

Abstract Submitted  
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**Spatial instability and bioturbulence in highly concentrated bacterial suspensions**<sup>1</sup> ANDREY SOKOLOV, IGOR ARANSON, Argonne National Laboratory — We present an experimental study of spatio-temporal organization and transition to complex collective swimming regimes in highly concentrated suspensions of *Bacillus subtilis*. Experiments are performed in a free-standing thin-film sample with controlled thickness. Novel non-invasive high-resolution optical coherence tomography technique is used to probe the density distributions in the film in real time. Increasing the film thickness beyond certain threshold triggered a transition from quasi-two-dimensional collective swimming to three-dimensional turbulent state which is attributed to Oxygentaxis. We have studied effect of the controlled oxygen concentration on the bacterial collective behavior and transition to turbulent bioconvection.

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