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Diffusion in active suspension of microswimmers ERIC CLIMENT, BLAISE DELMOTTE, FRANCK PLOURABOUE, Institut de Mecanique des Fluides de Toulouse - France, ERIC KEAVENY, Imperial College - Dept. of Math. - London - UK, MATTHIEU MARTIN, SALIMA RAFAI, PHILIPPE PEYLA, ERIC BERTIN, Laboratoire Interdisciplinaire de Physique - Grenoble, France, IMFT TEAM, IC TEAM, LIPHY TEAM — The presence of microswimmers in a fluid generates flow agitation due to multi-body hydrodynamic interactions. This agitation of the fluid leads to random trajectories of passive tracers particles and the swimmers themselves, and from a macroscopic point view, it can be interpreted as a diffusive mechanism. By means of experiments (videomicroscopy of suspensions of chlamydomonas reinhardtii)and numerical simulations (Stokesian fluid populated with squirmers), we investigate the evolution of the effective diffusion coefficient when the volumetric concentration of the active suspension varies. By comparing the experimental and numerical results, we quantify the role of active swimming on the measured diffusion and identify the physical mechanisms that lead to diffusion enhancement. Our results aim to provide a better understanding of how swimming organisms affect micron-scale transport in the environment.

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