

Vibrations of the ANPxyz50 Positioning Unit Measured Using the attoCFM II (1" Version)

The attoCFM II confocal microscope is thermally compensated guaranteeing unreached stability required e.g. to perform single quantum dot spectroscopy over a long period of time. Ultra compact versions for 1" bore liquid Helium dewars and larger versions for 2" bore cryostats or similar chambers are available. The 1" version of the attoCFM II is equipped with an ANPxyz50 positioning unit.

The vibrations of this ANPxyz50 positioning unit can be measured optically by means of confocal microscopy. Having an ideally flat, reflecting sample, the optical signal reaches a maximum when the sample surface lies in the focal plane (Figure 1). By positioning the fiber at half maximum of the signal, a change in Z-position (e.g. vibrations) will change the intensity of the measured reflected light significantly, thus providing information on the system's vibrations.

The vibration spectrum of the confocal microscope attoCFM II (1" version), which is composed from an ANPxyz50 positioning unit, was recorded at room temperature. The spectrum of the noise is shown in Figure 2. Vibration amplitudes of less than 100 pm were observed, main. The total vibration (integral of all harmonics) was determined to be about 800 pm.

The image depicted in Figure 3 has been recorded with the confocal microscope attoCFM II (1" version) in scan mode at a wavelength of 633 nm. The sample was a SiO₂ on Si chess board with a period of 2 microns. The scan range was 15 x 15 microns.



The attoCFM II (1" version).

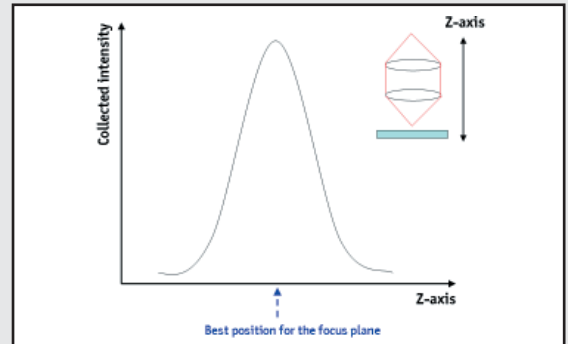


Fig. 1: Graph of the collected intensity as a function of the Z axis position in the confocal set-up. By changing the position of the plan of focus on the sample, the measured intensity first increases and then decreases again.

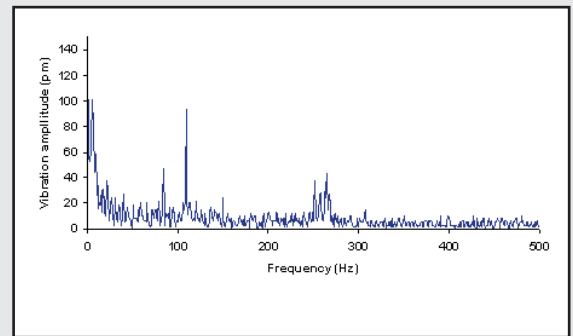


Fig. 2: Vibration spectrum of the ANPxyz50 positioning unit recorded at 300 K.

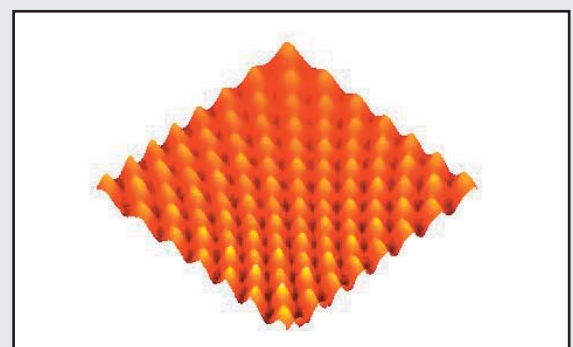


Fig. 3: Picture of the chess board using the CFM II 1". The scan range is 15 microns using only 45 Volts.

RELATED PRODUCTS	
ANPxyz50	high precision, piezo electric, inertial positioner for 1" setups
attoCFM II	highly stable confocal microscope for 1" setups
ANC150/3	electronic controller
attoScan	data acquisition software
attoView	data viewing and editing software