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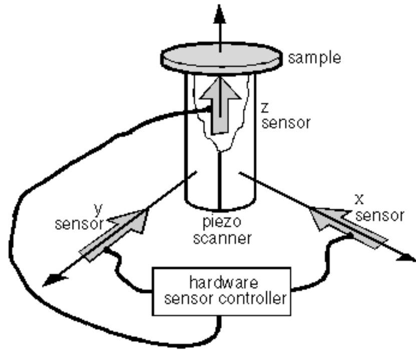
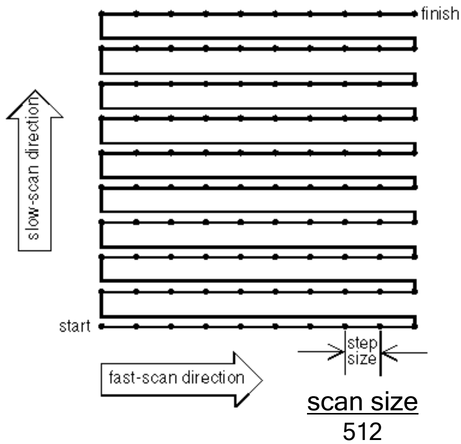
# Piezo-Scanner as used in AFM




Schematic of a scanner similar to that of d.i.'s Nanoscope III

Schematic of the Image Scan and of the data collection points




scan size
512

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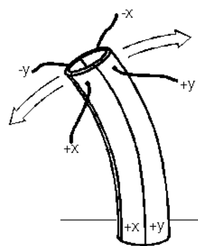
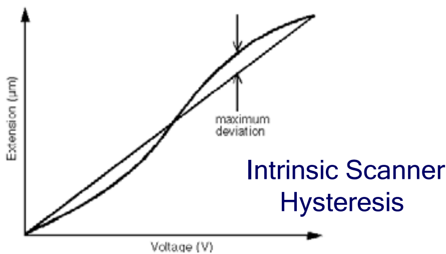
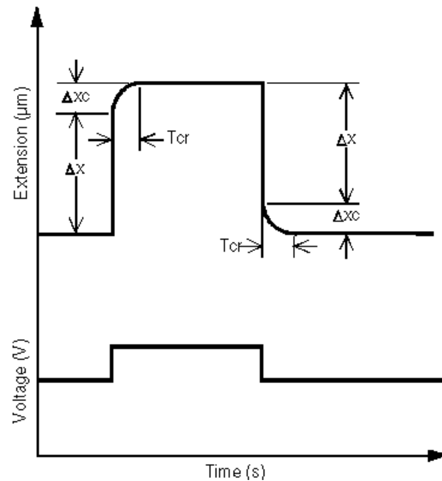
# Piezo-Scanner Creep



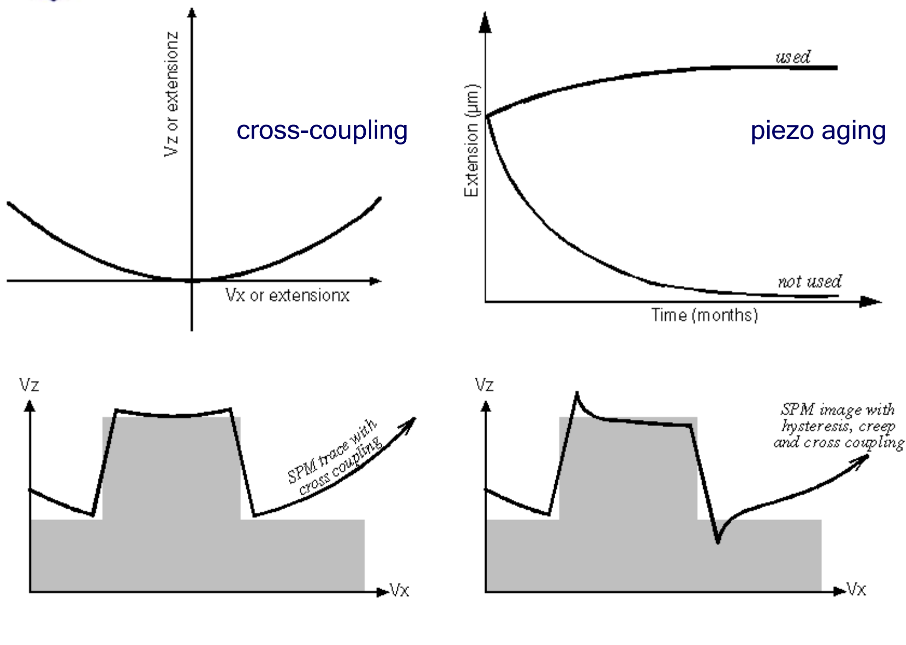

Schematic of a scanner tube as that of d.i.'s Nanoscope III




Intrinsic Scanner Hysteresis




Typical effect due to creep & hysteresis of scanner






# *Wrap-Up of the AFM course*

**AFM Modes:**
- Force / Distance (est. adhesion, capillary strength, etc)
- Contact (plus Lateral Force)
- Tapping (plus phase, force modulation, neg. lift, etc)
- Other modes (electrostatic, magnetic, etc)

**Tip Artifacts & Tip Selection:**
- Tip / Sample convolution
- Dull tip and Double tip effects

**Surface Roughness:**
- Definitions, AFM estimation

***concluding remarks & details…***

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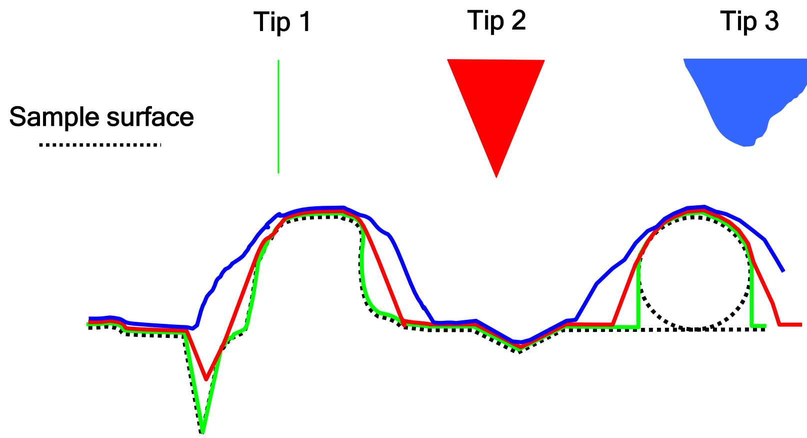
## Influence of the Tip Geometry on the AFM image (tip/sample convolution)




***always be aware of the effects caused by:***
***any surface features sharper than the tip***
***any surface features with high "slopes"***

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## Samples for AFM Imaging

- **Sample dimensions:**
  maximum diameter : 12 mm
  maximum thickness : 5 mm (this is "flexible")
  maximum peak to peak height : 5 µm ( !! )
- **Sample preparation:**
  conductive and nonconductive samples
  surface cleaning sometimes necessary (no vacuum)
- **Scan size:** 10 nm - 150 µm (on Nanoscope III)
- **Environments:**
  air and liquids
- **Resolution** typically in the subnanometer range but depends also on:
  scan size → Image Data 512*512 pixels maximum
  tip shape & sharpness → see tip artifacts
  piezo-crystal artifacts