Physikalisches Kolloquium

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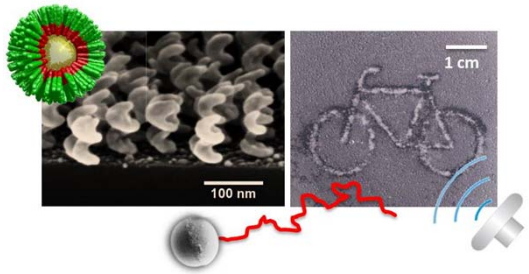
Di 23.01.18
15:15 Uhr
14:45 Uhr, Kaffee/Tee
R 513

Symmetry-breaking in the fabrication, assembly, and motion of colloids



Dynamic assembly and self-organization is a common phenomenon in living systems. Artificial systems that mimic this behavior are currently a research area of intense activity. The goal is to find model systems that exhibit the complex self-organization found in natural systems. Symmetry-breaking appears to be a pre-requisite for assembly of complex objects and in achieving many interesting functions including locomotion, but is in general difficult to realize with most colloidal systems. Here it is shown how relatively large numbers of complex colloids with a defined structure and material composition can be obtained in a fast physical process. These hybrid micro- and nanocolloids enable a number of applications including as rheological and optical probes, where they show record sensitivities. The same process can also be used to obtain self-propelled colloids that act as chemical nanomotors and provide a means to observe their non-equilibrium assembly. Finally, it is shown that a recent advance in the generation of complex ultrasound fields offers an alternative approach to achieve the rapid directed assembly of soft-matter into arbitrary shapes.