

AFSEM[®] Interface to OpenHardware Controller

Open a world of possibilities

We know our customers have great ideas! To give them the freedom and control to explore them we have developed an open hardware interface to our AFSEM for the *OpenAFM* project maintained by *École Polytechnique Fédérale de Lausanne*¹.

This new interface provides full access to all controller functions of the AFM, from the high-level user interface down to real-time FPGA processing. The interface supports all hardware functions of the AFSEM as well as controlling the piezo motors of the coarse stage. This makes implementation of custom workflows easy and allows seamless integration of the AFSEM with other instruments.

Do you have a great idea for a new correlative measurement mode? With our open hardware interface and the *OpenAFM* controller you can implement it in an easy to program LabView-based environment.

¹ <https://www.epfl.ch/labs/lbni/openhardware/>

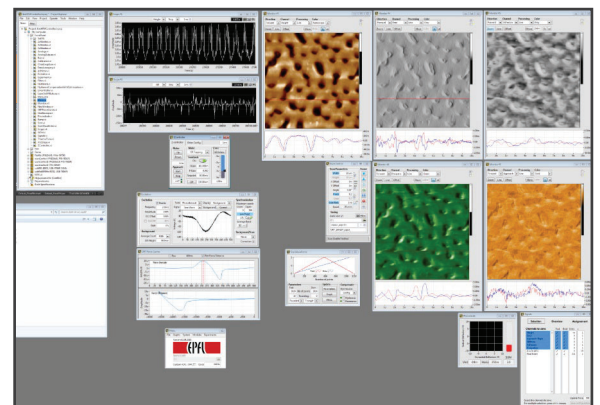
Features:

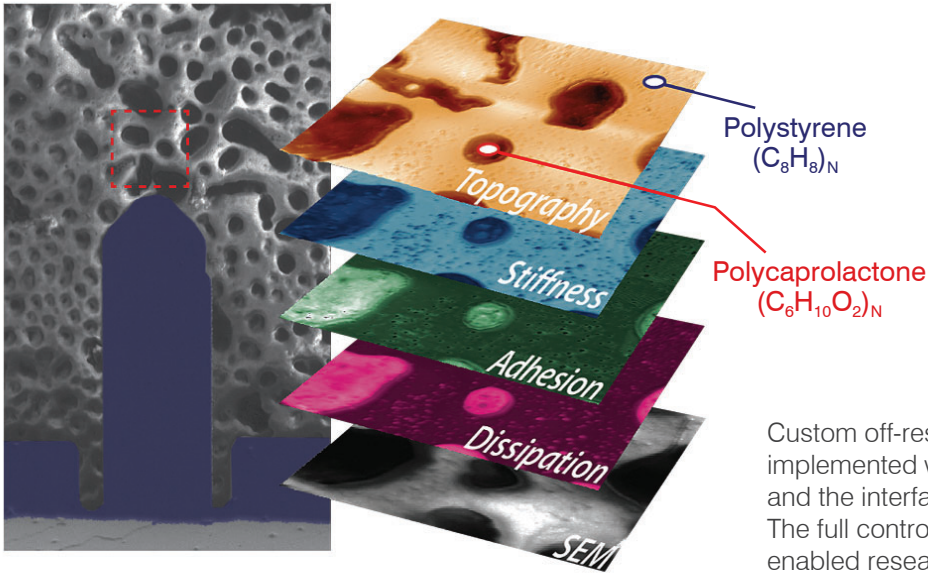
- Access to all signals in the AFSEM, such as: XYZ scanning, all cantilever-related signals, closed loop sensors, limit switches, etc.
- Open software based on National Instruments LabVIEW
- High voltage amplifiers for Piezo stage
- Piezomotor driver for coarse stage
- Access to low voltage and high voltage signals



OpenHardware Controller showing EPFL open hardware AFM controller, AFSEM interface, and QD-EPFL high voltage amplifier.

LabView-based software allows user to operate experiments with the OpenHardware controller.





Custom off-resonance AFM imaging mode implemented with the OpenHardware controller and the interface to the AFSEM microscope. The full control provided by the AFSEM interface enabled researchers to extract nanomechanical properties from a polymer-blend sample. Data courtesy of Santiago Andany and Georg Fantner (EPFL).

Examples of custom AFM modes already realized by users:

- Mechanical properties measurement using off-resonance tapping (ORT)
- Contact resonance mode
- Nanomanipulation
- Adaptive Z control
- Data driven control
- Multi-actuation

