Active Colloids confined at the gas-liquid interface

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Active motion of microswimmers or active colloids may occur in strong confinement and in complex environments. As a consequence of the particle-environment interaction, confined active colloids show specific dynamics, which are not observable in the bulk of simple liquids. Recently, we showed that the interface between two fluids act as a confinement, which dramatically affects translational and rotational dynamics of colloidal particles [1]. Here, the impact of partial wetting dynamics on the motion of active Janus colloids will be presented. Immersion depth of the Janus colloids as well as their orientation with respect to the water surface reveal complex and rich wetting properties of Janus particles at the air-water interface [2]. Active directional and circular trajectories have been observed at the interface with a motion persistence significantly enhanced by the partial wetted state of the Janus particles. This confined state impacts the in-plane and out-of-plane particle rota tional diffusions, and leads to a truly two dimensional active motion [3][4].

[1] Nature Materials 14, 908 (2015).
[2] Faraday Discussions 191, 305 (2016).
[3] Soft Matter 11, 7376 (2015).
[4] Langmuir 33 (48), 13766 (2017).