

Abstract Submitted
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Velocity measurements near a moving contact line with sub-micron resolution BIAN QIAN, KENNETH BREUER, Brown University — Employing high-speed particle tracking, we experimentally investigate the slip boundary condition in the vicinity of a moving contact line. A liquid bridge was established between a stationary hydrophobic glass slide and a rod. By translating the rod at a controlled speed, we establish a well-controlled moving contact line. The liquid was seeded, either with nano-scale fluorescent particles or with quantum dots. Evanescent wave illumination, with exponentially decaying intensity, was used for particle illumination, which allows for three dimensional measurements of the flow field near the liquid/solid interface. The motions of the contact line and the particles were captured using a high speed camera coupled to a high-resolution microscope. Slip length was extracted from the particle motions and shown to be a function of the distance to the contact line. Different behaviors were observed between advancing and receding motions of the contact line. Measurements with different-sized particles were performed to correct for tracer particle effects.

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