Holograms with Sound

A new way of shaping waves in 3D could find applications in technology and medicine

It will soon be possible to easily make sound three-dimensional. Researchers from the Max Planck Institute for Intelligent Systems and the University of Stuttgart have found an easy way to produce an acoustic hologram. It works in much the same way as its optical counterpart, which uses the phase shift of light waves to produce a three-dimensional image. The acoustic hologram created by the Max Planck researchers is a plastic relief through which sound waves travel faster than through the surrounding area. Because of the varying thickness of the material, the profile of the acoustic pressure changes as it passage through the plastic relief. With the help of this finely modulated acoustic pressure, particles ranging in size from several micrometers to several millimeters can be shifted to form larger structures. The technique could also be used to improve ultrasound diagnostics in medicine and materials testing. (www.mpg.de/10741300)

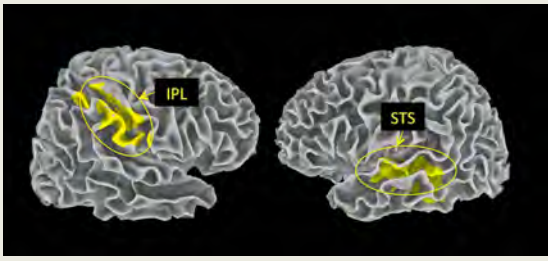
Ultrasound-driven surfer: On the surface of water, a hologram can be used to produce a standing wave on which a paper boat rides in circles.

Photos and graphic: Kai Melde/MPI for Intelligent Systems (top), MPI for Human Cognitive and Brain Sciences (bottom)

Good and Evil in the Brain

Two areas are involved in networks that interpret situations positively or negatively

When someone offends you while smiling, should your brain interpret it as a genuine smile or as an offense? Such ambiguous situations are difficult for our brain to interpret. The same sentence can take on different meanings depending on the tone of voice. Researchers at the Max Planck Institute for Human Cognitive and Brain Sciences in Leipzig have identified how the brain interprets such scenarios. They found that two networks in the brain determine how we interpret situations. The one is active when we perceive a scene as positive, and the other when we have negative impressions. Two areas within these networks respond to the change between perceptions. The superior temporal sulcus in the temporal lobe is responsible for interpreting positive events, and the inferior parietal lobule (IPL) for negative events. The two regions appear to inform each other which of them is active or inactive. In this way, it is believed, they determine whether positive or negative impressions dominate in an ambiguous situation, and relay that information to other areas of the brain. (www.mpg.de/10680717)



A matter of interpretation: The inferior parietal lobule (IPL) in the parietal lobe evaluates negative situations, while the superior temporal sulcus (STS) in the temporal lobe interprets positive events. Both areas are part of two neural networks that help the brain to evaluate its environment.