

# KAWAKATSU LAB.

## [Coupling to the nano regime]

Centre for International Research on MicroNano Mechatronics

<http://www.inventio.iis.u-tokyo.ac.jp>

Applied Scientific Instruments

Precision Engineering Department

### Coupling to Nano

Touching the untouched, and seeing new landscapes of familiar objects

Detection of the vibration of small objects tell us about their mass and the field in which they are placed. Atomic Force Microscopy (AFM) is one example. We are investigating various detection and control methods of vibration of micro to molecular level objects, with the main objective of implementing novel microscopy.

Liquid AFM - Succeeded in imaging ice-like structuring at room temperature  
 High frequency, low amplitude AFM: Imaging with 10 pm amplitude and 3D force mapping

FIM/Atom Probe : Towards measurement of vibration of nanocantilevers

Colour AFM: Towards chemical characterization of atoms by multi-modal AFM

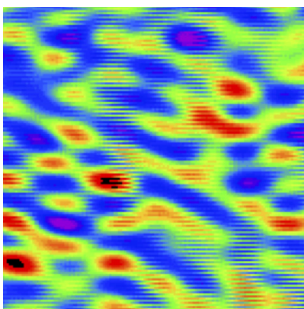


Fig.1 Towards a Colour AFM

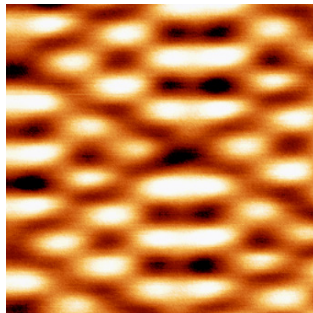


Fig.2 Direct detection of lateral force gradient

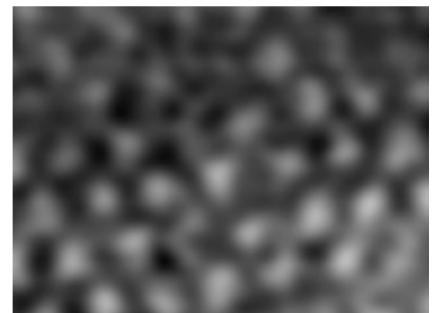


Fig. 3 Structured liquid molecules at RT.



Fig.4 UHV AFM/TEM

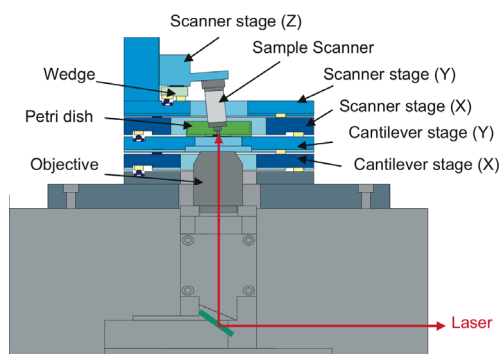


Fig.5. Liquid AFM

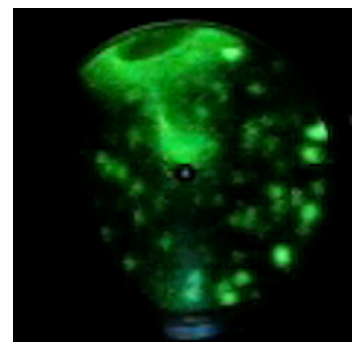


Fig.6 Towards vibration measurement of molecules and nano-oscillators