

Nanoscopy Laboratory



FEI TITAN : Monochromated Probe
Cs Corrected TEM

Main Tool

FEI TITAN microscope:

Operating modes: TEM (Parallel Illumination), STEM (Convergent illumination)

Operating voltages: 300kV, 200kV and 80kV

Type of source: FEG (cold emission)

Special features:

Monochromator, Condenser lens Cs corrector, High Angle Annular Dark Field Detector, Gatan Image Filter

Resolution limit: Spatial 0.8 Å Spectral 0.18 eV

CURRENT MEMBERS:

Dr. Somnath Bhattacharyya,
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PhD positions available: 2

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Welcome to Nanoscopy lab

Laws of nature chain every piece of information starting from subatomic to the structure of the whole universe. The soul of science is to find out this logical chain. Following this simple logic we also try to find out the relation between structure and chemistry of materials at atomic scale with physical properties. The goal of our work is focused on proper interpretation of whatever we see because deconvolution of original information is at the heart of every research stream. In short, we not only believe in improving the experimental methods but also put same amount of effort to understand proper interpretation of the results.

Research

1. Studying materials at atomic scale:

We work on a broad range of materials like superconductors, magnetic, semiconductors, nanostructured materials, ceramics, artificial bones, different alloy systems as well as on bio materials.

Few ongoing projects are like imaging magnetic flux distribution within different atomic columns at interfaces of multilayer stack using inline holography, determining composition variation within single atomic column using HAADF STEM imaging, Studying phase transition and diffusion related phenomena of nanomaterials at different temperatures using in-situ in TEM techniques etc.

2. Studying nano-bio interaction :

Recently we have started studying the interaction of colloidal nanoparticles with biological cells for biomedical application where the aim is to do time resolved study of nano particles behavior and the change in chemistry around them within living cell (in vivo) at a spatial resolution of nanometer regime using electron probe.

Example of one recent project: Random Nb vacancy at different atomic columns in NbN Thin film

<http://www.nature.com/srep/2013/131017/srep02979/pdf/srep02979.pdf>

