

Abstract Submitted  
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**Aerotactic Cell Density Variations in Bacterial Turbulence** VICENTE FERNANDEZ, STEVEN SMRIGA, MIT and ETH Zurich, FILIPPO MENOLASCINA, MIT and University of Edinburgh, ROBERTO RUSCONI, ROMAN STOCKER, MIT and ETH Zurich — Concentrated suspensions of motile bacteria such as *Bacillus subtilis* exhibit group dynamics much larger than the scale of an individual bacterium, visual similar to high Reynolds number turbulence. These suspensions represent a microscale realization of active matter. Individually, *B. subtilis* are also aerotactic, and will accumulate near oxygen sources. Using a microfluidic device for generating oxygen gradients, we investigate the relationship between individuals' attraction to oxygen and the collective motion resultant from hydrodynamic interactions. We focus on changes in density revealed by a fluorescently labeled sub-population of *B. subtilis* in the dense suspension. This approach allows us to examine changes in density during the onset of collective motion as well as fully developed bacterial turbulence.

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