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Development of an AFM-based hanging fiber rheometer for interfacial microrheology[1] SHUO GUO, XIAOMIN XIONG, ZULI XU, PING SHENG, PENGER TONG, Department of Physics, Hong Kong University of Science and Technology — A new interfacial microrheology technique using atomic force microscope (AFM) as a force sensor is developed. The probe used for microrheology contains a long vertical glass fiber with one end glued onto a rectangular shaped cantilever beam and the other end immersed through a water-air interface. The motion of the modified cantilever can be accurately described by the Langevin equation for a damped harmonic oscillator, from which we obtain the friction coefficient ξ of the glass fiber in contact with the water. It is found that ξ contains two contributions. One is generated by the bulk fluid, which increases with the immersion length of the glass fiber. The other contribution comes from the contact line between the water-air interface and the glass fiber, which is obtained by a linear extrapolation of the measured ξ at the limit of zero immersion length. The experiment thus demonstrates an application of AFM in the studies of interfacial microrheology and contact line dynamics.

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