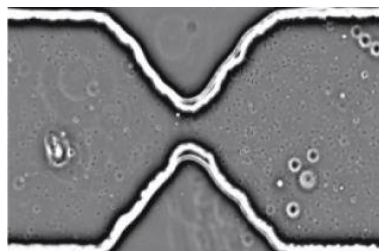


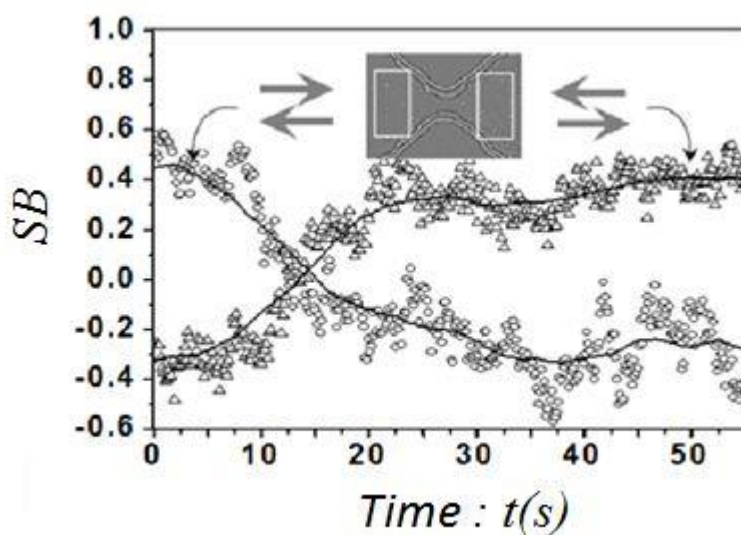
Supplementary documents

- VideoS1.avi



Movie of the constriction area when the symmetry breaking is established and then the flow is reversed. One can see the building of the symmetry breaking on the other side

- FigureS1



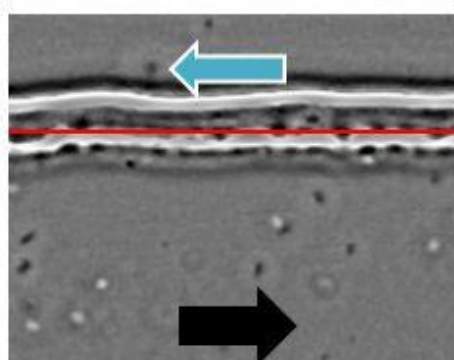
Time evolution of the symmetry breaking parameter $SB(t)$ at $\langle V_x \rangle = 20 \mu\text{m/s}$ as the flux direction is suddenly reversed from left to right (triangles) and then right to left (circle); $t=0$ represents the onsets of flow inversion; see arrows pointing in the flow direction. Points and continuous lines correspond respectively to experimental values and adjacent-average smoothing.

- **VideoS2.avi**

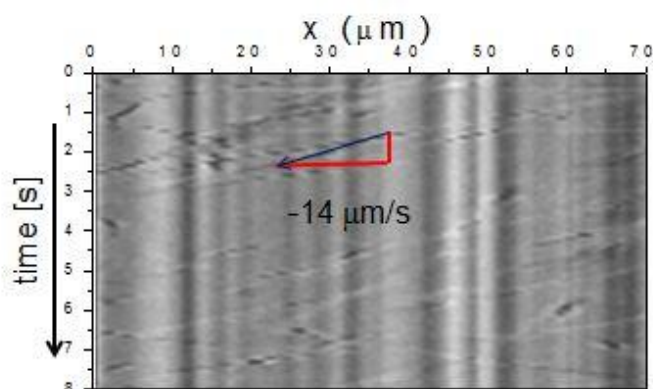


Movie of an area around the left lateral wall far from the constriction illustrating the adsorption and desorption processes

- **FigureS2**



(a)



(b)

Backflow motion of bacteria trapped at the side wall. (a) Snapshot of the movie (Video2_add.avi) featuring in red, a pixel line from which the spatio-temporal diagram of (b) is constructed. (b) spatio temporal diagram showing characteristic streaks witnessing a backward motion at the side walls.