Curriculum Vitae

Personal details

Name: Bharat Kumar

Designation: Assistant Professor, Central University of Karnataka

Address: School of Physical Sciences,
Central University of Karnataka,
Kadaganchi, Kalaburagi.

Email: bharat@cuk.ac.in

Education

- PhD. in Physical Sciences (2010), Raman Research Institute, Bangalore, India (affiliated to Jawaharlal Nehru University, New Delhi, India).
- Master of Science (Physics) [specialization in Materials Science] (2004), Gulbarga University, Kalaburagi, India (**4**th rank, First Class).
- Bachelor of Science [Physics, Chemistry & Mathematics] (2002), Laxmi Venkatesh Desai College, Raichur, affiliated to Gulbarga University, India.

Research Experience

From January 2014: Assistant Professor, School of Physical Sciences, Central University of Karnataka.

August 2013 - January 2014: DST-INSPIRE Faculty, Department of Chemical Engineering, Indian Institute of Technology Kanpur.

August 2010 – July 2013: Post-doctoral Research Associate, Department of Physics and Astronomy, University of South Carolina, Columbia, SC, USA.

August 2006 – July 2010: Senior Research Fellow, Soft Condensed Matter Group, Raman Research Institute.

July 2004 - July 2006: Junior Research Fellow, Soft Condensed Matter Group, Raman Research Institute.

Teaching Experience

Since January 2014: Assistant professor at School of Physical Sciences, Central University of Karnataka (CUK).

Sponsored Projects

Period	Sponsoring Organization	Title of Project	Grant
Five years	Department of Science and Technology, Govt. of India	Electrical interactions between antimicrobial peptides and supported lipid bilayers	Rs. 35 Lakh
Three Years	Department of Science and Technology, Govt. of India	Electrical properties of amyloid peptides and their interaction with biomembranes	Rs. 45.1 Lakh

List of Publications

1. "Novel mesogenic azobenzene dimer at air-water and air-solid interfaces"
   Bharat Kumar, A K Prajapati, M C Varia and K A Suresh; *Langmuir* **25**, 839 (2009).

2. "Kinetics of *trans – cis* isomerization in the azobenzene dimers at air-water interface"
   Bharat Kumar and K. A. Suresh; *Phys. Rev. E* **80**, 021601 (2009).

3. "Stress-strain relation in the collapse of Langmuir monolayer of a dimer of disc shaped moiety"
   Bharat Kumar, K A Suresh, S. K. Gupta and Sandeep Kumar; *J. Chem. Phys.* **133**, 044701 (2010).

4. "Dielectric constants by multifrequency non-contact atomic force microscopy"
   Bharat Kumar, Joseph C. Bonvallet and Scott R. Crittenden; *Nanotechnology* **23**, 025707 (2012).

5. "Spreading and retraction dynamics of a dye doped smectic liquid crystal domain at the air–water interface"
   Viswanath P., Suresh K. A. and **Bharat Kumar**; *Soft Matter* **8**, 11180 (2012).

6. "Stern potential and Debye length measurements in dilute ionic solutions with electrostatic force microscopy"
   Bharat Kumar and Scott R. Crittenden; *Nanotechnology* **24**, 435701 (2013).

7. "Synthesis and Characterization of Novel Azobenzene-based Mesogens and their organization at Air-Water and Air-solid Interfaces"
   Santanu Kumar Pal, Monika Gupta, Nishtha Agarwal, Ashima Arora, Sandeep Kumar, **Bharat Kumar,** and Goutam Sheet; *RSC Advances* **4**, 41371 (2014)

8. "Nanoscale dielectric measurements from electrostatic force microscopy"
   Bharat Kumar and Scott R. Crittenden; *Mod. Phys. Lett. B*, **28**, 1430011 (2014).

9. "Charge transport in liquid crystalline triphenylene polymer monolayer at air-solid interface"
   H. N. Gayathri, **Bharat Kumar**, K. A. Suresh, H. K. Bisoyi and Sandeep Kumar; *Phys. Chem. Chem. Phys.*, **18,** 12101-12107 (2016)

10. "Kinetics of interaction between antimicrobial peptide nisin and Langmuir monolayers of DPPC and DPPG molecules" Imranpasha and **Bharat Kumar**; *Phys. Rev. E*, **100**, 032404 (2019)

Statement of Research Interests

Organic molecules became very popular as novel electrical materials with applications varying from thin-film devices to molecular electronics and nanotechnology because of low cost synthesis and properties like self-assembly. The studies on electrical and mechanical properties of thin films of organic molecules also find its importance in understanding various phenomena occurring in nature. The properties of thin films of organic molecules are predominantly controlled by the molecular structure, intrinsic molecular dipole moment, charge distribution at the interface, and intermolecular forces (van der Waals forces). My research so far has focused on the mechanical and electrical properties of thin films of organic molecules including liquid crystal films formed by self-assembly of molecules at air-water and air-solid interfaces.

Currently our research activities are focused to understand the electrical interactions between polyelectrolytes and charged soft surfaces. In particular, we are investigating the electrical interactions between charged proteins/peptides/amino acids and lipid membranes.