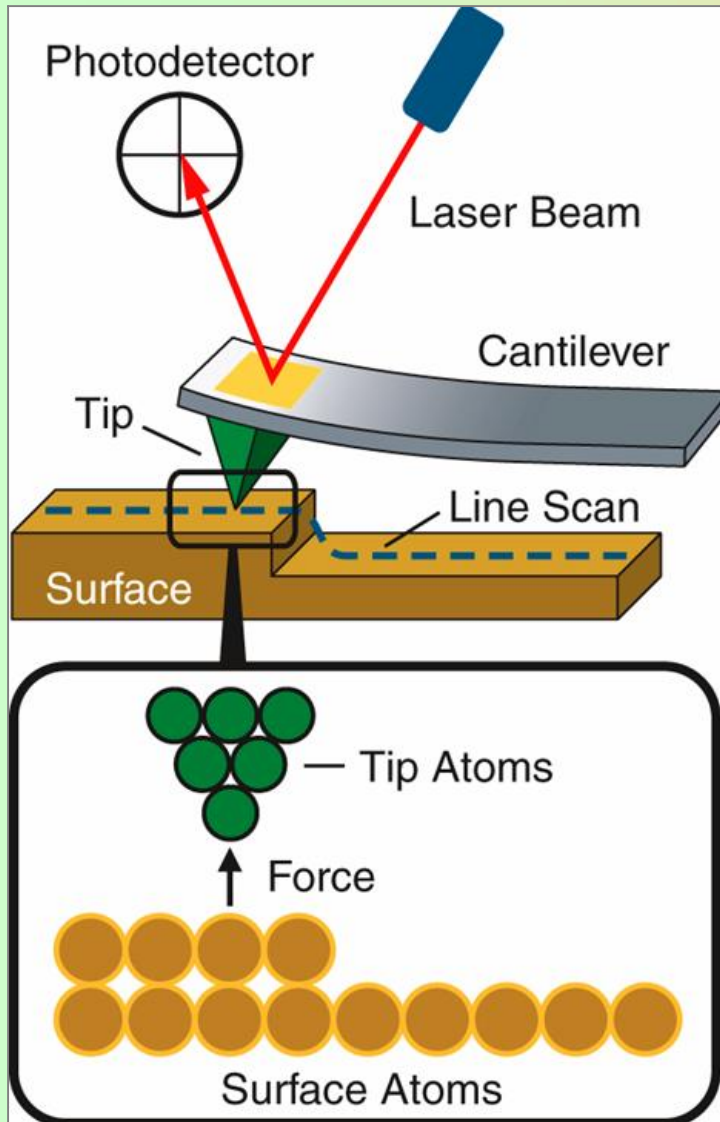


# Atomic Force Microscope (AFM)

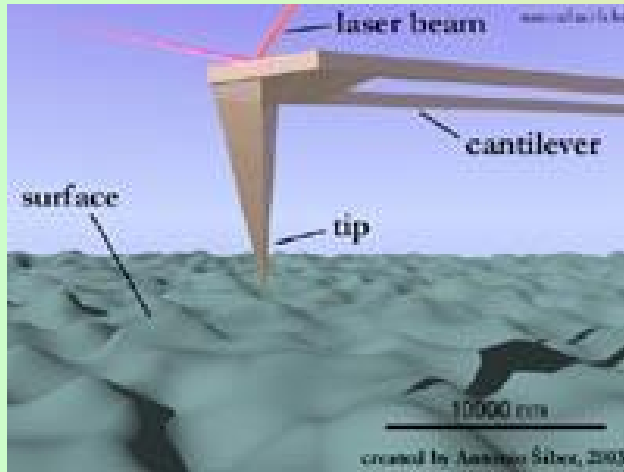


## Introduction

The AFM is one of the foremost tools for imaging, measuring and manipulating matter at the nanoscale. The information is gathered by "feeling" the surface with a mechanical probe.

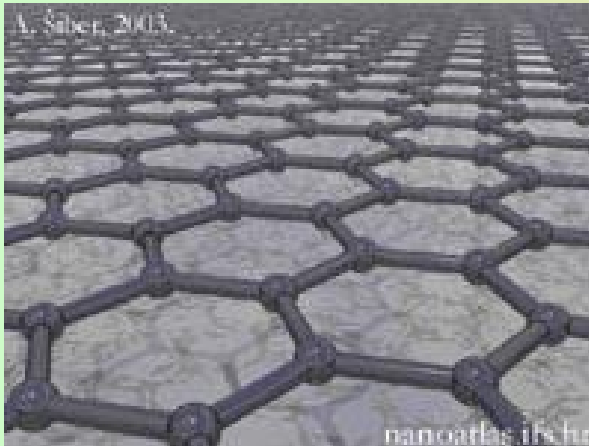
Piezoelectric elements that facilitate tiny but accurate and precise movements on (electronic) command enable the very precise scanning.

# Atomic Force Microscope (AFM)



A schematic 3D description of an atomic force microscope (AFM).

[http://www.nanotech-now.com/images/Art\\_Gallery/AS-AFM-sm.jpg](http://www.nanotech-now.com/images/Art_Gallery/AS-AFM-sm.jpg)



Atomic structure of graphene, a planar structure in graphite.

[http://www.nanotech-now.com/images/Art\\_Gallery/AS-graphene-sm.jpg](http://www.nanotech-now.com/images/Art_Gallery/AS-graphene-sm.jpg)

## Basic Principle

The AFM consists of a microscale cantilever with a sharp tip (probe) at its end that is used to scan the specimen surface.

When the tip is brought into proximity of a sample surface, forces between the tip and the sample lead to a deflection of the cantilever.

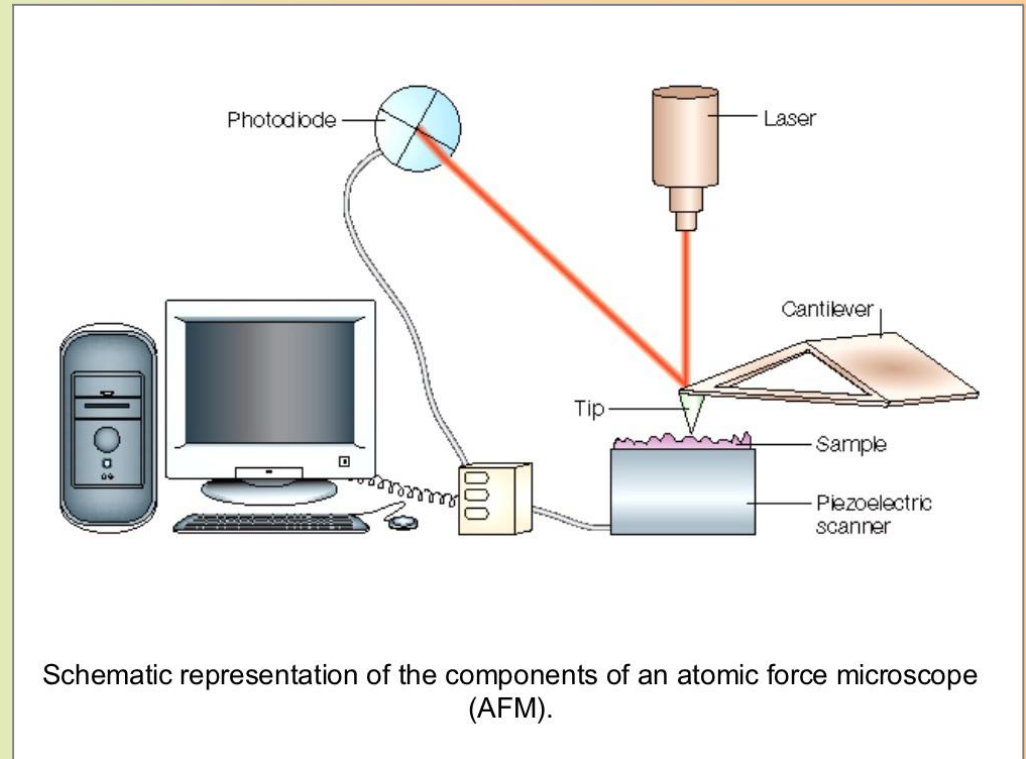
Typically, the deflection is measured using a laser spot reflected from the top surface of the cantilever.

# Atomic Force Microscope (AFM)



**MFP-3D AFM Microscope from Asylum Research mounted on Inverted Optical Microscope from Olympus.**

[http://www.unmc.edu/media/pharmacy/nanoimaging/asylum1\\_small.jpg](http://www.unmc.edu/media/pharmacy/nanoimaging/asylum1_small.jpg)



Schematic representation of the components of an atomic force microscope (AFM).

[http://www.geobacter.org/research/nanowires/images/jpg/AFM\\_diagram.jpg](http://www.geobacter.org/research/nanowires/images/jpg/AFM_diagram.jpg)