

Curriculum Vitae

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Education

2014–2020 **Ph.D., Physics (Soft matter)**, Department of Physics, Indian Institute of Science Education and Research Bhopal, India

Thesis Title: Understanding the dynamics of diffusiophoretically moving vesicle and colloids using computer simulations

Thesis supervisor: Dr. Snigdha Thakur

2010–2012 **M.Sc., Physics**, Department of Physics, Soban Singh Jeena Campus, Almora, Kumaun University Nainital, Uttarakhand, India.

2008–2010 **B.Sc., Physics, Chemistry, Mathematics**, L.S.M. Govt. Post Graduate College Pithoragarh, Kumaun University, Nainital, Uttarakhand, India.

Awards and fellowships

- [1] Awarded with merit scholarship by the Uttaranchal Board of Secondary Education in 10th.
- [2] Awarded with JEST-2014.
- [3] Doctor of Philosophy- July 2020 (Indian Institute of Science Education and Research Bhopal, India)
- [4] Postdoctoral fellowship, Skolkovo Institute of Science and Technology (Skoltech), Moscow, Russia

Research Interests

- [1] Studying the autonomous propulsion of deformable active vesicle.
- [2] Active vesicle under the influence of the external flow field; like the shear flow and poiseuille flow.
- [3] How an active vesicle behaves in viscosity varying environment.
- [4] How does the interplay of positive and negative chemotaxis influence the propulsion mechanism of an chemically active vesicle.
- [5] Chemotactic response of an inert colloid in the presence of an active colloid.
- [6] Self-assembly and formation of dynamical motors as a consequence of symmetry breaking.
- [7] Find the best strategy of target search for the biological systems.
- [8] Influence of a viscoelastic medium in the movement of an active vesicle.
- [9] How does the channel flow created by the different channel lengths change the dynamics of a deformable object?

Technical skills

- [1] **Operating System:** Linux, Windows
- [2] **Languages known:** Fortran, Shell Scripts
- [3] **Tools:** Latex, Mathematica, Gnuplot
- [4] **Software:** Visual Molecular Dynamics (VMD), Javaview, Paraview

Conferences attended

- [1] **Compflu-2017**, Indian Institute of Technology Madaras, India (18-20 December 2017)
- [2] **SMYIM-2018**, Koti resorts, Shimla, India (23-25 May 2018)
- [3] **Designer Soft Matter 2018**, Nanyang Technological University, Singapore (06-08 June 2018)
- [4] **Compflu-2019**, Indian Institute of Science Education and Research Bhopal, India (05-07 December 2019)

Presentations/Talks

- [1] Poster presentation on "**Propulsion of an chemically active vesicle**" in in-house symposium at IISER Bhopal, India (2015).

- [2] Talk on "**Active membrane**" in Departmental research scholar group at IISER Bhopal, India (2015).
- [3] Talk on "**Chemotactic response of an inert particle in the presence of an active particle**" in Departmental in-house symposium at IISER Bhopal (2017).
- [4] Talk on "**Theory of Diffusiophoretic phenomena**" in Departmental research scholar group at IISER Bhopal, India (2017).
- [5] Poster presentation on "**Run and tumble dynamics of an active vesicle**" in Comp-Flu-2017, IIT Madaras, India (2017).
- [6] Talk on "**Capture of a fixed and moving target by an inert particle by diffusiophoresis mechanism**" in Departmental research scholar group at IISER Bhopal, India (2018).
- [7] Poster presentation on "**Diffusiophoretically induced interactions between chemically active and inert particles**" in Designer Soft Matter 2018, Nanyang Technological University, Singapore (2018).
- [8] Poster presentation on "**Chemical micromotors self-assemble and self-propel by spontaneous symmetry breaking**" in SMYIM-2018, koti resorts, Shimla, India (2018)
- [9] Poster presentation on "**Diffusiophoretically induced interactions between chemically active and inert particles**" in departmental in-house symposium at IISER Bhopal, India (2018)
- [10] Poster presentation on "**Dynamics of diffusiophoretic vesicle under external shear flow**" in Comp-Flu-2019, IISER Bhopal, India (2019)
- [11] Talk on "**Dynamics of diffusiophoretic vesicle under external shear flow**" in departmental in-house symposium at IISER Bhopal, India (2020))
- [12] Talk on "**Active vesicle propulsion; with and without external stimuli**" in CDISE-CDMM seminar at Skolkovo Institute of Science and Technology (Skoltech) Moscow, Russia (2021))

Publications

- [1] Diffusiophoretically induced interactions between chemically active and inert particles. *Soft Matter*, 14, 6043, 2018 (<https://pubs.rsc.org/en/content/articlepdf/2018/sm/c8sm01102h>)
- [2] Chemical micromotors self-assemble and self-propel by spontaneous symmetry breaking. *Chem. Commun.*, 54, 11933, 2018 (<https://pubs.rsc.org/en/content/articlepdf/2018/cc/c8cc06467a>)
- [3] Dynamics of diffusiophoretic vesicle under external shear flow. *J. Chem. Phys.* 151, 000000, 2019 (<https://aip.scitation.org/doi/full/10.1063/1.5112808>)
- [4] Colloidal chemotaxis and a biased random walk model with finite mean first passage time *EPL*, 128, 20001, 2019 (<https://iopscience.iop.org/article/10.1209/0295-5075/128/20001>)

- [5] Formation of self-propelling clusters starting from randomly dispersed Brownian particles. Bulletin of Materials Science 43, 183, 2020 (<https://link.springer.com/article/10.1007/s12034-020-02108-4>)
- [6] Effect of Poiseuille flow on the dynamics of active vesicle (Under review)

Teaching Assistant

- [1] Teaching assistant for ‘Quantum Physics’, ‘Thermal Physics’, ‘Basic Electronics’, ‘Numerical Methods’, ‘General Physics Laboratory-I’, ‘General Physics Laboratory-III’, for UG courses at IISER Bhopal.
- [2] Teaching assistant for ‘Computational Physics’, for PG course at IISER Bhopal.
- [3] Mentored two students during their MS project at IISER Bhopal.

Activities

- N.S.S. member 2005-2006.
- Student Volunteer, INSA Meeting 2016.
- Student Travel Volunteer, Vijyoshi 2018.
- A member in organizing committee of comp-Flu-2019.

References

- [1] Dr. Snigdha Thakur
Associate Professor, Indian Institute of Science Education and Research Bhopal, India.
Phone : +91 755 269 1223
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- [2] Dr. Auditya Sharma
Assistant Professor, Indian Institute of Science Education and Research Bhopal, India.
Phone : +91 755 269 1227
Email : auditya@iiserb.ac.in
- [3] Dr. Vladimir Palyulin
Assistant Professor, Skolkovo Institute of Science and Technology (Skoltech), Center for Computational and Data-Intensive Science and Engineering
Moscow, Russia
Email: V.Palyulin@skoltech.ru

Declaration

I hereby declare that the information furnished above is true to the best of my knowledge.

Prabha Chuphal

April 5, 2021