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ACTIVE COLLOIDS WITH EXTERNAL AND INTERNAL FEEDBACK

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14 aprile 2021 ore 15:00 – Piattaforma TEAMS
(codice: kopvp5w; per utenti esterni: https://bit.ly/39ioNd9)
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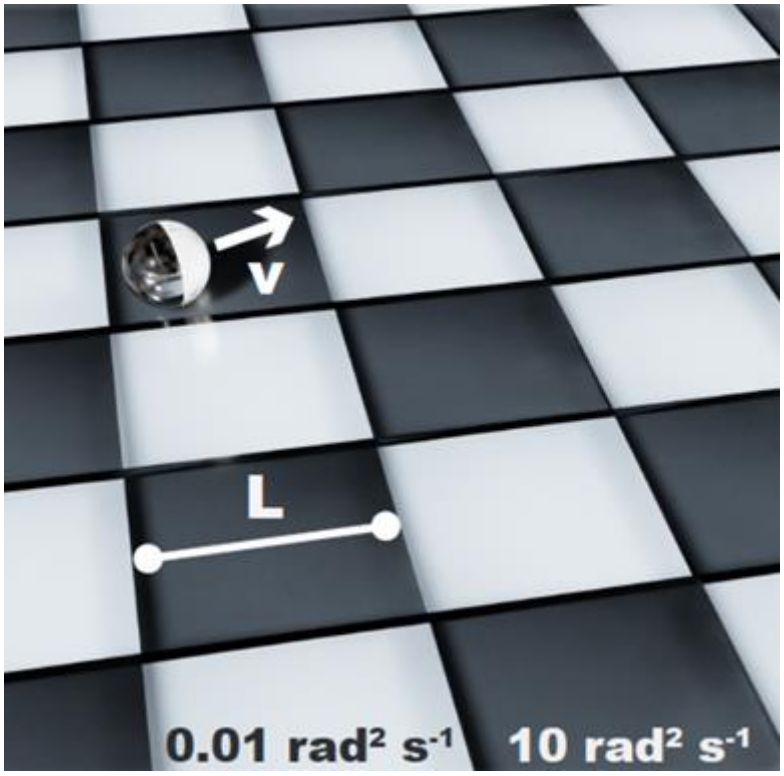
As research on artificial microswimmers continues to fascinate a broad community of scientists, new directions emerge by extending the scope of their application and by introducing new ways to control active motion. In this talk, I will first describe the case of active magnetic particles with external feedback. By applying randomly oriented magnetic fields, we can effectively impose rotational diffusivities decoupled from the bath temperature. This, combined with real-time tracking of the particle position, makes it possible to realize landscapes of spatially varying rotational diffusion with dramatic consequences on particle dynamics. By comparing experiments with numerical simulations, we show that interesting anomalous diffusion and particle localization emerge [1].
I will then present the case of reconfigurable active colloids that display a coupling between motility, internal properties (such as shape and dielectric properties) and environmental stimuli. I will illustrate the way in which we fabricate these particles, comprising soft responsive microgels, and discuss the detailed mechanisms of the dynamical coupling [2]. Both parts indicate new ways in which we can control the active motion of artificial microswimmers, taking us one step closer to realizing the vision of autonomous active materials.

References

[1] MA Fernandez-Rodriguez, F Grillo, L Alvarez, M Rathlef, I Buttinoni, G Volpe and L Isa “Feedback-controlled active Brownian colloids with space-dependent rotational dynamics”, *Nature Communications* 11: 4223 (2020)

[2] L Alvarez, MA Fernandez-Rodriguez, A Alegria, S Arrese-Igor, K Zhao, M Kröger and L Isa, "Reconfigurable Active Colloids with Internal Feedback" *submitted*, https://arxiv.org/abs/2009.08382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