

武汉物数所理论交叉学术交流系列报告

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Tractor beam on the water surface and more

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报告人简介: 夏华2006年获得澳大利亚国立大学博士学位。主要从事湍流、表面波以及相关的输运等物理实验研究和大气边界层湍流的测量与风能相关的研究,并取得了卓越的成就。获得澳大利亚研究基金会的初级研究基金和未来人才研究基金。在高影响的杂志上发表文章38篇,其中包括3篇《自然》子刊(Nature Physics and Nature Communications)、1篇《美国国家科学院院刊》(Proceedings of the National Academy of Sciences)和11篇《物理评论快报》(Physical Review Letters)。

Abstract

In this talk, I will give a brief introduction of the activities in the Physics of Fluid Laboratory at the Australian National University. The research focus of the team is waves, wind, turbulence and self-organization in fluids. In particular, I will describe the first observation of the tractor beam on water wave [1]. We have discovered that objects floating on the water surface can be forced to move towards a wave source. The effect is quite spectacular: small waves produced on the water surface by a vertically oscillating wave maker push floating particles in the direction of the wave propagation. But as soon as some wave amplitude threshold is reached, waves change their shape and floating particles reverse their direction. A ping-pong ball can be pulled towards the wave maker. The interaction between the vortices generated by the surface waves may be the underlying mechanism for the tractor beam generation [2].

References

- [1]. Punzmann H., Francois N., Xia H., Falkovich G. and Shats M. Generation and reversal of surface flows by propagating waves, Nature Physics 10, 658-663 (2014).
- [2]. Francois N., Xia H., Punzmann H., Ramsden S., and Shats M. Three-dimensional fluid motion in Faraday waves: Creation of vorticity and generation of two-dimensional turbulence, Physical Review X 4, 021021 (2014).

主办单位:武汉物数所理论与交叉研究部