

## Controlled manipulation, lithography and sliding experiments on the nanoscale

*Friday, 1 July 2022 16:40 (25 minutes)*

Nanotribology is a young and dynamic research field that aims to investigate friction, wear and adhesion phenomena down to the atomic scale. Since these processes occur in all natural, artificial or conceptual situations involving two surfaces (at least) in contact or in close proximity to each other, it is not surprising that, knowingly or not, many physicists, materials scientists, mechanical engineers or chemists must sooner or later confront these topics in their careers. In this talk, I will first present investigations on the friction force acting on single molecules [1], polymer chains [2] or metal clusters [3] manipulated on solid surfaces an AFM probe. If the surface itself is “manipulated”, it becomes possible to observe and quantify early stages of abrasive wear on the nanoscale, which is of utmost importance for assessing the quality of technical surfaces and possible environmental issues. Particularly instructive in this content are the cases of compliant polymers [4,5] and layered materials[6,7], where ripples, round-shaped nanoparticles, and flakes are easily generated out of the nanoscratch processes. Finally, I will also introduce first results on sliding friction in liquid environments and the influence of nanoroughness on lateral force sensing that we are currently studying in collaboration with TU Dresden.

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