



# The Physics of Soft and Biological Matter

## P.22 Hindered diffusion coefficients of spherical particles confined by microchannels

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We present here the measurement of the diffusivity of spherical particles closely confined by narrow microchannels. Our experiments yield a 2D map of the position-dependent diffusion coefficients parallel and perpendicular to the channel axis with a resolution of down to 129 nm. The diffusivity was measured simultaneously in the channel interior, the bulk reservoirs as well as the channel entrance region. In the channel interior we found strongly anisotropic diffusion. While the perpendicular diffusion coefficient decreased with the distance to the confining walls down to approximately 25% of the value on the channel axis, the parallel diffusion coefficient remained constant throughout the entire channel width. In addition to the experiment, we performed finite element simulations for the diffusivity in the channel interior and found good agreement with the measurements. Our results reveal the distinctive influence of strong confinement on Brownian motion which is of significance to microfluidics as well as quantitative models of facilitated membrane transport.