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Bacterial populations growth under co- and counter-flow condition FRANCESCA TESSER, JOS C.H. ZEEGERS, HERMAN J.H. CLERCX, FEDERICO TOSCHI, Eindhoven University of Technology — For organisms living in a liquid ecosystem, flow and flow gradients play a major role on the population level: the flow has a dual role as it transports the nutrient while dispersing the individuals. In absence of flow and under homogeneous conditions, the growth of a population towards an empty region is usually described by a reaction diffusion equation. The solution predicts the expansion as a wave front (Fisher wave) proceeding at constant speed, till the carrying capacity is reached everywhere. The effect of fluid flow, however, is not well understood and the interplay between transport of individuals and nutrient opens a wide scenario of possible behaviors. In this work, we experimentally observe non-motile E. coli bacteria spreading inside rectangular channels in a PDMS microfluidic device. By use of a fluorescent microscope we analyze the dynamics of the population density subjected to different co- and counter-flow conditions and shear rates.

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