



Münchner Physik- Kolloquium

Winter
2017/18

Simple nanofluidic devices for high-throughput, non-equilibrium studies at the single-molecule level

Dr. Johannes Hohlbein, *Wageningen University, The Netherlands*

Monday, 6 November 2017, 17:15 h

Hörsaal H 030, Fakultät für Physik der LMU, Schellingstraße 4, München

Single-molecule detection schemes offer powerful means to overcome static and dynamic heterogeneity inherent to complex samples. Probing chemical and biological interactions and reactions with high throughput and time resolution, however, remains challenging and often requires surface-immobilized entities. Here, utilizing camera-based fluorescence microscopy, I will present glass-made nanofluidic devices in which fluorescently labelled molecules flow through nanochannels that confine their diffusional movement. The first design features an array of parallel nanochannels for high-throughput analysis of molecular species under equilibrium conditions allowing us to record 200.000 individual localization events in just 10 minutes. Using these localizations for single particle tracking, we were able to obtain accurate flow profiles including flow speeds and diffusion coefficients inside the channels. A second design featuring a T-shaped nanochannel enables precise mixing of two different species as well as the continuous observation of chemical reactions. We utilized the design to visualize enzymatically driven DNA synthesis in real time and at the single-molecule level.

Furthermore, I will present a novel, phasor-based algorithm for single-molecule localisation microscopy that allows localisation rates in the MHz range on standard CPUs.

Student event: Meet the speaker

We invite you to a **student-only** discussion-round with Dr. Johannes Hohlbein before his Munich Physics Colloquium talk.

Be curious and feel free to ask any question.

Monday, 6 November 2017, 16:00 h

Room H 522 (5th floor), Fakultät für Physik der LMU, Schellingstraße 4, München

