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Manipulation of drop-drop interactions in millifluidic device using inlet spacing design E. M. ARUN SANKAR, RAGHUNATHAN RENGASWAMY, Indian Institute of Technology Madras — Colloidal particles of different shapes and anisotropy are required for various applications. Researchers have reported synthesis of simple structures of colloidal particles in 1D microfluidic devices. Synthesis of more complicated 2D structures by contacting drops in a 2D device demands knowledge of their movement. When there are many drops in the system, each drop disturbs the flow field and interact with other drops. By appropriately manipulating these hydrodynamic interactions, one can arrange the drops in a desired shape. A simple model which captures the dominant interactions in 2D millichannel Hele-Shaw geometry, and can be used in an optimization framework, was proposed from our group. We noticed that, the hydrodynamic interactions between the drops and therefore the resulting droplet pattern formation are affected by the initial inter-droplet spacing. The spacing between the drops can be changed by infusing (withdrawing) the continuous phase fluid into (from) the space between drops. In this work, we demonstrate manipulation of hydrodynamic interactions to arrange the drops in a desired shape in a millifluidic device by sending them into the channel at optimum spacing.

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