

Super-Resolution Fluorescence Cryo-Microscopy

Initiative: Freigeist-Fellowships

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Laufzeit: 5 Jahre

Projekt-Website: www.cssb-hamburg.de/research/research_groups/kaufmann_group

Super-resolution light microscopy - e.g. introducing fluorescent molecules and switching them on and off with lasers to 'calculate' much 'sharper' images - allows zooming into the complex nano-world of a cell unveiling their functional mechanistics. However, these super-microscopes are too slow to deal with the very dynamic environments in living cells. Currently, the practised solution is to use chemicals that kill the cell and stop all movement, but this also leads to structural changes. Thus, images from these super-microscopes are not necessarily valid representations of the structures and cause misleading conclusions. Alternatively, samples can be frozen so quickly that no structural changes can occur. However, there is lack of suitable technology for optical imaging of these cryo-samples at the super-microscopy level. To address this gap, the applicant will develop a new microscope that will allow imaging cryo-samples at high spatial resolution. This will open up a new field of microscopy that will enable to investigate various biological problems (e.g. better understanding of communication in synapses or the DNA damage repair machinery) that have remained unanswered due to limitations of the current technology. Furthermore, this new field will bridge the gap to the booming world of electron cryo microscopy, thus bridging even to atomic resolution range.

Projektbeteiligte

Dr. Rainer Kaufmann

Universität Hamburg

Fachbereich Physik

Institut für Nanostruktur- und Festkörperphysik

Centre for Structural Systems Biology (CSSB)

c/o Deutsches Elektronen-Synchrotron DESY

Hamburg