Abstract Submitted for the DFD08 Meeting of The American Physical Society

Interaction of rotating helical bacterial flagella with nearby solid<sup>1</sup> RICARDO CORTEZ, RICARDO ORTIZ, Tulane University, JOHN KESSLER, LUIS CISNEROS, University of Arizona, MARTIN BEES, University of Glasgow — The axes of the rotating flagella of bacteria whose body is immobilized at a surface may initially be oriented in arbitrary directions. Through simulations using the method of Regularized Stokeslets, it is seen that the hydrodynamic interaction of the flagella with the neighboring solid surface produces attraction of the flagella toward that surface. Furthermore, the rotation generates a drag such that the flagella "roll" toward the cell body from which they emerge. This phenomenon requires that the flagella are initially or eventually oriented at an angle (between axis and plane) such that the hydrodynamic attraction overcomes thermal fluctuations. This interaction converts a three-dimensional initial situation into the two dimensional transport-generating phenomenon discussed in the previous abstract.

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