

## SCANNING FUNCTIONALIZED, STRUCTURED SURFACES WITH OPTICALLY TRAPPED PROBES

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Functionalized surfaces can affect (bio-) chemical reactions and control spatially the affinity for various binding partners (receptor-ligand, antibody-antigene, etc.). These usually short-range interactions are initiated by long range electrostatic, electrodynamic and entropic interactions. We investigate the influence of long-range interactions on structured surfaces with Photonic Force Microscopy, where an optically trapped bead (probe) is scanned across the surface. The change of the bead's fluctuations encodes the interaction with the surface. The fluctuation traces are recorded interferometrically in three dimensions with nm-resolution and at scan-rates of several hundred kilohertz with a quadrant photodiode. Interactions can be imaged in the sub-piconewton range. The optical phase changes induced by the surface structure (e.g. an adhering cell) on the probing laser beam can be extracted from the signal of the trapped probe.



Figure: Surface probing with a trapped bead

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