

Abstract Submitted
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Direct measurement of friction of a fluctuating contact line SHUO

GUO, Department of Physics, Hong Kong University of Science and Technology, MIN GAO, Department of Mathematics, Hong Kong University of Science and Technology, XIAOMIN XIONG, Department of Physics, Sun Yat-sen University, YONG JIAN WANG, Department of Physics, Hong Kong University of Science and Technology, XIAOPING WANG, Department of Mathematics, Hong Kong University of Science and Technology, PING SHENG, PENGGER TONG, Department of Physics, Hong Kong University of Science and Technology* — What happens at a moving contact line, where one fluid displaces another (immiscible) fluid over a solid surface, is a fundamental issue in fluid dynamics. In this presentation, we report a direct measurement of the friction coefficient in the immediate vicinity of a fluctuating contact line using a micron-sized vertical glass fiber with one end glued to an atomic force microscope (AFM) cantilever beam and the other end touching a liquid-air interface. By measuring the broadening of the resonance peak of the cantilever system with varying liquid viscosity η , we obtain the friction coefficient ξ_c associated with the contact line fluctuations on the glass fiber of diameter d and find it has the universal form, $\xi_c = 0.8\pi d\eta$, independent of the contact angle. The result is further confirmed by using a soap film system whose bulk effect is negligibly small. This is the first time that the friction coefficient of a fluctuating contact line is measured. *Work supported by the Research Grants Council of Hong Kong SAR.

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