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台灣大學應用力學研究所
演 講 公 告

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主 講 人：魏憲鴻教授
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講　　題：滑移流體力學：微觀壁面滑移可強烈改變巨觀流力特徵

主 持 人： 周佳靚助理教授

時　　間： 108年9月23日（星期一）下午2時20分開始

地　　點： 台灣大學應用力學研究所國際會議廳

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Slipping Fluid Mechanics: Microscopic Wall Slip Can Cause Drastic Changes in Macroscopic Flows

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When coming to solve fluid mechanics problems, the no-slip boundary condition is often employed to render necessary velocity gradients for generating viscous drags to resist fluid flows. While this commonly used condition can break down in situations involving polymer liquids or hydrophobic surfaces, wall slip generally is considered to be a microscopic effect and contributes nothing but drag reduction without changing features of macroscopic flows. In this talk, I will show that even though the amount of wall slip is miniscule, it can still lead to drastic changes in flow characteristics when the slip length is comparable to or greater than the characteristic transverse length scale. I will also show that such flow characteristic changes can occur to a diversity of flows. In particular, for coating, dynamic wetting and spreading, boundary layer flows, and unsteady colloidal motions, the extent of slip can be further controlled by applied flow conditions. This inevitably leads to slip-stick transitions, representing a ubiquitous feature of flows with wall slip. This hydrodynamic transition may not only spur new approaches to measuring slip length in experiments, but also provide alternative means to judiciously control flows through tunable slip effects.