Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Measurements of a high-speed receding contact line on a hydrophobic surface JOONSIK PARK, KENNETH S. BREUER, Brown University — We report on the behavior of a non-equilibrium receding contact line generated by the rapid pinchoff of a liquid bridge extending between a capillary tube and a smooth hydrophobic substrate. The motion of the contact line is measured from below using a high-speed camera (10kfps). Three stages are identified according to the power-law scaling between the droplet radius and the receding time. In the initial non-equilibrium phase, the power-law exponent scales with the retraction speed of the tube. As the contact angle approaches the minimum receding angle, the contact line retreats according to a universal power-law exponent. In the final stage, close to the pinch-off, the receding contact angle increases to the minimum equilibrium contact angle and the power-law exponent decreases. The variation of the behavior is measured as a function of the fluid properties (viscosity, elasticity and surface tension), the tube retraction speed, and the substrate properties (hydrophobicity and surface roughness).

Joonsik Park
Brown University

Date submitted: 26 Jul 2013 Electronic form version 1.4