

Abstract Submitted
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Bacterial streamers in curved microchannels¹ ROBERTO RUSCONI, SIGOLENE LECUYER, Harvard University, LAURA GUGLIELMINI, HOWARD STONE, Princeton University — Biofilms, generally identified as microbial communities embedded in a self-produced matrix of extracellular polymeric substances, are involved in a wide variety of health-related problems ranging from implant-associated infections to disease transmissions and dental plaque. The usual picture of these bacterial films is that they grow and develop on surfaces. However, suspended biofilm structures, or streamers, have been found in natural environments (e.g., rivers, acid mines, hydrothermal hot springs) and are always suggested to stem from a turbulent flow. We report the formation of bacterial streamers in curved microfluidic channels. By using confocal laser microscopy we are able to directly image and characterize the spatial and temporal evolution of these filamentous structures. Such streamers, which always connect the inner corners of opposite sides of the channel, are always located in the middle plane. Numerical simulations of the flow provide evidences for an underlying hydrodynamic mechanism behind the formation of the streamers.

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