

Droplet microfluidics controlled by light

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In this talk, I will discuss how optical tweezers can be used to trap microscopic liquid droplets, both in air (aerosols) and in liquids. This area of microfluidics, known as droplet microfluidics, is receiving increasing attention due to its applications in atmospheric chemistry and physics as well as opening up new architectures in microfluidic design. I will give a short overview of the technology and physics of optical tweezers and discuss new areas of study, such as holographic beam shaping. I will outline our experiments on trapping aerosol droplets and possible applications as well as discuss work on how water droplets in oil can be trapped using both optical forces and optically induced thermocapillary forces.