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Scientists develop incredible new method that could revolutionize how we contain oil spills: 'Never been done before'

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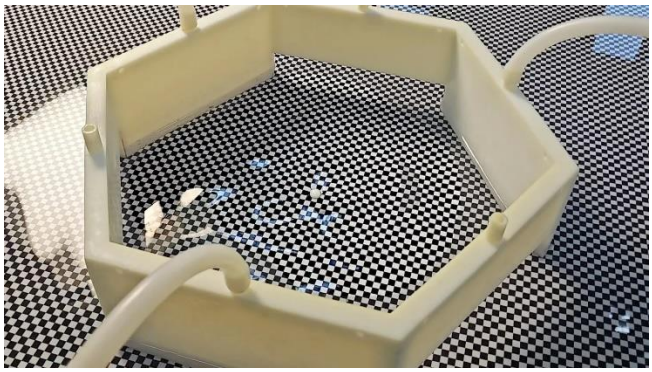

Photo Credit: Henan University

by Leslie Sattler

Scientists have discovered a way to use sound waves to create specific patterns on water that can move and trap floating objects, reported IEEE Spectrum.

This breakthrough could change how we clean up oil spills and other water pollutants. By making precise wave patterns, researchers can control the movement of floating objects as small as a rice grain or as large as a ping-pong ball, acting like "invisible tweezers" that could someday corral and remove harmful substances from our waterways.

The international team, led by assistant professor Yijie Shen from Nanyang Technological University in Singapore, created special 3D-printed structures that are partially submerged in water.

When connected to ordinary speakers that produce low-frequency sounds between 6.8 and 9 hertz, the structures create wave patterns like vortices (swirling water), Möbius strips (twisting loops), and skyrmions (3D twists and turns).

"We were able to use these patterns to control the movement of objects as small as a grain of rice to as large as a ping-pong ball, which has never been done before," Shen said, per Spectrum.

These wave patterns can apply forces similar to those seen in light and sound systems, attracting objects toward the strongest part of the wave, like leaves moving to the center of a whirlpool.

"The wave patterns we generated are topological and stable, so they keep their shape even when there is some disturbance in the water," Shen explained. This stability is key for practical applications like containing oil spills in choppy ocean conditions.

Dr. Usama Kadri, a mathematics expert at Cardiff University, told Spectrum the research was "conceptually innovative and a significant development in using sound to generate water waves."

Similar techniques using light waves could manipulate cells for biological applications at the microscopic scale. At a larger scale, specially designed water waves might produce electricity from ocean movement.

However, lab success doesn't guarantee real-world results. Oceans throw curveballs like background noise and unpredictable currents that complicate matters.

Oil spills don't stay in one neat puddle either. "Such spills can break up and require individual manipulation, leading to wave patterns interfering with each other," Kadri noted. Still, basic cleanup principles remain sound.

The real magic lies in what this means for pollution control. No harsh chemicals, no workers in hazmat suits — just sound waves doing the heavy lifting. Picture this: after a tanker leak, small devices deploy around the spill, their subtle tones herding oil into collection points. Fish swim freely nearby, unharmed by the process.

Testing continues on deeper water applications because scientists want to know if their wave tricks work below the surface, too. We're likely a few years from seeing this tech battling real spills, though.

https://www.thecooldown.com/green-tech/oil-spill-cleanup-sound-waves-pollution-control/