HIGH-FIDELITY FAST TRACKING OF PROTEIN MOTION

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Understanding the structure and function of biological matter at nanoscale is among the most exciting challenges of modern technologies in biological imaging. In this work, we aim at tracking the motion in biophysical system with a nanometer fidelity and at microsecond temporal resolution. We employ interferometric scattering microscopy (iSCAT) which is an optical microscopy technique capable of detecting and localizing extremely small scattering signals such as a few-nm particles or even unlabeled proteins [1,2]. We explore new challenges arising from ultra-fast tracking of scattering labels including fluctuations in the label position and background.
Using this new methodology we exploit unknown mechanisms of microtubule associated proteins revealing the choreography of its diffusible motion which were not to date deciphered

[1] M. Piliarik and V. Sandoghdar, Direct optical sensing of single unlabelled proteins and super-resolution imaging of their binding sites, Nat. Commun. 5 (2014)

[2] M. P. McDonald et al,. Visualizing Single-Cell Secretion Dynamics with Single-Protein Sensitivity, Nano Lett. 18 (2018)

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