Optica group Delft – Sonar & Acoustics group Den Haag

Measuring Ultrasound with light

Peter Harmsma

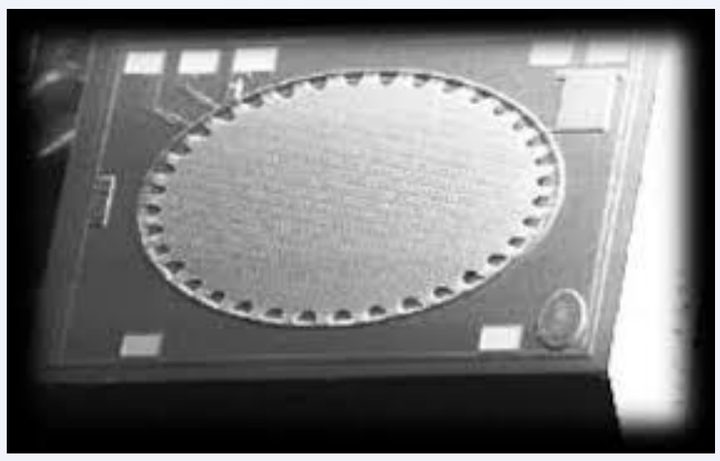
Sound is a vibration of air. 1 Herz means 1 vibration per second.

200 – 1500 Hz

15,000 – 120,000 Hz

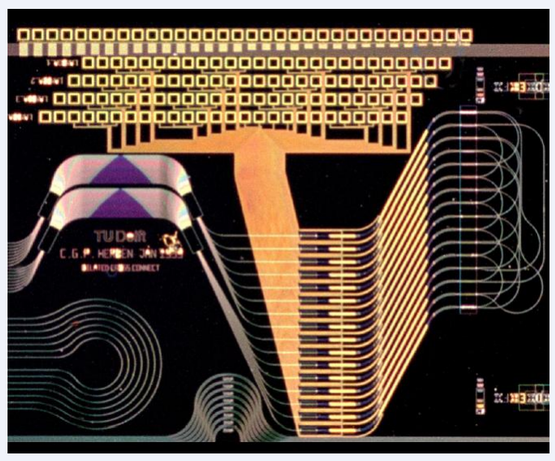
150,000 Hz

1000,000 – 5000,000 Hz

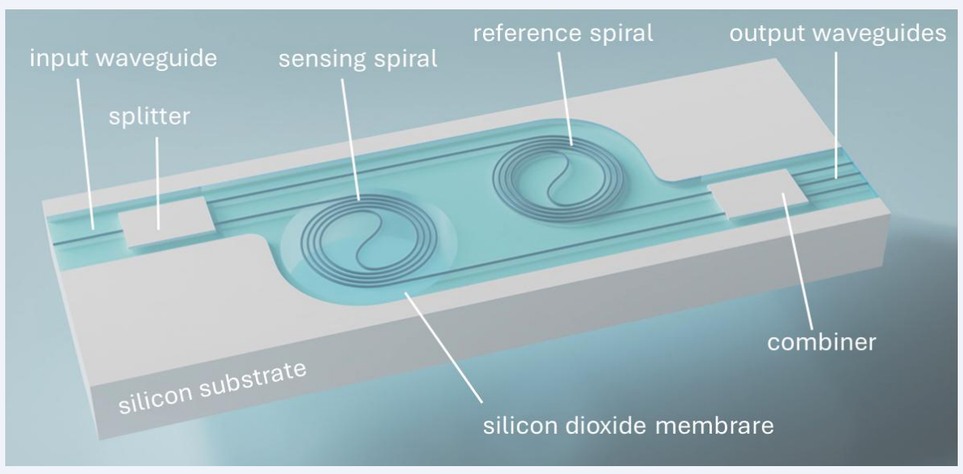


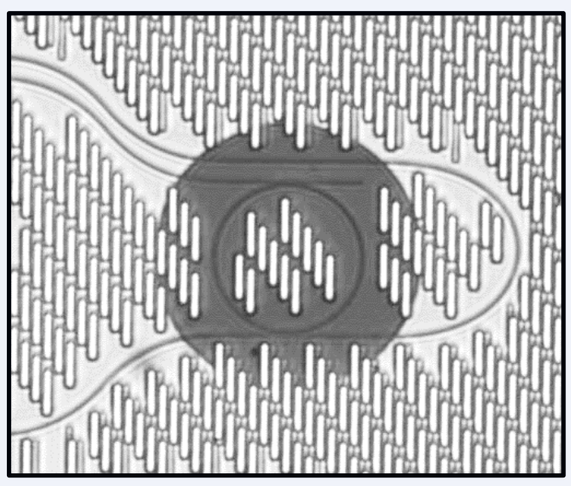
You can ‘hear’ sound using a membrane. In a microphone, the movement of the membrane is converted to an electrical signal.

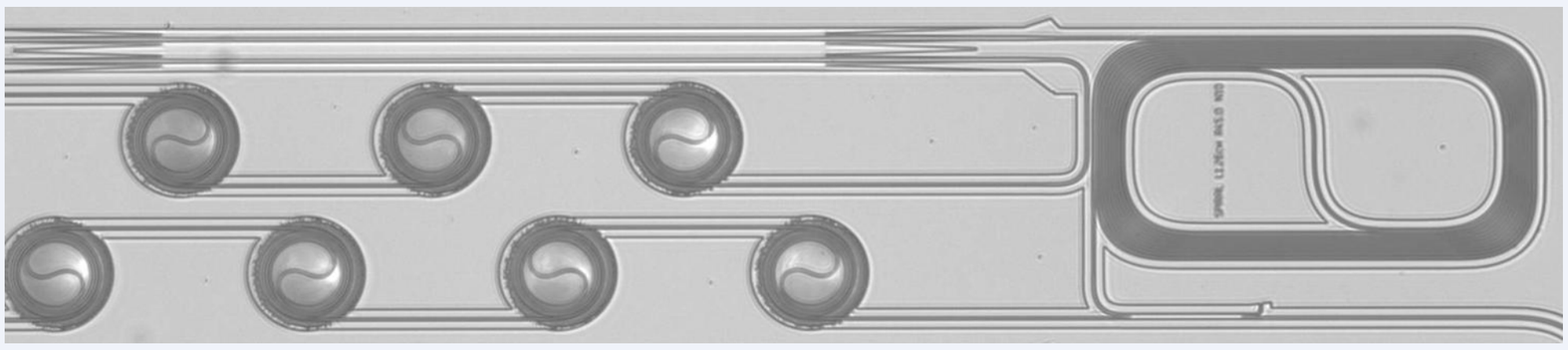
Light can be transported using a fiber-optic cable. This is wat makes ultrafast internet possible. Without fiber-optics no TikTok, Instagram, …



Optical chip are based on waveguides, miniature on-chip ‘fibers’. We can make optical circuits by clever design of these waveguides







VTT

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EUROPEAN INSTITUTE FOR BIOMEDICAL IMAGING RESEARCH

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TNO develops optical chips with membranes, so that we can make extremely sensitive ultrasound detectors. We cannot do this alone, and we work together with our partners. With such detectors, we can detect 20 - 100 times smaller signals, so that doctors can diagnose deeper-lying organs, and see smaller details..

TNO innovation for life

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