SFB1242

SFB 1242 Nichtgleichgewichtsdynamik kondensierter Materie in der Zeitdomäne

UNIVERSITÄT DUISBURG ESSEN

Open-Minded

26.05.2026 / 10 Uhr c.t., Raum MG 272
Campus Duisburg

The case of the wandering probe: Light-induced translocation and the illusion of static spectroscopy

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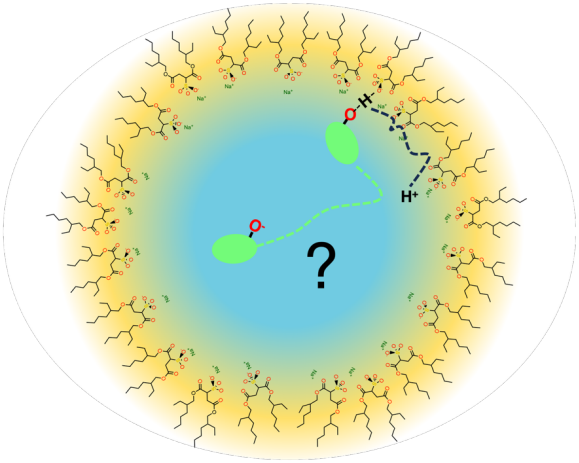
Spectroscopy experiments enlisting a molecular probe generally assume that the molecule resides in a well-defined local environment for the duration of the experiment. But what if we aren't actually measuring what we think we are? HPTS is a widely used photoacid and pH probe that exists as two different species, the acid and its conjugate base. Using steady-state and time-resolved optical spectroscopy, molecular dynamics simulations, and infrared solvation shell spectroscopy, we observe protonation-state dependent translocation of the molecule when it is confined in AOT reverse micelles. In its ground electronic state, the protonated HPTS species can reside hydrogen-bonded to the AOT interface, but upon photon absorption, excited state proton transfer breaks the hydrogen bond and allows the molecule to rapidly move away from the interface and into the aqueous reverse micelle core. This light-driven mobility has profound implications for a broad range of systems where HPTS is used to probe complex environments, from its application as a pH sensor in medical bandages, to mapping intracellular pH and proton transfer dynamics in complex biological environments like cancer cells. Our findings challenge the prevailing view where molecular probes are assumed to be static reporters, remaining in a fixed location for the duration of an experiment.



Für diese Zeit steht eine Kinderbetreuung nach vorheriger Anmeldung zur Verfügung.

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