

Abstract Submitted
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Flows around bacterial swarms JUSTAS DAUPARAS, ERIC LAUGA,
Department of Applied Mathematics and Theoretical Physics, University of Cambridge — Flagellated bacteria on nutrient-rich substrates can differentiate into a swarming state and move in dense swarms across surfaces. A recent experiment (HC Berg, Harvard University) measured the flow in the fluid around the swarm. A systematic chiral flow was observed in the clockwise direction (when viewed from above) ahead of a *E.coli* swarm with flow speeds of about $10\mu\text{m/s}$, about 3 times greater than the radial velocity at the edge of the swarm. The working hypothesis is that this flow is due to the flagella of cells stalled at the edge of a colony which extend their flagellar filaments outwards, moving fluid over the virgin agar. In this talk we quantitatively test his hypothesis. We first build an analytical model of the flow induced by a single flagellum in a thin film and then use the model, and its extension to multiple flagella, to compare with experimental measurements.

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