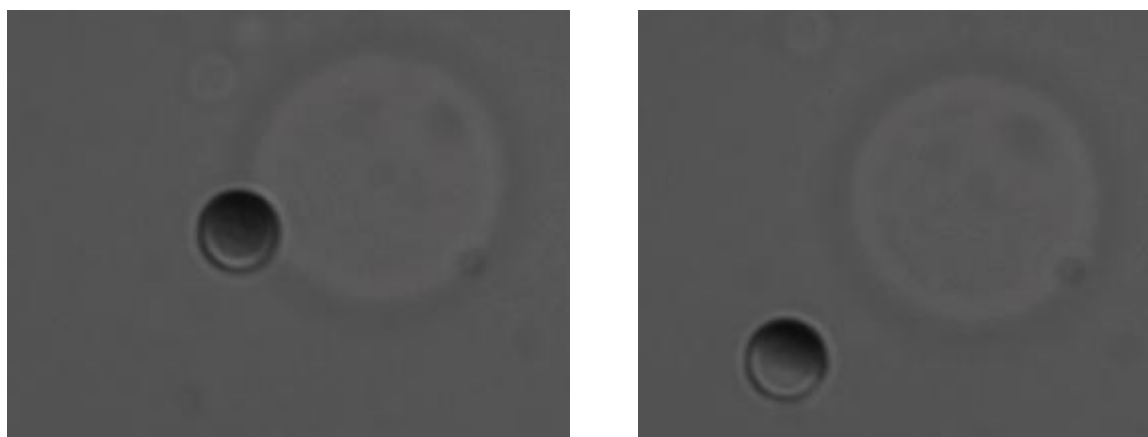


# Microparticles and micromotors in the neighbourhood of giant lipid vesicles

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The coupling between hydrodynamic forces and the elastic response modes of lipid membranes results in a complex dynamical behaviour that only now starts to be unveiled [1]. Micromotor self-propulsion, which is the outcome of energy consumption in a hydrodynamic environment, is by essence sensitive to the boundary conditions at the liquid interfaces where it often takes place. For catalytic micromotors made of Janus colloids self-propelling in hydrogen peroxide solutions, we have recently studied the effects of fluid interface confinement on the particle velocity and propulsion persistence time, which is set by the particle Brownian rotational diffusion [2,3]. Here, we studied the same class of self-propelled particles in the neighbourhood of phospholipid giant unilamellar vesicles (GUVs). In the absence of hydrogen peroxide fuel, the interaction between passive Janus Platinum/silica microparticles and GUVs is weak, with a slight preferential attraction of the lipid membrane for the Platinum face of the colloid. However, when self-propulsion is triggered, Janus colloids show strong interactions with GUVs, resulting in a variety of interesting phenomena including particle orbital motion around GUVs, which also induces rotational dynamics of the giant vesicles and active transport of GUV by self-propelled particles, with the silica face of the colloid moving in front and the Platinum face dragging and transporting the lipid vesicle..



**Fig. 1:** Active Janus microparticle (radius = 2  $\mu\text{m}$ ) interacting with a GUV..

## References

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