

High-throughput electroactuation of droplets

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Soft Micro Systems

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Droplet-based microfluidics is a key technology to perform biological assays at a ultra-high throughput. Over the past years, several platforms for droplet manipulations have been used to miniaturize assays and perform experiments that can not be done otherwise. The power of droplet-based microfluidics comes for the high level of parallelization achieved by manipulating emulsion droplets in microchannels. Yet, as millions of droplets can be manipulated in parallel, there is a need to specifically manipulate one or a few of specific droplets in large populations of drops, for example to select those droplets containing biological variants with extraordinary properties. Electric fields provide such a high level of control over emulsion droplets. Here we will describe and discuss the use of electric fields in droplet-based microfluidics and exemplify how electric fields provide key functions to perform highly controlled experiments at a ultra-high throughput for screening or for the bottom-up assembly of complex structures in miniaturized compartments

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