

Großes Physikalisches Kolloquium an der Universität zu Köln

Prof. Dr. Ulrich Schwarz

Institute for Theoretical Physics,
Heidelberg University



21.05.2019

16⁴⁵ Uhr / HS III

Active Cell Mechanics



Biological cells use non-equilibrium processes to actively generate forces, movement and growth. Some of these processes can be reconstituted in biomimetic experiments with active soft matter, nurturing the vision of a synthetic cell built from the bottom-up. In this talk, I will first discuss how and why contractile forces are generated by cells, and how they can be measured. I will also explain how cell forces sometimes can be inferred from a model-based shape analysis, thus rendering a direct measurement unnecessary. For many situations of interest, we find that continuum mechanics can describe well the mechanical properties of cells and cell monolayers, if extended by an active tension in the force balance. We finally discuss how elasticity can emerge on cellular scales despite the fact that the underlying molecular processes are highly dynamic.

