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Advective effects on the propulsion of phoretic micro-swimmers SEBASTIEN MICHELIN, LadHyX - Ecole polytechnique, DENIS BARTOLO, PMMH - ESPCI — This work focuses on the dynamics of self-propelled spherical particles that can exchange a solute with the surrounding fluid. The propulsion mechanism is based on the interaction of this solute with the surface of the "swimming" particle: concentration gradients along the particle's surface result in a slip velocity distribution, and the particle effectively behaves like an artificial squirmer. In the well-studied diffusive limit, the solute concentration is decoupled from the Stokes flow problem, and the particle's velocity can be directly computed from the distribution of solute flux on the boundary. In this presentation, we identify instead the effect of the solute advection on the propulsive properties of such phoretic micro-swimmers by considering the fully-coupled non-linear problem for the solute concentration and velocity fields around the particle.

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