Master Degree: Department of Physics (Center of Advance Study)

Banaras Hindu University

PhD: Indian Institute of technology Kanpur

Postdoc 1: Department of Chemical Science

Tata Institute of Fundamental Research Mumbai

Postdoc 2: Department of Physics of Complex Systems

Weizmann Institute of Science

Rehovot Israel.

International Visit: 1. Universite Joseph Fourier

Cargese, Corsica Island France

2. EPFL | École Polytechnique Fédérale de Lausanne

Switzerland .

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Teaching Experience : 10 year

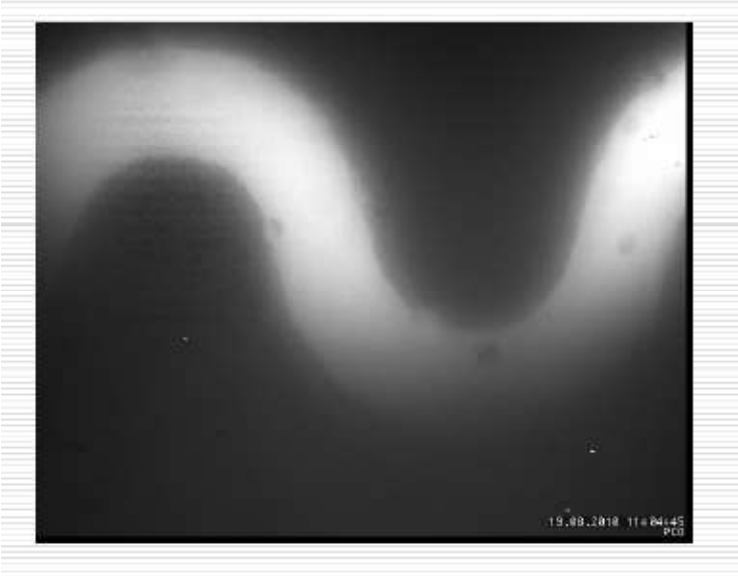
Post PhD Research experience : 14 years

Current Are of Research.

1. Biophysics and Micro fluidics:

Development of micro fluidic device has opened a new window for study of behavior /confirmation bio molecules in complex flow. We have developed a micro fluidic device

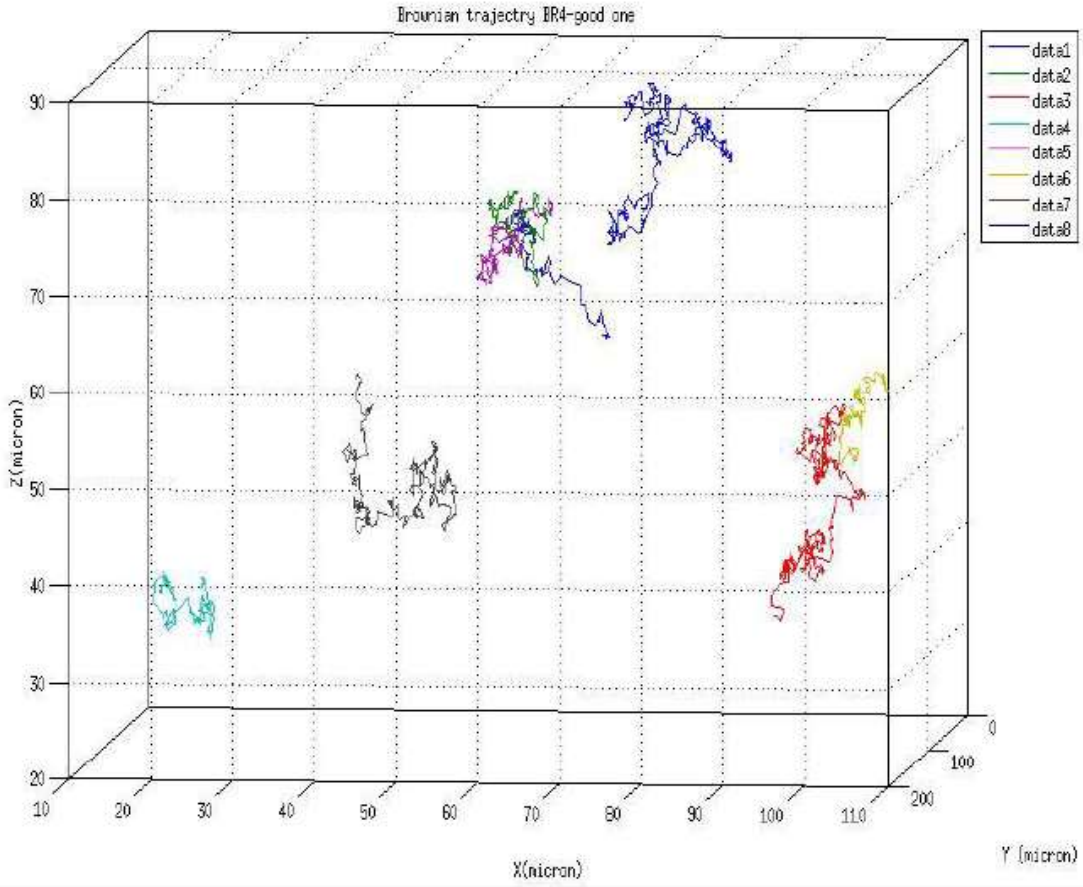
of dimension 50 micron to study the dynamics of Red Blood Cells, Vesicles and Single DNA molecule. Device look like this.



2. Development of Three dimensional Optical Microscope

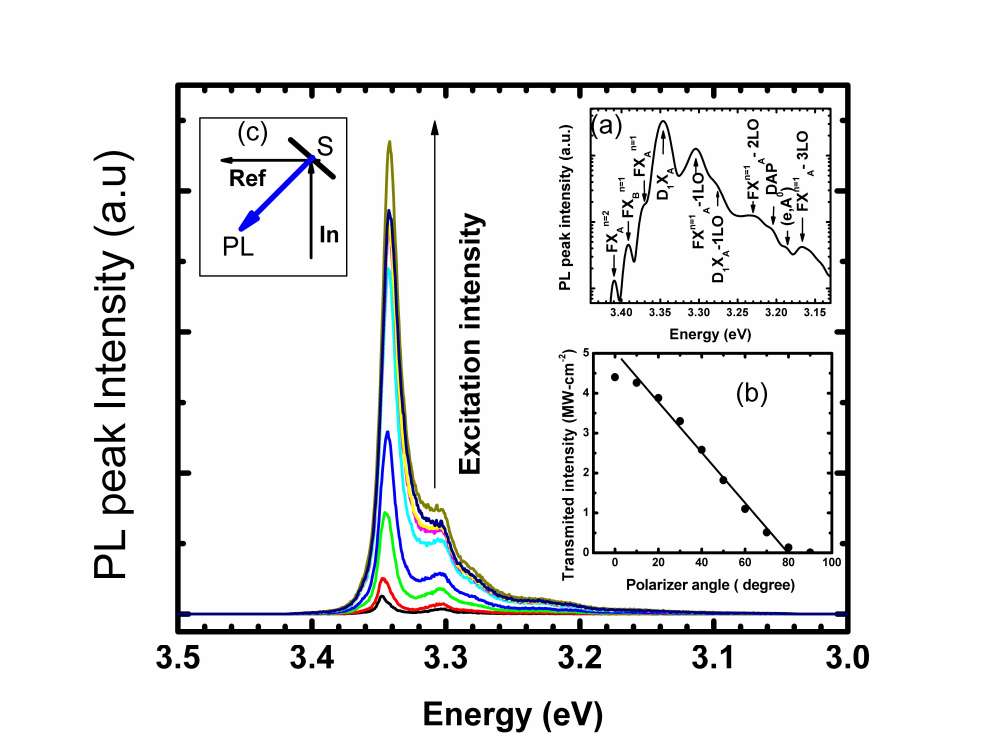
In continuation of our first project. We realize that when you use any optical detection device (optical cameras like CCD, ICCD) for imaging, your lost sense of depth and you ended into two dimensional view only or at least into view of focal depth. In order to break this constrain we had developed a three dimensional optical microscope based on Mie-scattering to record motion of particle (~ 1 micron size) in 3 dimension. Till now we were able to follow the (x,y,z,t) co-ordinate of any particle in range of 50-100 micron . This tool is very useful to study the flow property of any fluid (Newtonian/Non Newtonian) via Lagrangian approach.

My special interest is to Study Elastic Turbulence in Lagrangian approach. i.e. performing velocity measurements at locations moving with the flow along the 3D Lagrangian trajectories . First result of this development e.g 3D Brownian motion trajectory is shown below.



3- Optical Properties of Wide band gap Semiconductors.

Our third project is to study the "Exciton dynamics in wide band gap semiconductors like ZnO and GaN" because of its use and hidden science behind it. For example span of ZnO lye in the range of sunscreen lotion,talcum powder to piezoelectric transducers and phosphors. The band gap structure and optical properties of ZnO are quite similar to GaN, however, it has advantage over GaN in terms of strong binding energy of excitons e.g. 60 meV compared to 25 meV (GaN). High binding energy of exciton makes it potential candidate for optoelectronic devices and ultra violet LEDs . The dynamics of EXCITOS with temperature or excitation intensity can be understood by this figure



Further. More details of research works can be found at following links.

Important publications:

- Origin of polychromatic emission and defect distribution within annealed ZnO nanoparticles

  N Kondal, SK Tiwari

  Materials Research Bulletin 88, 156-165

- Selectively enhanced oxygen vacancies in undoped polycrystalline ZnO as a consequence of Multi-Step Sintering

  N Kondal, SK Tiwari

  Ceramics International 43 (13), 10347-10352

- Defect related photoluminescence and EPR study of sintered polycrystalline ZnO

  SK Tiwari

arXiv preprint arXiv:1202.6335

Thermal and temporal evolution of microstructure in polycrystalline ZnO

N Kondal, SK Tiwari

AIP Conference Proceedings 1728 (1), 020369

Zero-field magnetic resonance of cobalt ion pairs in ZnO nanocrystals

D Marin, SK Tiwari, S Bertaina, A Savoyant

Physical Review B 105 (3), 035424

Study of amplified emission in polycrystalline ZnO below characteristic temperature

SK Tiwari

arXiv preprint arXiv:1202.6338

Low temperature photoluminescence study of polycrystalline ZnO

SK Tiwari

arXiv preprint arXiv:1202.6248