

Max-Planck-Institut für Dynamik und Selbstorganisation
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Abteilung Dynamik komplexer Fluide

Dr. David Zwicker

RG Theory of Biological Fluids, MPI-DS

talks about

“Biological droplets driven by chemical reactions”

Friday, February 2nd, 2018, 10:15 a.m., Seminar room (0.77)

Abstract:

Phase separation has recently emerged as an important concept to understand the spatial organization of biological matter. In this talk, I will demonstrate that such biological droplets can be controlled by non-equilibrium chemical reactions that affect the droplet material. As an example, I will describe a model for centrosomes, which are membrane-less organelles that organize cell division. Here, an autocatalytic reaction explains their growth dynamics in wild-type and mutant conditions, while a localized reaction controls their nucleation. More generally, the compositional fluxes generated by the chemical reactions can counteract the destabilizing effect of surface tension and thus suppress Ostwald ripening. Since the active droplets that I discuss resemble simple protocells where the chemical reactions play the role of a prebiotic metabolism, we propose that this property played an important part at the origin of life.

