Dual-axis Probe for Friction Force Microscopy

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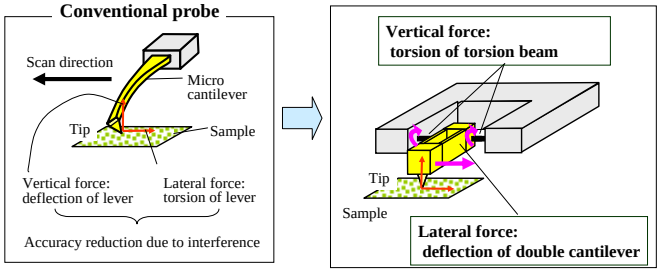
1. Friction Force Microscope (FFM)

- **About FFM** : A kind of scanning probe microscope
  Visualization method of friction properties on a nano scale
  Standard equipment in commercial atomic force microscope (AFM)
- **Application** : Measurement of micro/nano tribological properties
  (friction, lubrication, wear)
  Identification of constitutive materials using friction properties

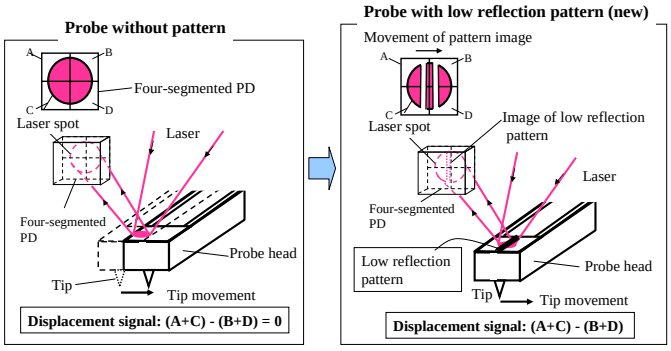
2. Improvement accuracy of FFM

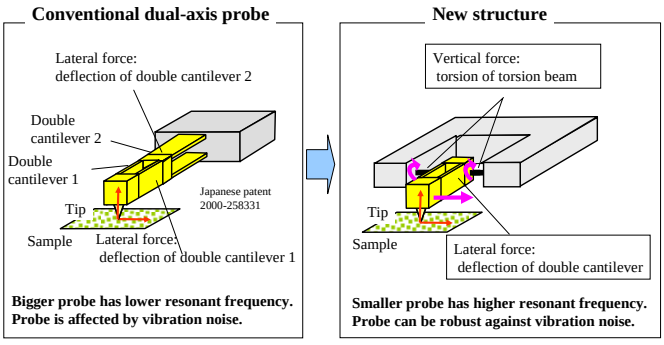
- **Problem: Mechanical interference reduces the accuracy of FFM**
- **Solution: Different parts independently respond to lateral and vertical forces => Dual-axis probe**



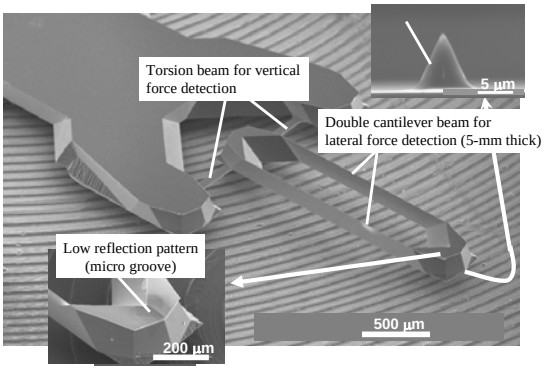
- **Point 1:**
  Detection of lateral displacement of probe
  => Movement of low reflection pattern on probe

- **Point 2:**
  Improvement of robustness against vibration noise => Small size





3. Fabricated prove

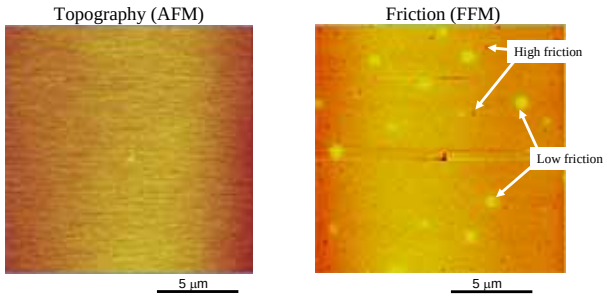


Fabricated using anisotropic etching suitable for mass production

4. Results of simultaneous AFM/FFM

Probe installed in commercial AFM (Nanoscope IV, Veeco) can provide highly accurate and resolved FFM images.

AFM/FFM images of 3-nm thick liquid lubricant on Si-wafer



5. Patent status & Patent owner contact

- **Patent license is available.**
  Patent No. : WO2007/094365
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