.g., several people talking simultaneously. In part, these limitations are attributed to the lack of localized sensorineural activation across different frequency regions. Therefore, alternative stimulation strategies and technologies need to be developed to achieve

higher specificity in activation of the peripheral hearing organ.

### Technology

The technology discloses the use of laser pulses to overcome limitations of currently commercially available hearing aids. Such laser pulses induce a brief and localized thermal expansion of the tissue that results in an acoustic transient. Visible light can be used to activate the peripheral hearing organ when applied to the ear drum or on bony structures that transmit vibrations to the cochlea. The new system eliminates the need for direct contact mechanical stimulation of the osseous structures and also reduces the acoustic feedback effect common for conventional hearing aids. The laser hearing aid is designed similar to conventional implantable hearing aids: an external piece worn behind the ear contains a microphone with a speech processor; the electrical signals computed by the processor are then transmitted to the implanted receiver and the laser system. This novel, non-contact laser stimulation method could be used to improve both implantable and external hearing aids.

### Commercial Opportunity

In-licensing or cooperation for further development is possible.

### Developmental Status

Proof-of-principle experiments have been conducted in guinea pigs.

### Patent Situation

A US patent application has been filed in 2009, followed by a PCT application in 2010.

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