

Microfluidic on a wire

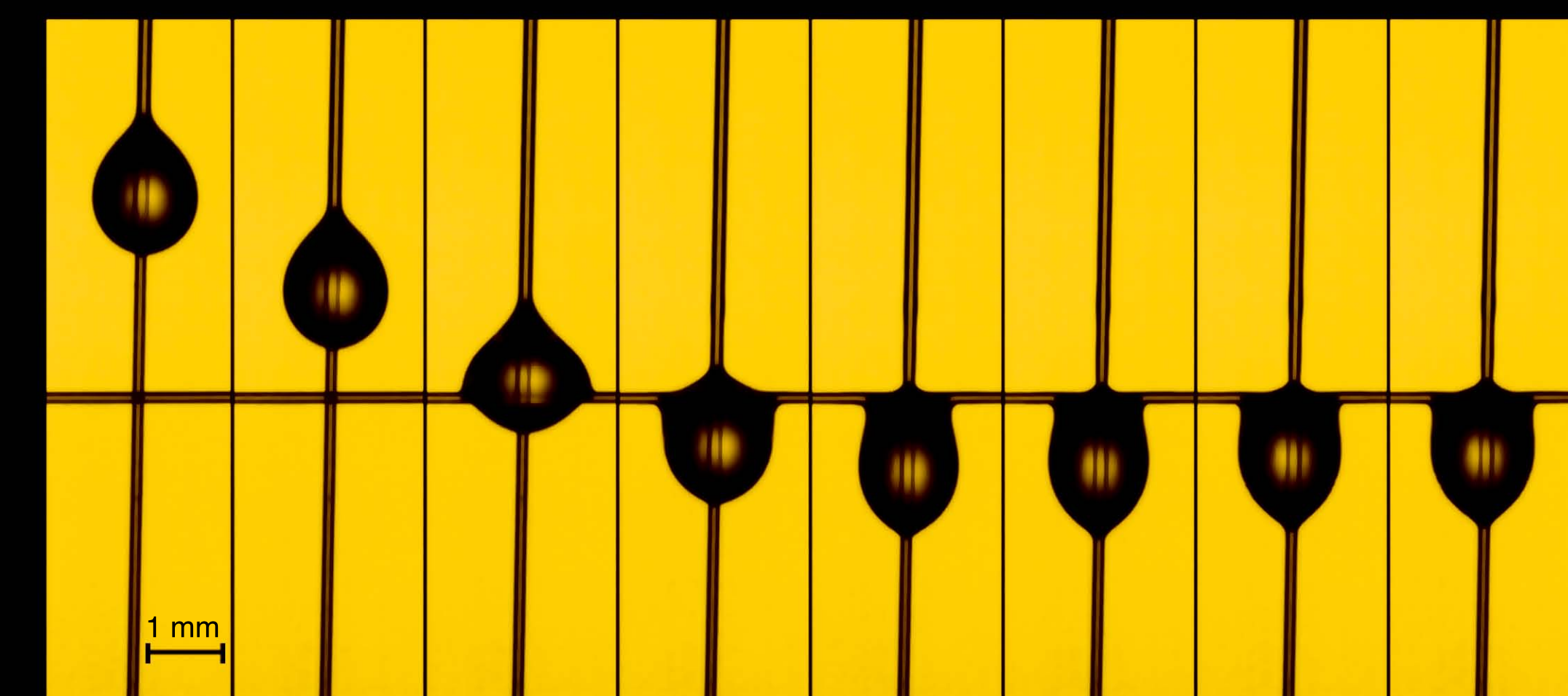
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Foreword

Elementary microfluidic operations, such as coalescence and division, are performed on simple fiber networks by adjusting gravity and capillary forces.

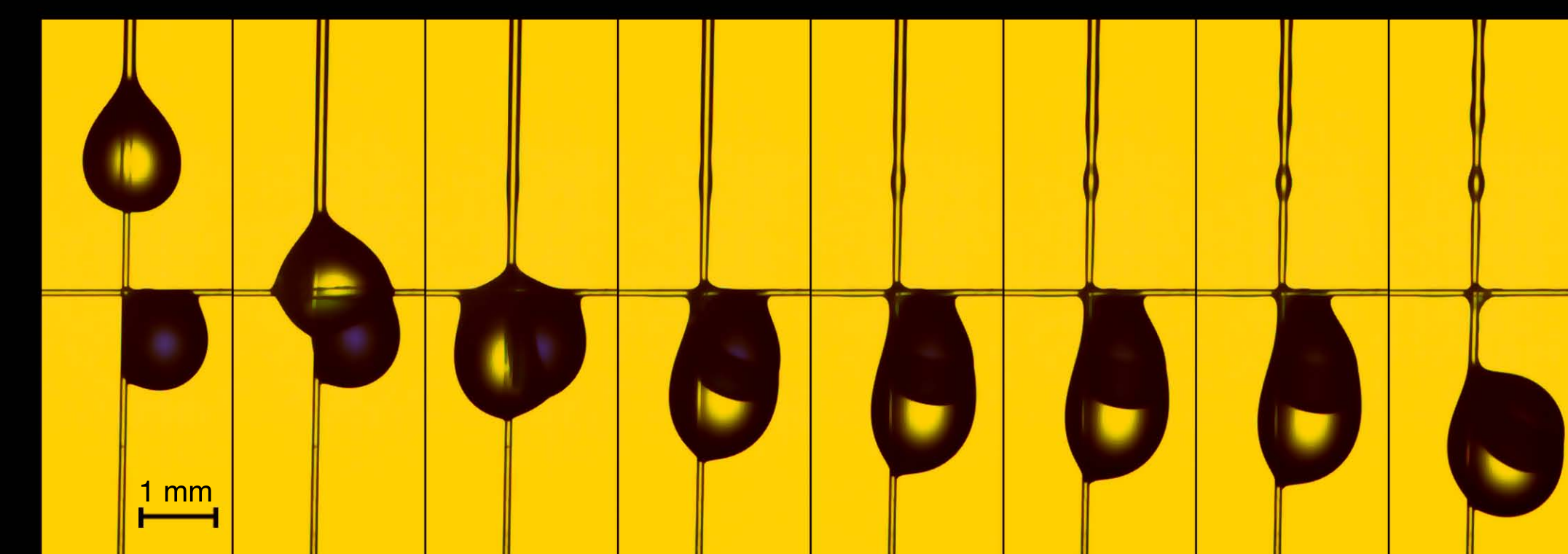
Logic gate

An on/off transition is observed when a droplet comes around an intersection between several fibers: large droplets cross the junction while small droplets remain pinned. Snapshots are taken every 10 ms.



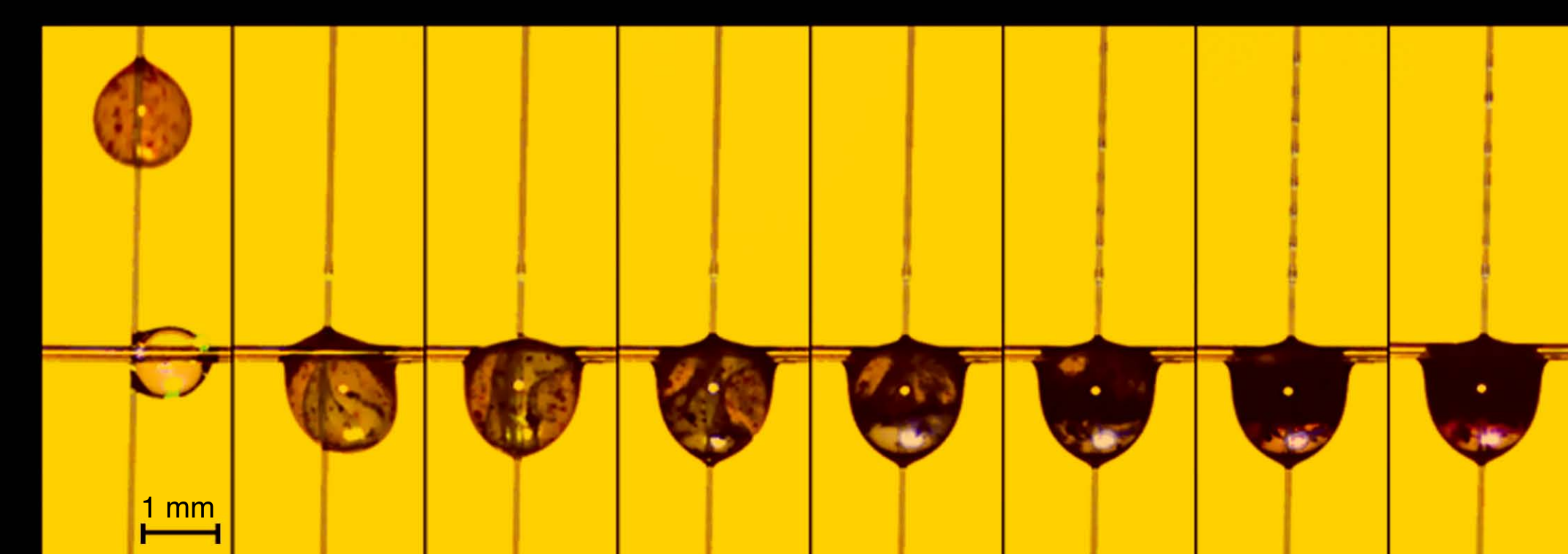
Encapsulation

An oil droplet slides down the vertical fiber, wraps a colored water droplet, and the resulting liquid object leaves the junction. Snapshots are taken every 64 ms.



Chemical reaction

A H_2SO_4 droplet fuses and mixes with a NaOH droplet on a node. The reaction is revealed by bromomethyl blue. The reaction is almost completed after about one tenth of second.



Division

With nodes in series, a millimetric droplet is divided into numerous tiny droplets. As the large droplet slides down, a coating film is left on the vertical fiber. The small pearls resulting from this unstable film (Rayleigh-Plateau) are progressively collected on the next junction. Snapshots are taken every 48 ms.

