Abstract Submitted
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Clustering and propulsion of isotropic catalytic swimmers[1] AKHIL VARMA, LadHyX, Ecole Polytechnique, France, THOMAS D MONTENEGRO-JOHNSON, School of Mathematics, University of Birmingham, UK, SEBASTIEN MICHELIN, LadHyX, Ecole Polytechnique, France — Catalytic micro-swimmers such as phoretic particles use local gradients in solute concentration for propulsion. An isolated isotropic phoretic particle generates a uniform concentration field on its surface and hence cannot propel on its own. Symmetry of this field is broken by the presence of at least another similar particle in the system, which leads to phoretic attraction or repulsion. Phoretic attraction drives the clustering of identical homogeneous particles into stable clusters of various configurations which may self-propel or rotate due to their geometric asymmetry. Using full numerical simulations and analytic approximations based on pairwise interactions of the particles, we study the cluster formation and its impact on the statistics of the propulsion properties. We finally analyze the effect of background noise on the results.

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Sebastien Michelin
LadHyX, Ecole Polytechnique, France

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