

# Physikalisches Kolloquium

## Antrittsvorlesung

Di 09.01.18

15:15 Uhr

14:45 Uhr, Kaffee/Tee

R 513

Im Anschluss Sektempfang



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## Tactic Response of Synthetic Microswimmers in Gravitational and Optical Fields

Many motile organisms have developed intriguing steering mechanisms allowing them to orientate and navigate within gravitational, chemical or light fields. Such tactic response strongly facilitates e.g., the search for food, reproduction and/or escape from unfavorable ambient conditions and is therefore an essential aspect of life. Unlike living systems (bacteria, motile cells), where tactic behavior is typically achieved by complex internal signal pathways, it is not obvious how this can be realized with synthetic microswimmers, which have much simpler internal structures. Using light-activated self-propelled particles, we demonstrate that autonomous steering in gravitational fields and light gradients can be achieved without invoking a complex internal machinery but simply by the combination of viscous forces and torques, which naturally arise during self-propulsion in liquids. In addition, we demonstrate, how to realize different types of “communication” rules between particles and how this affects, e.g. the cluster formation in such systems. Because the interaction between particles can be easily varied (range of interaction, local vs. non-local interactions), this allows us to study the conditions, under which cooperative phenomena such as cluster and swarm formation can be generated in active systems.

