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The random walk of a low-Reynolds-number swimmer[1] SALIMA RAFAÏ, MICHAËL GARCIA, STEFANO BERTI, PHILIPPE PEYLA, Grenoble, UJF-CNRS UMR5588, France, LABORATOIRE DE SPECTROMÉTRIE PHYSIQUE TEAM — Swimming at a micrometer scale demands particular strategies. Indeed when inertia is negligible as compared to viscous forces (*i.e.* Reynolds number Re is lower than unity), hydrodynamics equations are reversible in time. To achieve propulsion a low Reynolds number, swimmers must then deform in a way that is not invariant under time reversal. Here we investigate the dispersal properties of self propelled organisms by means of microscopy and cell tracking. Our system of interest is the microalga Chlamydomonas Reinhardtii, a motile single celled green alga about 10 micrometers in diameter that swims with two flagellae. In the case of dilute suspensions, we show that tracked trajectories are well modelled by a correlated random walk. This process is based on short time correlations in the direction of movement called persistence. At longer times, correlations are lost and a standard random walk caracterizes the trajectories. Moreover, high speed imaging enables us to show how speed fluctuations at very short times affect the statistical description of the dynamics. Finally we show how drag forces modify the characteristics of this particular random walk.

[1]Région Rhône Alpes - Cible Program

Salima Rafaï
Grenoble, UJF-CNRS UMR5588, France

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