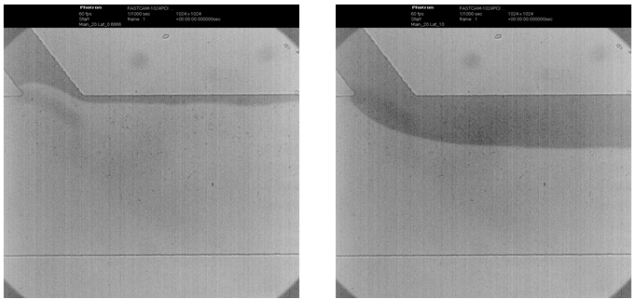
Electronic Supplementary Information

The fluid dynamics of the LOC was characterized by changing the ratio between the two inlets flows. Figure 1 shows the characterization. The main solution was fixed while the lateral flow was increased. When using a smaller flow rate, the behavior of the fluid seems less steady than with bigger flow rate. However this particular behavior does not lead to bubble formation.



a) b)

Fig. 1 Microscopic images of the fluid dynamics, main flow at 20 µl/min. a) Lateral flow at 0.666 µl/ min resulting in a desired focalization of 56 µm, b) Lateral flow at 10 µl/min focalization of 334 µm.

After acquiring the images, the focalization of the fluid was measured. The practical results obtained from the microscopic images (Fig.1) were compared with theoretical data. The calculations were done with equations (1) and (2). Figure 2 represents the comparison between experimental information and calculations.

$$\frac{w_0}{w} = \frac{1}{g(\lambda)}\frac{Q_i}{Q_i+Q_f}^{6} \quad (1)$$

$$g(\lambda) = (1+\lambda^2)(1-1.3553\lambda+1.9467\lambda^2-1.7012\lambda^3+0.9564\lambda^4-0.2537\lambda^5);\ \lambda<1 \quad (2)$$

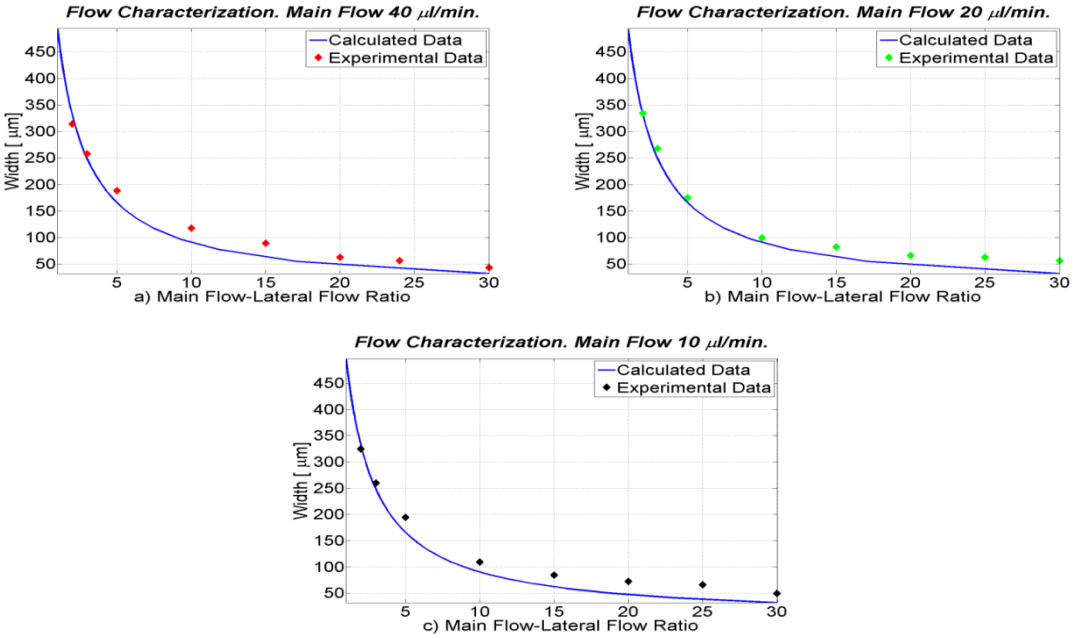


Fig.2 Validation of the experimental data with theoretical results. a) Main flow at 40 µl/min, b) Main flow at 20 µl/min, c) Main flow at 10 µl/min.

With the lateral co-flow there is no risk of bubble formation, since fluids are injected through a well closed syringe.