Abstract Submitted
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Distribution of self-propelled organisms in fluid flows ZOLTAN NEUFELD, University College Dublin — We study the distribution of microorganisms represented as self-propelled particles in a moving fluid medium. The particles are advected by the flow and, in addition, they swim in a direction controlled by external factors. Two cases are considered: 1. passive spheroidal particles, that swim with constant speed but the swimming direction is reoriented by the viscous torque acting on the spheroid due to the local velocity field, and 2. chemotactic particles, whose swimming speed is oriented and proportional to the gradient of the concentration of a chemoattractant. We show that the combined effects of chaotic mixing and chemotaxis or flow reorientation leads to aggregation of the particles along a complex manifold. We analyse the properties of the aggregates and the efficiency of chemotaxis in flows with strongly non-uniform fluctuating distribution of the chemottractant.

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