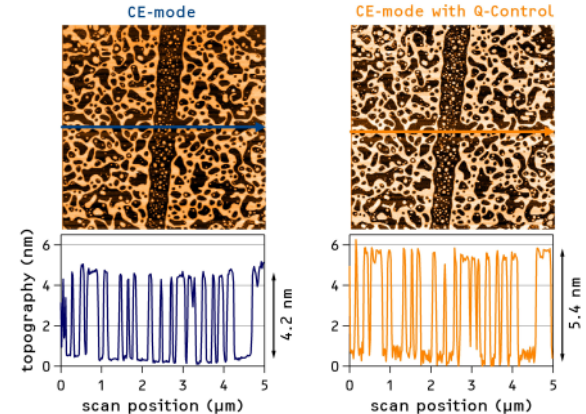


QFM-Module

SPM add-on hardware for advanced dynamic force microscopy and spectroscopy

The QFM-Module comprises a controller and a frequency detector dedicated for SPM applications in air and liquid. The controller provides three modes of operation:

- FM-mode with constant excitation
- FM-mode with constant excitation and Q-Control
- AM-mode ("tapping") with Q-Control



The QFM-Module allows to apply the Q-Control technique to AM- and FM-modes. Thereby forces exerted by the probing SPM tip on the sample surface can be minimized and imaging of soft samples in liquid or in air is improved.

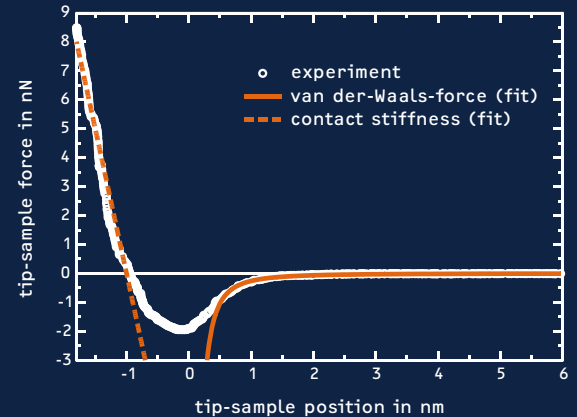
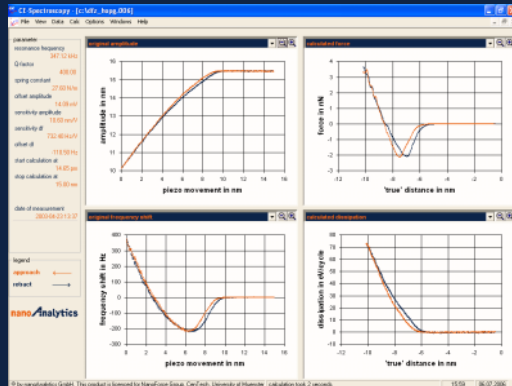
The top figure shows a Langmuir-Blodgett film (DPPC) in liquid scanned in CE-mode. The observed height of the layer structure is significantly larger in case of imaging with Q-Control.

[D. Ebeling, H. Hölscher, B. Anczykowski, Appl. Phys. Lett. 89, 203511 (2006)]

QFM-Module

In FM-mode with constant-excitation (CE-mode) conservative and and dissipative tip-sample interactions can be directly determined. The customized analysis software which is provided with the QFM-Module enables the user to easily quantify tip-sample forces.

[H. Hölscher, B. Gotsmann, A. Schirmeisen, Phys. Rev. B 68, 153401 (2003)]



A tip-sample force curve obtained with a silicon cantilever on an untreated silicon wafer (symbols). The right part of the curve is fitted with a force law describing long-range van-der-Waals forces (solid line). The repulsive part on the left increases nearly linearly with a contact stiffness of 10 N/m (dashed line)

[H. Hölscher, B. Anczykowski, Surf. Sci. 579, 21 (2005)]

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