Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Random walk of microswimmers: puller and pusher cases SALIMA RAFAI, PHILIPPE PEYLA, LIPhy - CNRS/Univ. Grenoble, DYFCOM 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 systems of interest are, on the one hand, the microalga Chlamydomonas Reinhardtii, a puller-type swimmer and on the other hand, Lingulodinium polyedrum, a pusher. Both are quasi-spherical single celled alga. 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 characterizes the trajectories. Finally we show how drag forces modify the characteristics of this particular random walk.

Salima Rafai
LIPhy - CNRS/Univ. Grenoble

Date submitted: 31 Jul 2014 Electronic form version 1.4