

Abstract Submitted
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No many-scallop theorem: Collective locomotion of reciprocal swimmers DENIS BARTOLO, ESPCI, ERIC LAUGA, UCSD — To achieve propulsion at low Reynolds number, a swimmer must deform in a way that is not invariant under time-reversal symmetry; this result is known as the scallop theorem. However, there is no many-scallop theorem. We demonstrate that two active particles undergoing reciprocal deformations can swim collectively; moreover, polar particles also experience effective long-range interactions. These results are derived for a minimal dimers model, and generalized to more complex geometries on the basis of symmetry and scaling arguments. We explain how such cooperative locomotion can be realized experimentally by shaking a collection of soft particles with a homogeneous external field.

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