

Keep an eye on your experiment wherever you are – the JPK ExperimentControl™ makes it possible

Introduction

Atomic force microscopy (AFM) is the ultimate tool for investigating samples with nanometer resolution under native environmental conditions. For biological, medical, chemical and material research, AFM measurements can provide a deeper view in terms of high-resolution imaging of soft matter and characterizing molecular/cellular interactive forces and nanomechanical properties under controlled measurement conditions.

Recent developments like JPK's Quantitative Imaging mode (QI™) provide new possibilities for automated, easy to use measurements. A force distance curve is recorded at each point. The newly developed QI™ Setup automatically adjusts the measurement conditions such as setpoint force and z-length thereby facilitating the imaging of delicate samples, even for beginners. The new QI™ tool, which uses the Sader method, also provides a straight forward approach for cantilever calibration. Within the QI™ Setup routine, the cantilever is automatically calibrated and measurements can be started immediately. The QI™ movement algorithm prevents lateral forces arising and controls the interaction force at any time. This makes the imaging of soft, loosely-attached or tricky samples easy.

Since the advent of AFM, there has been a requirement to perform long-term experiments with the aim of tracking either surface changes over a long time scale or recording a statistically relevant number of interaction-force measurements or nanomechanical characterizations. New measurement modes like QI™ or software tools like ExperimentPlanner™ help the user to set up automated measurements but, until now, there was no capability for the remote control tracking of long-term experiments.

ExperimentControl™

With NanoWizard® 4, JPK fills this gap and with ExperimentControl™ provides a browser-based tool for the remote control and monitoring of complex and long-term experiments via the internet by a PC, tablet or smartphone.

Using SPM Software, every user can create his or her own profile for ExperimentControl™. Access is password protected and possible with any web-enabled device.



Fig 1: ExperimentControl™ offers remote control and monitoring of AFM experiments via computer, tablet and smartphone.

This provides the user with completely new possibilities to perform complex and time-consuming measurements. Via remote control, it is possible to check the quality of the AFM and the corresponding optical image. Furthermore, it is possible to control the AFM (e.g. stepper motors), monitor the system status and the quadrant detector for laser alignment. ExperimentControl™ also delivers the continuous status of the instrument making AFM measurements more efficient and compliant for all users.

ExperimentControl™ inside acoustic hood

The ExperimentControl™ package is delivered together with an 8.4" tablet and a corresponding holder for using it inside an acoustic enclosure. This simplifies setting up the instrument. The different adjustment steps like laser alignment, photodetector adjustment and control of the stepper motors can be performed via the tablet independent of the position of the AFM computer or visibility of the SPM software on the monitor screen. Furthermore, using tablet control to setup an experiment for more complex AFM measurements can be advantageous over moving the AFM computer and monitor, e.g. on an optical table or,

depending on the experiment, using different microscopy setups.

Conclusion

AFM technology is becoming more and more user-friendly and easy to use. ExperimentControl™ has taken a major step forward in this direction. It is now possible to leave the experiment running and go for lunch, have a constructive conversation with colleagues or attend a meeting without losing control of the AFM. ExperimentControl™ offers the possibility for the user to keep an eye on their experiment wherever they are and enhances their life as a researcher.

Key features

- Browser-based user-interface for remote control of the AFM
- Password protected, secure login
- Tablet with holder included
- Remote control for monitoring complex and long-term experiments via the internet by a PC, tablet or smartphone
- Delivers a continuous status update of the instrument
- Simplifies setting up the instrument especially inside an acoustic hood