LadHyX Seminar – May 2nd, 10:45

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Brownian motion at interfaces

Brownian motion near interfaces is a canonical situation, encountered from fundamental biophysics to nanoscale engineering. Using a combination of experimental, theoretical and numerical methods, we study the thermally-induced random tridimensional trajectories of individual microparticles, within salty aqueous solutions, in the vicinity of rigid walls, and in the presence of surface charges. We construct the time-dependent position and displacement probability density functions, and study the non-Gaussian character of the latter which is a direct signature of the hindered mobility near the wall. Furthermore, we implement a robust multifitting method, allowing for the thermal-noise-limited inference of diffusion coefficients spatially resolved at the nanoscale, equilibrium potentials, and forces at the femtonewton resolution. Finally, we discuss more complex situations, such as the ones involving soft boundaries, external flows or active microswimmers.