

Abstract Submitted
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Bidirectional sorting of flocking particles in the presence of asymmetric barriers JEFFREY DROCCO, CHARLES REICHHARDT, CYNTHIA REICHHARDT, Los Alamos National Laboratory — We numerically demonstrate bidirectional sorting of flocking particles interacting with an array of funnel-shaped barriers. The particles choose a swimming direction by averaging the headings of their neighbors according to the Vicsek model, and experience additional steric interactions as well as repulsion from the fixed barriers. We show that particles preferentially localize to one side of the barrier array over time, and that the direction of this rectification can be reversed by adjusting the particle-particle exclusion radius or the noise term in the equations of motion. These results provide a conceptual basis for isolation and sorting of single- and multi-cellular organisms which move collectively according to flocking-type interaction rules.

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