

List of Publications:

Journal Publication

1. S. Majhi, S. Bhattacharyya, and T. Baier: Electrophoresis of droplets laden with insoluble ionic surfactants incorporating correlations among finite-sized ions. **Journal of Fluid Mechanics** (2025) (accepted for publication).
2. B. Mondal and S. Bhattacharyya: Effects of electrostatic correlations and ion–solvent interactions of finite-sized ions on the electrophoresis of a soft particle. **Journal of Fluid Mechanics** 1006 (2025), A9.
3. S. Paik, S. Bhattacharyya and B. Weigand : Effects of thermoosmosis and thermophoresis of finite-sized ions along with a pressure-driven flow on the thermoelectric field in a conical hydrophobic nanopore. **International Journal of Heat and Mass Transfer** 241 (2025), 126758.
4. S. Paik, S. Bhattacharyya, and S. Majhi: Nonlinear electrophoresis of a highly charged particle by incorporating electrostatic correlations and ion steric interactions for a finite Debye length. **Journal of Fluid Mechanics** 1000 (2024), A71.
5. N. Barick and S. Bhattacharyya: Sedimentation of a charged hydrophobic colloid with physisorbed surface charge and similarity with a charged droplet. **Physics of Fluids** 37, 082017 (2025).
6. S. Sahu, B. Mondal and S. Bhattacharyya: Ion steric interactions and electrostatic correlations on electroosmotic flow in charged nanopores with multivalent electrolytes. **Physical Review Fluids** 9, 074201 (2024).
7. D. Pandey, S. Bhattacharyya and S. Hardt: Net flow of charge-asymmetric electrolytes through uncharged channels and over uncharged spheres due to direct-current electroosmosis. **Journal of Fluid Mechanics** 997 (2024), A28.
8. S. Majhi, S. Bhattacharyya and P.P. Gopmandal: Impact of laterally mobile surface charge on diffusiophoresis of hydrophobic rigid colloids. **Journal of Fluid Mechanics** 997 (2024), A8.
9. S. Majhi and S. Bhattacharyya: Finite ion size effects on electrophoresis of a dielectric surfactant-laden droplet in a non-dilute electrolyte. **Applied Mathematical Modelling** 132 (2024) 384–401.
10. S. Majhi, S. Bhattacharyya and P.P. Gopmandal: Effect of the surface charge-dependent boundary slip on the electrophoresis of a hydrophobic polarizable rigid colloid. **Langmuir** 40 (2024), 3725–3737.
11. B. Mondal and S. Bhattacharyya: Diffusiophoresis of charge-regulated nanoparticles comprising finite ion size and electrostatic correlation effects. **Physics of Fluids** 36, 022022 (2024).
12. B. Bhaskar and S. Bhattacharyya: Diffusiophoresis of a highly charged rigid colloid in a hydrogel incorporating ion steric interactions. **Physics of Fluids** 35, 102023 (2023).
13. S. Majhi and S. Bhattacharyya: A simplified model for the impact of dielectric polarization of a charged droplet on its diffusiophoresis. **Physics of Fluids** 35, 032018 (2023).
14. S. Sahu, B. Mandal and S. Bhattacharyya: A numerical study supplemented with theoretical analysis on streaming potential in a soft nanochannel influenced by ion partitioning and mobile surface charge-dependent wall slip. **Physics of Fluids** 35, 122021 (2023).
15. B. Bhaskar and S. Bhattacharyya: Numerical model supplemented by thin-layer analysis for diffusiophoresis of a particle incorporating finite ion size effects. **Physics of Fluids** 35, 062012 (2023).
16. B. Mondal, S. Bhattacharyya, S. Majhi and H. Ohshima: Diffusiophoresis of a soft particle incorporating ion partitioning and hydrophobic core. **Physics of Fluids** 35, 062017 (2023).
17. B. Bhaskar and S. Bhattacharyya: Numerical study supplemented with simplified model on electrophoresis of a hydrophobic colloid incorporating finite ion size effects and ion-solvent interactions. **Electrophoresis** 44 (2023), 403–416.
18. S. Majhi and S. Bhattacharyya: Diffusiophoresis of a charged droplet in asymmetric as well as mixed electrolytes through numerical and semi-analytic models. **Langmuir** 39 (2023), 7831–7845.

19. A. D. Ratschow, D. Pandey, B. Liebchen, S. Bhattacharyya, and S. Hardt: Resonant Nanopumps: ac Gate Voltages in Conical Nanopores Induce Directed Electrolyte Flow. **Physical Review Letters** 129 (2022), 264501. (highlighted with a Synopsis in Physics Magazine <https://physics.aps.org/articles/v15/s174>)
20. D. Pandey and S. Bhattacharyya: Effects of membrane polarization, steric repulsion and ion-solvent interactions on electroosmosis through a conical nanopore. **Applied Mathematical Modelling** 111 (2022), 471–485.
21. D. Kundu, S. Bhattacharyya and P. P. Gopmandal: Ion partitioning and ion size effects on streaming field and energy conversion efficiency in a soft nanochannel. **Colloid and Polymer Science** 300 (2022), 1049–1062.
22. S. Bhattacharyya and D. Kundu: Enhanced electroosmotic flow, conductance and ion selectivity of a viscoplastic fluid in a hydrophobic cylindrical pore. **Applied Mathematical Modelling** 111 (2022), 802–817.
23. S. Dutta, S. Bhattacharyya and I. Pop: Effect of hybrid nanoparticles on conjugate mixed convection of a viscoplastic fluid in a ventilated enclosure with wall mounted heated block. **Alexandria Engineering Journal** 62 (2022), 99–111.
24. S. Majhi and S. Bhattacharyya: Numerical Study on Diffusiophoresis of a Hydrophobic Nanoparticle in a Monovalent or Multivalent electrolyte. **Colloids and Surfaces A: Physicochemical and Engineering Aspects** 648 (2022), 129272.
25. S. S. Barman and S. Bhattacharyya: Finite ion size and ion permittivity effects on gel electrophoresis of a soft particle. **Colloids and Surfaces A: Physicochemical and Engineering Aspects** 636 (2022), 128088.
26. S. Dutta, S. Bhattacharyya and I. Pop: Heat transfer enhancement compared to entropy generation by imposing magnetic field and hybrid nanoparticles in mixed convection of a Bingham plastic fluid in a ventilated enclosure. **International Journal of Numerical Methods for Heat & Fluid Flow** 32 (2022), 3007–3038.
27. A. Haque, A. Nayak and S. Bhattacharyya: Numerical Study on Ion Transport and Electro-Convective Mixing of Power-law Fluid in a Heterogeneous Micro-Constrained Channel. **Physics of Fluids** 33 (2021), 122014.
28. S. S. Barman and S. Bhattacharyya: Finite ion size and ion permittivity effects on gel electrophoresis of a soft particle. **Colloids and Surfaces A: Physicochemical and Engineering Aspects** 636 (2022), 128088.
29. D. Pandey and S. Bhattacharyya: Influence of finite ion size and dielectric decrement on the ion current rectification in a single conical nanopore. **Physics of Fluids** 33 (2021), 062006.
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31. P. S. Majee and S. Bhattacharyya: Impact of ion partitioning and double layer polarization on diffusiophoresis of a pH-regulated nanogel. **Meccanica** 56 (2021), 1989–2004.
32. P. Bharti, P. P. Gopmandal, S. Bhattacharyya and H. Ohshima: A simplified model for gel electrophoresis of a hydrophobic rigid colloid. **Soft Matter** 17 (2021), 5700–5710.
33. D. Pandey, S. Bhattacharyya and S. Ghosal: Charge selectivity of an ionic transistor. **Langmuir** 37 (2021), 4571–4577.
34. S. Dutta, S. Bhattacharyya and I. Pop: Two-phase model for mixed convection and flow enhancement of a nanofluid in an inclined channel patterned with heated slip stripes. **International Journal of Numerical Methods for Heat & Fluid Flow** 31 (2021), 3047–3070.
35. S. Barman, S. Bhattacharyya and P. Dutta: Electrokinetic actuation of an uncharged polarizable dielectric droplet in charged hydrogel medium. **Electrophoresis** 42 (2021), 920–931.
36. D. Pandey and S. Bhattacharyya: Impact of finite ion size, Born energy difference and dielectric decrement on the electroosmosis of multivalent ionic mixtures in a nanotube. **Colloids and Surfaces A: Physicochemical and Engineering Aspects** 610 (2021), 125905.
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40. S. Dutta, S. Bhattacharyya and I. Pop: Nonhomogeneous model for conjugate mixed convection of nanofluid and entropy generation in an enclosure in presence of inclined magnetic field with Joule heating. **International Journal of Numerical Methods for Heat & Fluid Flow** 31 (2021), 418–441.
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42. S. S. Barman and S. Bhattacharyya: Electrokinetic transport of a non-conducting liquid droplet in a poly-electrolyte medium. **Physics of Fluids** 32 (2020), 012011.
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45. S. Dutta, S. Bhattacharyya and I. Pop: Non-homogeneous model for the mixed convection of a nanofluid in a lid-driven inclined enclosure with discrete heat source. **ASME Journal of Heat Transfer** 142 (2020), 012505.
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99. A. K. Nayak and S. Bhattacharyya: Double-diffusive convection in a cubical lid-driven cavity with opposing temperature and concentration gradients. **Theoretical and Computational Fluid Dynamics** 26 (2012), 565–581.
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