Title:	Persistence of an active asymmetric rigid Brownian particle in two dimensions
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Keywords:	Persistence Active asymmetric Brownian particle
Issue Date:	2022
Publisher:	AIP Publishing
Citation:	J. Chem. Phys. 157(19), 194905
Abstract:	We have studied the persistence probability p(t) of an active Brownian particle with shape asymmetry in two dimensions. The persistence probability is defined as the probability of a stochastic variable that has not changed its sign in a given fixed time interval. We have investigated two cases: (1) diffusion of a free active particle and (2) that of a harmonically trapped particle. In our earlier work, by Ghosh et al. [J. Chem. Phys. 152, 174901 (2020)], we had shown that p(t) can be used to determine the translational and rotational diffusion constant of an asymmetrically shaped particle. The method has the advantage that the measurement of the rotational motion of the anisotropic particle is not required. In this paper, we extend the study to an active anisotropic particle and show how the persistence probability of an anisotropic particle is modified in the presence of a propulsion velocity. Furthermore, we validate our analytical expression against the measured persistence probability from the numerical simulations of single particle Langevin dynamics and test whether the method proposed in our earlier work can help distinguish between active and passive anisotropic particles.
Description:	Only IISER Mohali authors are available in the record.
URI:	https://doi.org/10.1063/5.0119081 (https://doi.org/10.1063/5.0119081) http://hdl.handle.net/123456789/4416 (http://hdl.handle.net/123456789/4416)
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

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