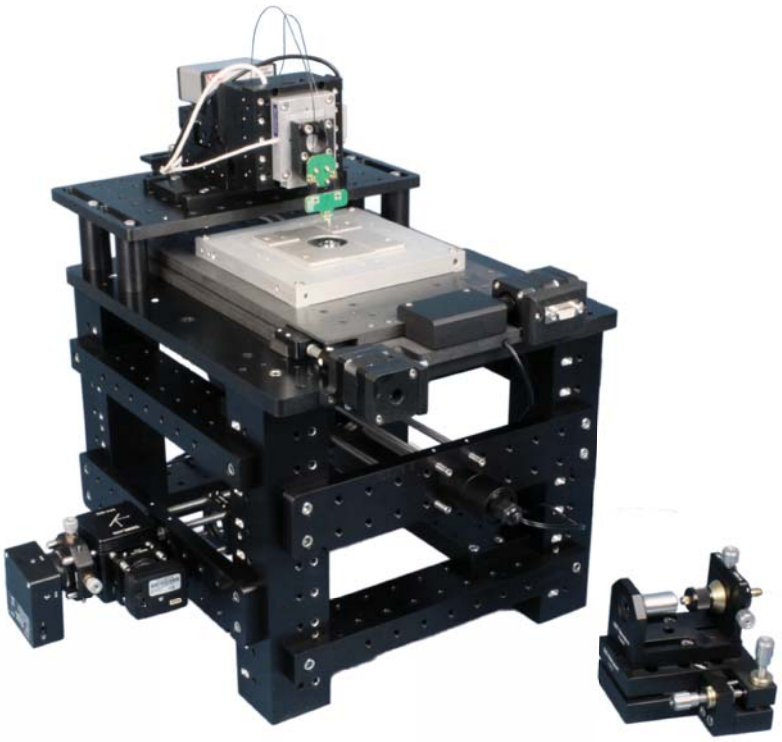
MCL-NSOM

Features

- *Complete inverted optical microscope*
- *Six axes of motorized control*
- *Closed loop nanopositioning in XYZ*
- *Independent automation for fiber alignment to optical axis*
- *Alignment camera and detection APD included*
- *Software included*

Other Applications

- *Aperture-less NSOM*
- *Resonant probe AFM*
- *Near field spectroscopy*
- *Fluorescence & epifluorescence microscopy*



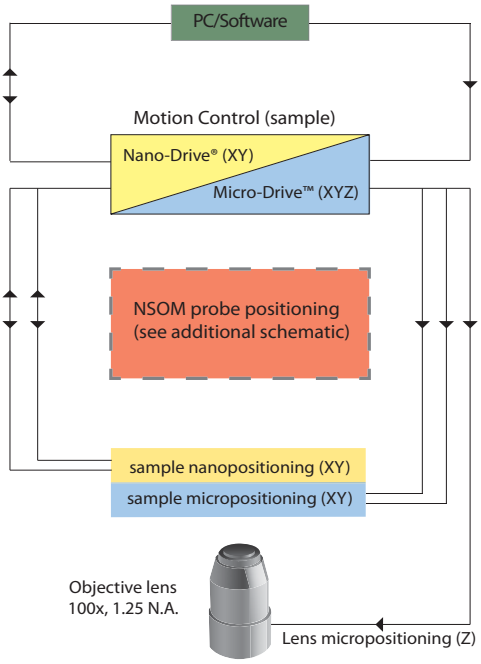
MCL-NSOM shown without acoustic, light tight enclosure

The MCL-NSOM is a fully operational near field scanning optical microscope. It has been built on Mad City Labs versatile RM21™ inverted optical microscope which allows users to convert between NSOM, SPM, and fluorescence optical microscopy techniques.

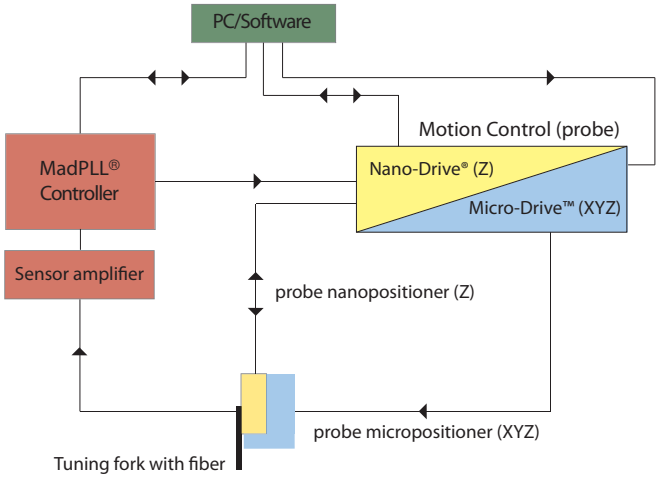
The MCL-NSOM builds on our successful resonant probe SPM and incorporates common elements such as the MadPLL® phase lock loop controller. The NSOM also exploits our expertise in precision motion control by including six axes of motorized positioning, for the sample and NSOM probe, and three axes of closed loop nanopositioning to provide exceptional position resolution and accuracy.

The MCL-NSOM also includes a 635nm laser excitation source, fiber launch, oil immersion objective lens (100x, 1.25 N.A.), CMOS alignment camera and avalanche photodiode detector. The microscope configurable design allows researchers to tailor the instrument for many different optical microscopy techniques including near field spectroscopy.

The MCL-NSOM is operated in aperture mode with shear force feedback. The standard 5 modes are supported: illumination, collection, illumination and collection, reflection and reflection collection. We supply a LabVIEW™ based software package which automates the motion control features.



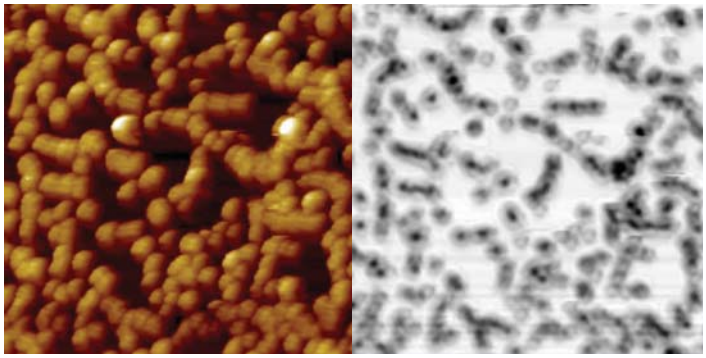
Instrument overview of MCL-NSOM hardware



Schematic of the probe positioning element

Specifications	
Sample micropositioning (XY)	25 mm
Lens micropositioning (Z)	50 mm
Fiber micropositioning (XYZ)	25 mm
Micropositioning step size	95 nm
Micropositioning controller	Micro-Drive
Nanopositioning range of motion (XYZ)	200 µm × 200 µm × 30 µm
Resolution	0.4 nm (XY), 0.06 nm (Z)
Step size	0.2 nm (XY), 0.03 nm (Z)
Nanopositioning controller	Nano-Drive®
Communication	USB 2.0
DAC/ADC	20 bit
TTL outputs	4 channels
NSOM operation	Aperture
Feedback	Shear Force
Phase lock loop controller	MadPLL®
Software	AFMView™
Software compatibility	LabVIEW™
Objective lens	100x, 1.25 N.A. oil immersion (Infinity corrected)
Excitation and detection	635nm, 5mW laser diode with fiber launch
	0.3MP fiber alignment CMOS camera
	Avalanche photodiode (200nm-1000nm, 1mm active area)
Supplied accessories	Coaxial illuminator (LED)
	Tuning fork with attached single mode fiber for NSOM
	Tuning forks with etched tungsten tips (3)
	Tuning forks (10)
Power supply	90 - 260 VAC (50/60Hz)
Operating system	Windows Vista/7/8/10

Images



50 µm x 50 µm images of 500nm diameter polystyrene beads on a glass coverslip.
Images taken using Mad City Labs AFM (left) and NSOM (right).
NSOM in transmission mode. NSOM data collected using 640nm light with 100x, 1.25 N.A. objective lens and avalanche photodiode.