

## Active Brownian motion of asymmetric particles

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Self-propelled microswimmers that – similar to chemotactic bacteria and cells – autonomously steer through liquids, currently receive considerable attention from experimentalists and theoreticians because they allow detailed insights on how active matter organizes into complex dynamical structures. So far, most studies have concentrated on spherical or rod-like microswimmers and their motional behavior has been studied in great detail. In contrast, much less is known about asymmetrically shaped swimmers, whose trajectories strongly deviate from that of spherical ones because their mobility strongly depends on the orientation of the particle relative to its swimming velocity. We experimentally investigate the motion of L-shaped swimmers and observe an effective torque acting on the particles which results in a circular motion. We investigate this behavior both under bulk conditions and close to walls where the torque leads either to the reflection or a sliding along the wall. In addition, we study the self-propulsion of asymmetric particles in the presence of an external gravitational field. This leads to additional torques on the particle which leads to rather complex trajectories which may give useful insights into the gravitactical motion of microorganisms.

### References

- [1] F. Kümmel, B.T. Hagen, R. Wittkowski, I. Buttinoni, R. Eichhorn, G. Volpe, H. Löwen, C. Bechinger: *Circular motion of asymmetric self-propelling particles*. Phys. Rev. Lett. **110**, 198302 (2013)