RHEINISCH-WESTFÄLISCHE TECHNISCHE HOCHSCHULE AACHEN

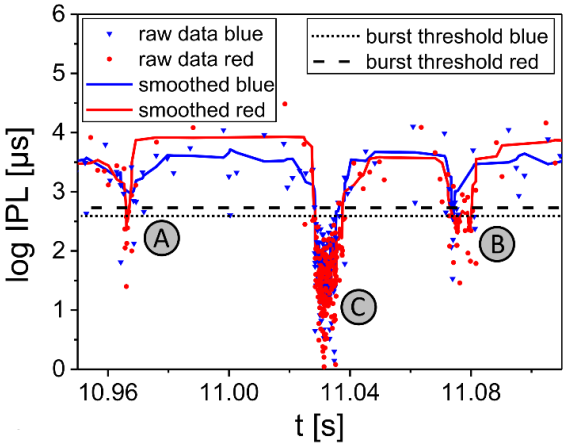
I. Physikalisches Institut (IA)

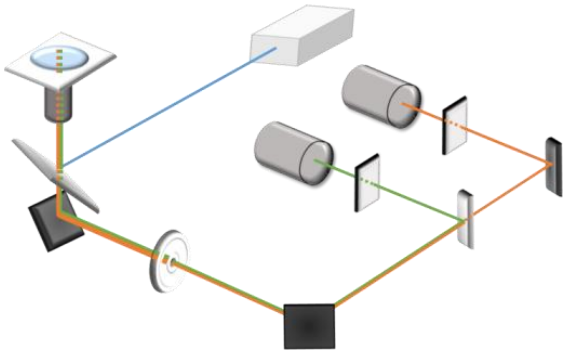
Arbeitsgruppe Biophysik (Prof. Fitter)

Bachelor- /Masterarbeit

Optimal Conditions for Single-Molecule Fluorescence Detection: Chance Coincidence Limitations

Single-molecule fluorescence confocal spectroscopy is an important tool for biological processes investigation [1]. Due to the high sensitivity of this technique, it enables to measure very small samples down to single molecules. Hence, one can characterize a diversity of properties (conformational changes, interaction between different protein species) that define the functioning of a selected biosystem. Interaction between molecules in confocal microscope can be monitored by observing molecules marked with different fluorophores.





Selecting optimal conditions for single-molecule experiment is a challenging and non-trivial task. It includes avoiding the detection of multi-molecule events and artefacts, selecting sufficient measurement time and plenty more.

The aim of this project is to find the most optimal conditions for single-molecule detection and to verify data analysis routines for sorting-out artefacts developed within the group [2].

Literature:

[1] Deniz et al., Annu. Rev. Phys. Chem. 52:233 (2001)

[2] Höfig et al., Commun. Biol. 2:459 (2019)

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