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Effective diffusivity of microswimmers in a crowded environment

MARVIN BRUN-COSME-BRUNY, Grenoble Alpes University — The effect of crowded environments on micro-swimmers is studied using the micro-alga Chlamydomonas Reinhardtii (CR) as a model system. Performing a Run-and-Tumble motion in bulk, its swimming describes a persistent random walk characterized by an effective diffusion coefficient for the large-time dynamics. This swimming is experimentally observed in a complex medium made of series of pillars designed in a regular lattice, using soft lithography microfabrication. Their trajectories are tracked and analyzed. The measure of relevant statistical observables provides insight into the bias induced by the obstacles. Particularly, the mean correlation time of direction and the effective diffusion coefficient are shown to decrease when increasing the density of pillars. This provides some bases of understanding for active matter in complex environments.

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