LadHyX Seminar — Feb. 1, 10:45

Giacomo Gallino (EPFL)

Self-propulsion of catalytic conical micro-swimmers

Self-propelled artificial micro-motors have attracted much attention both as fundamental examples of active matter and for their potential biomedical applications (e.g. drug delivery, cell sorting). A popular design exploits the catalytic decomposition of a fuel (e.g. hydrogen peroxide) on the active surface of the motor to produce oxygen bubbles that propel the swimmer, effectively converting chemical energy into swimming motion. We focus here on a conical shape swimmer with chemically-active inner surfaces. Using numerical simulations of the chemical problem and viscous hydrodynamics, we analyse the formation, growth and motion of the bubbles inside the micro-motor and the resulting swimming motion. Our results shed light on the fundamental hydrodynamics of the propulsion of conical swimmers and may help to improve the efficiency of these machines.