

8th Nordic Workshop on Statistical Physics: Biological, Complex and Non-Equilibrium Systems

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Current Perspectives on Active Matter

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Active Brownian particles, also referred to as microswimmers and nanoswimmers, are biological or manmade microscopic and nanoscopic particles that can self-propel. Because of their activity, their behavior can only be explained and understood within the framework of nonequilibrium physics. In the biological realm, many cells perform active motion, for example, when moving away from toxins or towards nutrients. Inspired by these motile microorganisms, researchers have been developing artificial active particles that feature similar swimming behaviors based on different mechanisms; these manmade micro- and nanomachines hold a great potential as autonomous agents for healthcare, sustainability, and security applications. With a focus on the basic physical features of the interactions of active particles with a crowded and complex environment, this seminar will provide a guided tour through the basic principles of active matter, the development of artificial self-propelling micro- and nanoparticles, and their application to the study of nonequilibrium phenomena, as well as the open challenges that the field is currently facing.

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