

AFM-based robotics platform for micro-force measurement and mechanical characterization

Research framework

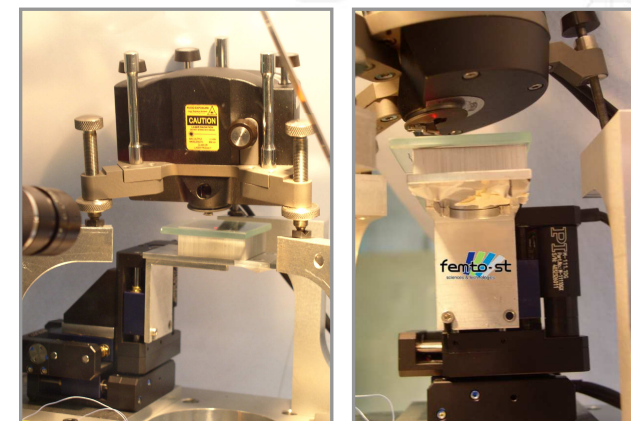
Microhandling performed with robotics devices is a promising way to assemble microcomponents. The success in complex tasks achievement for micro–nano robotics is conditioned by the analysis of surface effects. However, at the scale of several micrometers, adhesion phenomenon highly perturbs micro-objects release and final positioning. This phenomenon is directly linked to both the object and the gripper surface mechanical and chemical properties. The control of the adhesion properties requires multidisciplinary approaches including roughness control, mechanical properties control and chemical surface functionalization.

Skills associated to the NANOROL platform

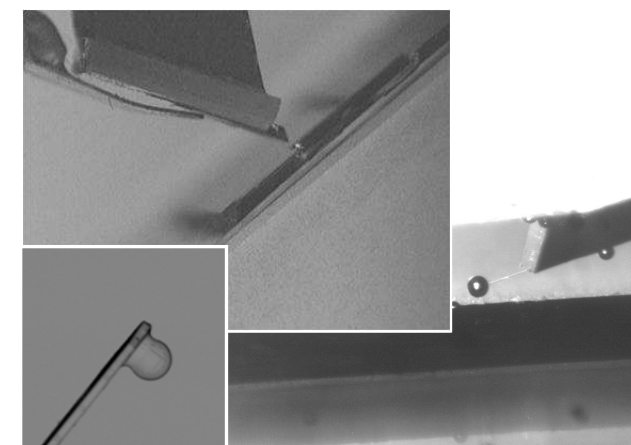
The applicative objective of the [AFM-based NANOROL robotics platform](#) is to improve the reliability of micro-objects manipulation which necessitate to control the different contact or non-contact forces involved in the dynamic of such micro-objects. Interactions have been studied between a micrometric sphere and a plane. The study of the deformation of an AFM beam whose end is equipped with a tip or a sphere allows the characterization of [functionalized](#) or [patterned](#) substrates that are used on the fingers of micro-grippers developed at AS2M. The measurements can be made in dry or ambient environment, and also in wet environment whose pH can be modified to control the adhesion / repulsion forces.

Major article: J. Dejeu, M. Bechelany, L. Philippe, P. Rougeot, J. Michler, M. Gauthier. Reducing the Adhesion between Surfaces Using Surface Structuring with PS Latex Particle, ACS Applied Materials & Interfaces, 2010, 2(6):1630-1636.

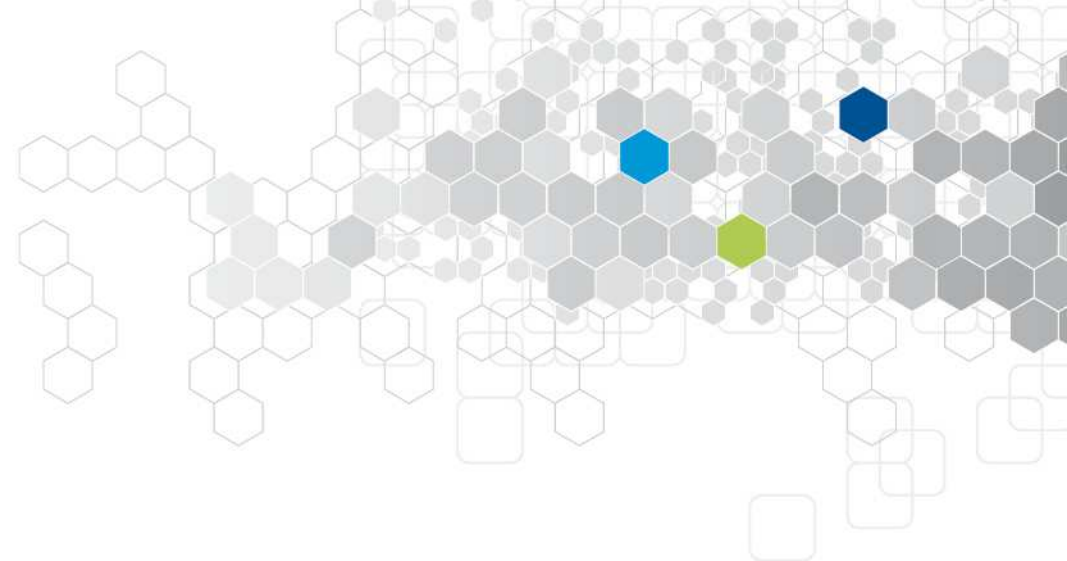
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Micro-force AFM-based measurement robotics platform with different actuators for substrates displacement



AFM cantilevers with a glued borosilicate microsphere (assembly done at AS2M)



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