

Abstract Submitted
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Response of a Motile/Non-Motile Escherichia coli Front to Hydrodynamic excitations¹ MAGALI BAABOUR, University Buenos Aeres (FUBA), CARINE DOUARCHE, Univ Paris Sud, Lab LPS, DOMINIQUE SALIN, Univ Pierre & Marie Curie, Lab FAST — In a recent study (Douarche et. al. PRL 102, 198101 (2009)), it has been shown that the motility of Escherichia coli (E. coli) is highly correlated to the oxygen level in a minimal medium: bacteria swim as long as they are provided with oxygen but reversibly transit to a non-motile state when they lack of it. Hence, when oxygen diffuses into an anaerobic sample of non-motile bacteria, a propagating front delineates a region of motile bacteria where oxygen is present from a region of non-motile ones where the oxygen is still not present. To study the response of this front to hydrodynamics excitation, we use the same fluorescent E. coli bacterial solution in rectangular cross section glass cells open to air (oxygen) at one inlet. After bacteria have consumed the oxygen of the solution, the presence of the oxygen only at the open edge of the sample leads to the formation of an analogous stationary front between motile and non-motile bacteria. We follow the response of this front to hydrodynamics flows such as an oscillating Poiseuille flow or natural convection. We analyze both the macroscopic behavior (shape and width) of the front as well as the microscopic displacements of individual bacteria. The dispersive behavior of this bacterial front is compared to the one of equivalent

¹Collaboration between Laboratories FAST and LPS, Univ Paris Sud and CNRS

Dominique Salin
Univ Pierre & Marie Curie

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