LNM学术报告(5月28日周一上午)

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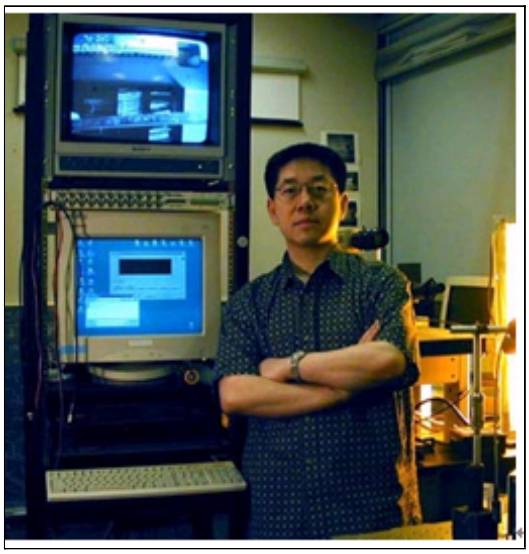


张俊教授

报告题目：On Unidirectional Flapping Flight of a Symmetric Wing

报告人：　Zhang jun professor

Department of Physics and Courant Institute, New York University

报告日期：2007年5月28日上午10:00 (星期一)

报告地点：中国科学院力学研究所主楼344会议室

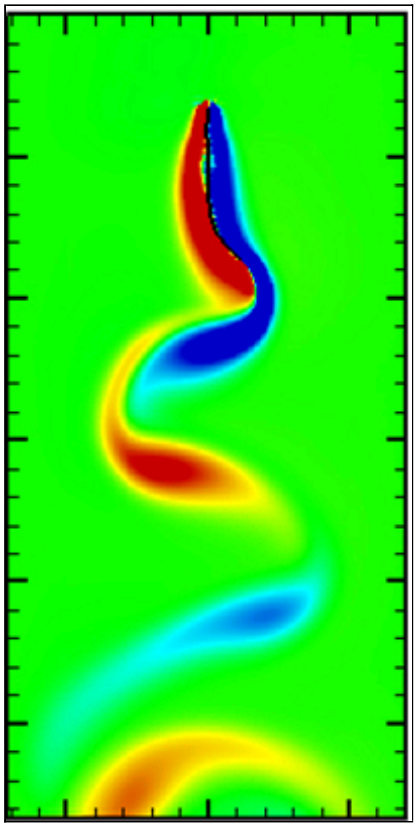
报告摘要：

The locomotion of most fish and birds is realized by flapping wings or fins transverse to the direction of travel. Here, we study experimentally the dynamics of a symmetric wing that is "flapped" up and down but is free to move in the horizontal direction. In this table-top prototypical

experiment, we show that flapping flight occurs abruptly at a critical flapping frequency as a symmetry-breaking bifurcation. We then investigate the separate effects of the flapping frequency, the flapping amplitude, the wing geometry and the influence from the solid boundaries nearby. Through dimensional analysis, we found that there are two dimensionless parameters well describe this intriguing problem that deals with fluid-solid interaction. The first one is the dynamical aspect ratio that combines four length scales, which includes the wing geometry and the flapping amplitude. The second parameter, the Strouhal number, relates the flapping efforts in the vertical direction to it resultant forward flight speed. Overall, we emphasize the robustness of the thrust-generating mechanisms determining the forward flight speed of a flapping wing, as observed in our experiments.

Zhang Jun 教授的上述工作发表于Nature,420,479-481(2002)和Nature,408,835(2000)等。

张俊教授发表的细丝在肥皂膜中运动的实验测得的涡量图



LNM湍流研究小组张星博士和白洁同学的近期数值模拟涡量图

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