UNIVERSITÄT LEIPZIG

Fakultät für Physik und Geowissenschaften

Prof. Dr. C. Schnohr
Prof. Dr. J. Vollmer

Physics Colloquium

Tuesday, 27 October 2020 at 17.15

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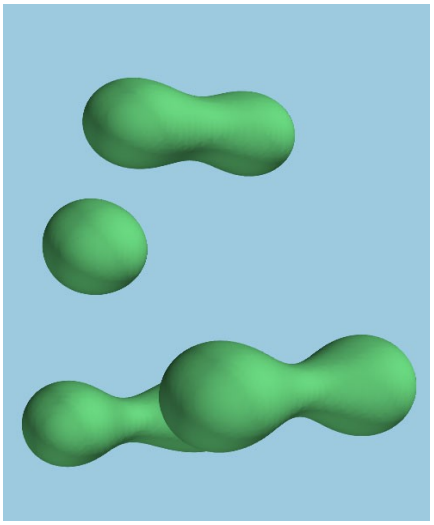
Controlling Phase Separation in Biological Cells

Phase separation has emerged as an essential concept for the spatial organization inside cells. In particular, phase separation explains how droplets can form spontaneously to create subcellular compartments. However, traditional theories of phase separation cannot explain how cells could control these droplets. To unveil part of this mystery, I will present two different mechanisms used by cells in this talk. I will first discuss chemical reactions that influence the physical properties of droplet components. Driving such reactions by exploiting the non-equilibrium environment of biological cells can stabilize multiple droplets and control their size. I will then focus on the elastic properties surrounding droplets, e.g., provided by the cytoskeleton. I will show that stiffness gradients, which are present in heterogeneous environments like cells, can influence the positioning of droplets and thus determine their overall arrangement. These two examples demonstrate that heterogeneous, living cells can regulate the size, number, and position of their droplets. Moreover, similar mechanisms may allow controlling droplets in the lab.



Venue: Hörsaal für Theoretische Physik, Linnéstraße 5 and Big Blue Button