Febbox (China)
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English translation

Water-bending technique can precisely guide floating objects

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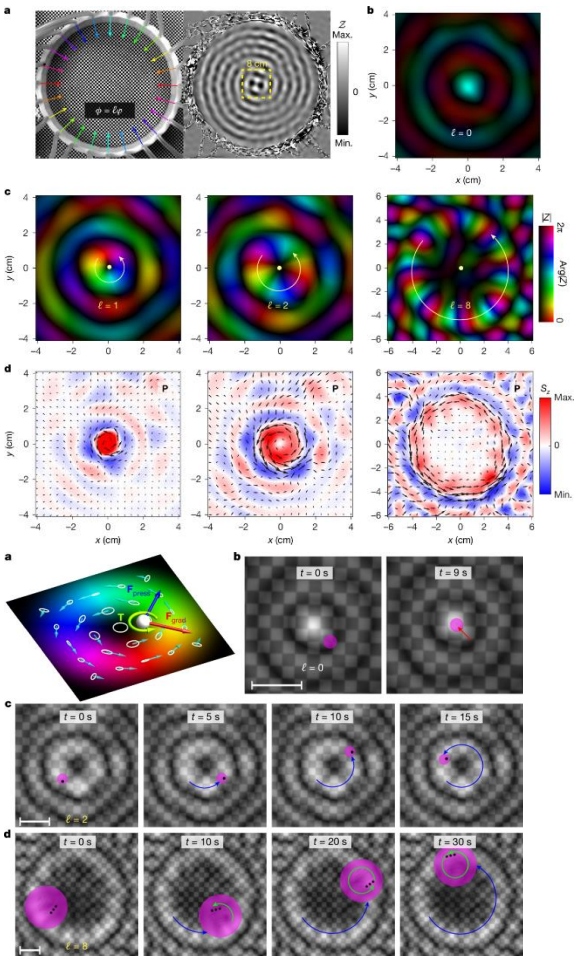
Abstract:

Researchers at Nanyang Technological University in Singapore have demonstrated the ability to manipulate water waves, allowing them to precisely control objects floating on the water's surface. If the technique can be perfected, it will pave the way for harnessing waves in new and exciting ways. The idea was inspired by earlier work involving light conducted by Yijie Shen. As co-leader of the new project, Shen realized that both light and water can move like waves, and he wondered if their achievements with light could also be applied to water.

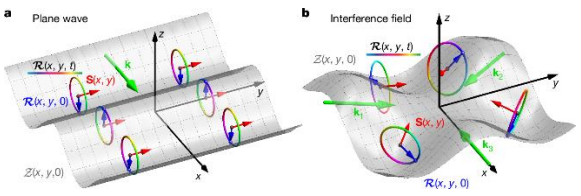
Early research included the use of computer simulations to determine if the idea would work. Convinced that it would work, they began conducting actual laboratory experiments involving small buckets of water and various objects such as foam balls and ping-pong balls.

By manipulating the frequency and amplitude of the waves, and adjusting whether they moved in sync, the team was able to fix the balls in a stationary position, or move them in circular or spiral paths at will.



The potential applications are many. When scaled up, the technology could be used to guide large objects such as ships through narrow harbors. Another innovative application is using waves to help control spills of hazardous chemicals, making them easier to clean up. Scaling the waves down to the micrometer scale, this method could potentially be used to reposition cells or other similarly sized particles without touching them.

More research is needed before commercialization is possible. Going forward, the team aims to determine if similar wave patterns can be created and controlled underwater to move submerged objects. They also need to determine how natural waves affect artificially created areas. Down the road, they could potentially even use water ripples to store data.



The team's work has been published in the journal Nature, titled "Manipulating topological water wave structures of particles."

https://www.febbox.com/channel/article/ouaaEo5V

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水流弯曲技术可精确引导漂浮物

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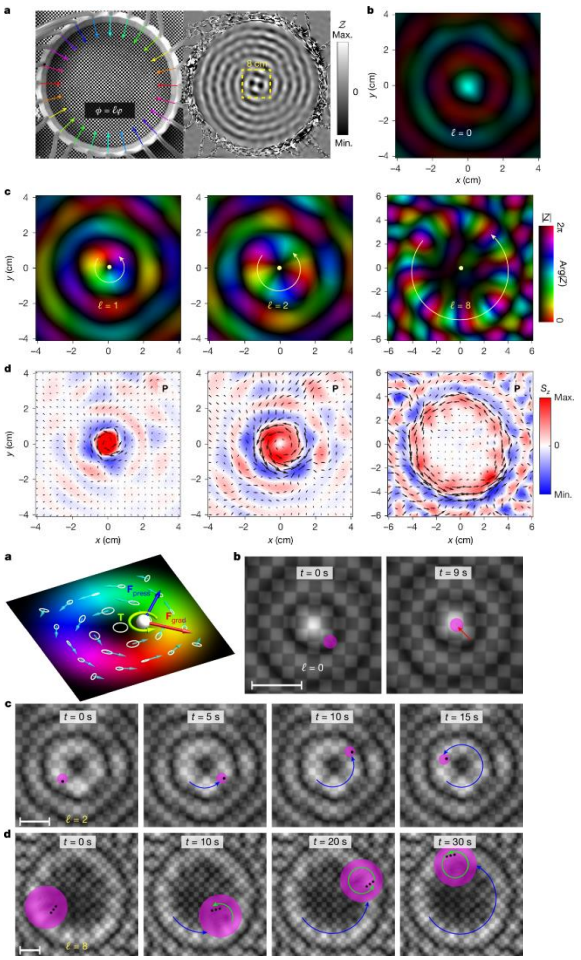
摘要:

新加坡南洋理工大学的研究人员展示了操纵水波的能力，使他们能够精确控制漂浮在水面上的物体。 如果这项技术得以完善，将为以全新的、令人兴奋的方式利用波浪铺平道路。这个想法的灵感来源于沈逸杰早先进行的涉及光的工作。 作为新项目的共同负责人，沈逸杰意识到光和水都能像波一样运动，他想知道他们在光方面取得的成就是否也能应用于水。

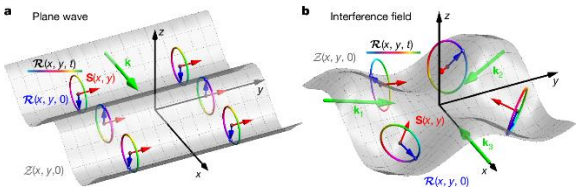
早期的研究包括使用计算机模拟，以确定这个想法是否可行。 他们确信这个想法一定会成功，于是开始进行实际的实验室实验，实验涉及小桶水和各种物体，如泡沫塑料球和乒乓球。

通过操纵波的频率和幅度，并调整它们是否同步移动，研究小组能够将球固定在静止位置，或随意沿圆形或螺旋形路径移动。



潜在的应用领域很多。 扩大规模后，该技术可用于引导船只等大型物体在狭窄的港口航行。 另一个创新应用案例是利用波浪帮助控制有害化学物质的溢出，使其更容易清理。 将波浪缩小到微米级，这种方法就有可能用于重新定位细胞或其他类似大小的颗粒，而无需接触它们。

在实现商业化之前，还需要进行更多的研究。 展望未来，研究小组的目标是确定能否在水下创造和控制类似的波浪模式，以移动水下物体。 他们还需要确定自然波浪会如何影响人工创造的区域。 在未来的道路上，他们甚至有可能利用水纹来存储数据。



该团队的研究成果已发表在《自然》杂志上，标题为"操纵粒子的拓扑水波结构"。

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