

L a u d a t i o

Recognizing his world leading contributions to Non-equilibrium
Statistical Physics and Active Matter Physics

Prof. Dr. Ramin Golestanian

has been awarded the
Martin Gutzwiller Fellowship 2017/2018
of the Max Planck Institute for the Physics of Complex Systems.

Ramin Golestanian is a world-wide authority on nonlinear and out-of equilibrium phenomena in statistical physics and soft matter. He made pioneering contributions to active matter and discovered a self-propulsion mechanism for active colloidal particles.

Ramin Golestanian was interested early in the role of fluctuations in non-equilibrium processes and in mechanisms of self-propulsion in active systems. Motivated by micro-swimmers in biology, Ramin Golestanian was interested to identify mechanisms of self-propulsion that could be realised in artificial systems. An essential breakthrough was the proposal in 2005 that colloidal particles can self-propel in a fluid if they catalyse a chemical reaction on their surface in a manner that breaks spatial symmetries. After developing the theory that showed that such a mechanism could generate significant propulsion, he guided the first experimental realisation of this active colloidal system. This work has by now stimulated many similar approaches both experimentally and theoretically and was instrumental for the realisation of active matter systems consisting of swarms of chemically driven micro-swimmers.

Together with his student Ali Najafi, Ramin Golestanian proposed a minimal model for a micro-swimmer that consists of three colloidal beads that interact dynamically. This model captures the essential physics of swimming at Low-Reynolds numbers and has since its invention stimulated the work of many researchers in the field.

Beyond these examples of his achievements, Ramin Golestanian has made important contributions to a variety of different problems, ranging from non-equilibrium versions of the Casimir effect to the dynamics of active liquid crystals. Recently, using field theoretical approaches, Ramin Golestanian has presented novel insights in the collective motion of cells guided by chemical cues.

Professor Ramin Golestanian is a prime example of outstanding scientific achievement, and we look forward to see his research continue to move towards exciting new avenues in the future.