LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

ARNOLD SOMMERFELD CENTER FOR THEORETICAL PHYSICS

Sommerfeld Theory Colloquium

Professor Reinhard Lipowsky

MPIKG Potsdam

Multispherical shapes, constant-mean-curvature surfaces, and the endoplasmic reticulum

The cells of our body are divided up into separate subcompartments by fluid membranes with a thickness of only a few nanometers. Even though these membranes provide robust barriers for the exchange of molecules between different compartments, they can easily remodel their shape and topology. [1]

A particularly interesting example of shape remodeling is the formation of multispherical shapes which represent constant-mean-curvature surfaces with two values of the mean curvature. [2] The individual spheres are connected by membrane necks which are crucial for topology remodeling by membrane fission and fusion. Multispherical shapes can attain many distinct patterns with multispherical junctions. The latter geometry is reminiscent of the endoplasmic reticulum, a fascinating organelle that forms a large network of membrane nanotubes connected by three-way junctions.

[1] R. Lipowsky. Remodeling of Membrane Shape and Topology by Curvature Elasticity and Membrane Tension. Adv. Biology 6, 2101020 (2022)

[2] R. Lipowsky. Multispherical shapes of vesicles highlight the curvature elasticity of biomembranes. Adv. Colloid Interface Sci. 301, 102613 (2022)

Wednesday, January 18, 2023, 16:15h, Room 348, Theresienstr. 37 / III and via Zoom

Prof. Erwin Frey