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Gutters on the size of droplets (abstract only)**

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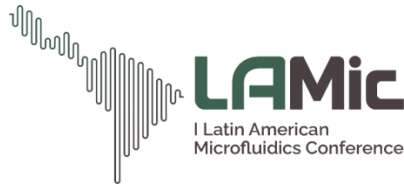
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Microfluidics T-Junction devices for study of Junction Gutters on the size of droplets

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Highlights

We investigate the use of Gutters in a T-junction configuration for passive microdroplet generation.

We present an experimental implementation of this configuration.

We identify and characterize the influence of the gutters on different properties of the dynamics of droplet formation.

Abstract

Droplet-based microfluidics is continuously evolving with applications in various fields of science and engineering due to the reliable manipulation of droplets. These applications include chemical and medical uses where the formation of highly uniform droplets is a constant necessity.

Building upon numerical simulations on the effect of "Junction Gutters (JG) on droplet formation within a standard T-junction in microfluidics, the hydrodynamic conditions leading to various flow regimes are identified and characterized. Under these conditions, various JG with different geometries are introduced. The results predict that the presence of JG can favorably alter the frequency of formation and the morphology of the droplets, significantly promoting the transition to hydrodynamic conditions associated with low Capillary Number.

The present study encompasses the fabrication, testing, and characterization of microfluidic devices based on the aforementioned simulations. We were able to identify different characteristics and correlate them with the geometry of the gutters. Preliminary results in this direction are presented

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