Seminar of SFB 910

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Towards a physics of living materials

Living cells move, deform and divide. The engine of these behaviors is the cytoskeleton, a highly crosslinked network of polymer filaments and molecular scale motors that use chemical energy to do work. We develop a theory that predicts how the micro-scale properties of molecular motors and crosslinks tune the networks emergent material properties and generate predictable, and possibly controllable, behaviors. I will present how this theory is constructed, and discuss its implications for cytoskeletal networks in vitro and in vivo, highlighting how it has helped to quantitatively understand motor driven microtubule fluxes in a system made from XCTK2 motors and stabilized microtubules, and how it resolved long-standing puzzles about the motion of microtubules in spindles. I will then discuss some future research directions and sketch how the approach taken here can be generalized to describe different and larger biological assemblies such as cells and tissues and form the basis for a quantitative physics of living materials.

For information on how to access the event, please contact: henning.reinken@itp.tu-berlin.de

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