

Abstract Submitted
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Rectification of Swimming Bacteria and Self Driven Particle Systems by Arrays of Asymmetric Barriers CHARLES REICHHARDT, Los Alamos National Laboratory, Los Alamos NM, MEW BING WAN, Department of Physics, Washington University, St Louis, MO 63160, CYNTHIA OLSON REICHHARDT, Los Alamos National Laboratory, Los Alamos NM 87545, ZOHAR NUSSINOV, Department of Physics, Washington University, St Louis, MO, 63160 — We show that the recent experimental observation of the rectification of swimming bacteria in a system with an array of asymmetric barriers occurs due to the ballistic component of the bacteria trajectories introduced by the bacterial “motor.” Each bacteria selects a random direction for motion and then moves in this direction for a fixed period of time before randomly changing its orientation and moving in a new direction. In the limit where the bacteria undergo only Brownian motion, rectification by the barriers does not occur. We also examine the effects of steric interactions between the bacteria and observe a clogging effect upon increasing the bacteria density.

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