Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Clogging of microswimmers at a constriction.[1] PHILIPPE PEYLA, MARVIN BRUN-COSME-BRUNY, University Grenoble Alpes, SALIMA RAFAI, CNRS, ANDRE FOERTSCH, WALTER ZIMMERMANN, Bayreuth University, THEORETICAL PHYSICS TEAM, LIPHY TEAM — We study the clogging of a suspension of photosensitive microswimmers [*Chlamydomonas Reinhardtii* (CR)] moving to a constriction in a microfluidic device. Swimming cells are fleeing light and accumulate at a gate that is twice larger than a CR. We study the statistics of times between two successive egresses. Our results fall in the general framework of clogging obtained for panicking pedestrians at a gate or granular materials at the exit of a silo: the survival function obeys a power law decrease with times. Our results also show a faster-is-slower effect: when cells are faster, clogging is increased. This phenomenon - very well known in crowd evacuation during a panic - unveils the role of tangential friction between cells at the constriction where unusual densities are reached. Our experimental observations are supported by lattice Boltzmann simulations.

[1]German French University

Philippe Peyla
University Grenoble Alpes

Date submitted: 26 Jul 2019 Electronic form version 1.4