Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

A minimal model for Spiroplasma chemotaxis[1] CHRISTIAN ESPARZA LOPEZ, ERIC LAUGA, University of Cambridge — *Spiroplasma* is a small helical bacterium that swims and performs chemotaxis in a non conventional way. Instead of actuating flagella, it swims by progressively shifting the chirality of its body. The change in geometry gives rise to a wall domain - a kink - which propagates along the cell body. The chirality is then reverted in a similar fashion completing a swimming stroke. The whole deformation is non-reciprocal in time, therefore movement at low Reynolds number is achieved with the bacterium moving in the direction opposite to the kink pair propagation. Based on experimental observations, we develop a minimal model to describe *Spiroplasma* chemotaxis. We start by a simple resistive force theory model of the bacterium swimming gait. Using symmetry arguments we show how to calculate the net rotation and translation of the bacterium during one full stroke. We obtain expressions for the linear displacement as a function of the time between kinks, τ_k, that compare favourably with numerical computations. Using our theoretical results, we then construct a random walk model for *Spiroplasma* and we obtain expressions for its diffusivity D_e and chemotactic drift velocity v_d as a function of τ_k and the kink angle θ.

[1]This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement 682754 to EL).

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Date submitted: 04 Sep 2019 Electronic form version 1.4