NEMS and Nanofabrication

SCOPE

Research on nanomechanical and nanoelectronic structures and devices applicable in miniaturized integrated systems: nanofabrication technologies, advanced AFM methods and functional properties.

NEMS

Nanomechanical resonators

Silicon nanowires present outstanding properties as mechanical resonators. We have developed processes to fabricate top-down and bottom-up nanowires, and methods to monolithically integrate nanomechanical resonators in CMOS circuits.

Nanomechanical sensing

Mechanical structures and devices at nanometer scale present enhanced performance as functional sensors. Transduction of the mechanical signal into electrical signal requires smart nanosystem designs.

AFM

AFM nanolithography

Carbon nanotubes

Silicon nanowires

FIB based fabrication

Top-down nanofabrication

We develop novel methods based on emerging nanolithographies to fabricate nanometer scale structures and devices of interest for integrated micro/nano systems.

Bottom-up nanofabrication

Bottom-up fabrication is based on using nano-objects as building blocks for fabricating devices and systems, surpassing the limitations of top-down lithography.

Directed self assembly (DSA)

Carbon nanotubes

Silicon nanowires

Atomic Force Microscopy

Advanced AFM characterization of nanometer scale devices

Multifrequency AFM to detect the eigen-modes of carbon nanotube mechanical resonators

Electromechanical AFM characterization at wafer-scale level

Polymeric AFM probes

Carbon nanotubes

Silicon nanowires

AFM Cantilevers with (insulated) conducting tips

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