# Articles

I have co-written more than ninety papers, with an h-index of 32 (according to google scholar database). An updated time–orderded list is available in my google scholar page. Here is a list organized by discipline following the PhySH classification of American Physical Society. Recently published paper and papers that are not yet peer–reviewed but available as preprints are marked.

# Physics of Living Systems

## Neuroscience

- Renormalization group analysis of noisy neural field.
  J. Zang, P. Helson, S. Liu, A. Kumar, and **D. Mitra**, arXiv preprint arXiv:2503.21605.

## Membranes

- Anomalous diffusion and effective shear modulus in a semi-solid membrane.
  V. Pandey and **D. Mitra**, arXiv preprint arXiv:2404.12211

- Force spectroscopy reveals membrane fluctuations and surface adhesion of extracellular nanovesicles impact their elastic behavior.
  F. Stridfeldt, et. al. including **D. Mitra** as co-corresponding author, *Proceedings of the National Academy of Sciences*, **122** (16), e2414174122, (2025).

- Estimate of entropy generation rate can spatiotemporally resolve the active nature of cell flickering.
  SK Manikandan, T Ghosh, T Mandal, A Biswas, B Sinha, and **D Mitra**, *Phys. Rev. Research.*, **6(2)** 023310 (2024).

- Formation of clathrin-pits and ATP-independent cholesterol-dependent tubules initiates mechano-regulation on de-adhesion.
  T Mandal, A Biswas, T Ghosh, S Manikandan, A Kundu, A Banerjee, **D. Mitra** and B. Sinha, *Cellular and molecular life sciences*, **81**, 43 (2024). bioRxiv 2023.05.31.543020

## Biological fluid dynamics

- Measuring red blood cell deformability and its heterogeneity using a fast microfluidic device.
  S Kumari, N Mehendale, T Roy, S Sen, **D Mitra**, and D Paul. *Cell Reports Physical Science*, (2024).

- A microfluidic device to sort capsules by deformability.
  L. Zhu, C. Rorai, **D. Mitra**, and L. Brandt, *Soft Matter*, **10**, 7705-7711 (2014) (arXiv:1402.6851)

# Statistical Physics and Thermodynamics

- Active buckling of pressurized spherical shells: Monte Carlo Simulation.
  V Agrawal, V Pandey, and **D Mitra**, *Phys. Rev. E. Letters*, **131(11)**, 114002 (2023) arXiv:2206.14172.

- Quantitative analysis of non–equilibrium systems from short–time experimental data.
  SK Manikandan, S Ghosh, A Kundu, B Das, V Agrawal, **D Mitra**, A. Banerjee and S Krishnamurthy, *Communications Physics* **4 (1)**, 1-10, (2021) (arXiv:2102.11374).

## Polymers and Soft Matter

- Flexible filament in time-periodic viscous flow: shape chaos and period three.
  V Agrawal and **D Mitra**, arXiv preprint arXiv:2210.04781.
- Intermittency in the not-so-smooth elastic turbulence.
  R.K. Singh, P. Perlekar, **D. Mitra**, and M.E. Rosti. *Nature Communications*, **15(1)**, 4070 (2024).
- Large is different: non-monotonic behaviour of elastic range scaling in polymeric turbulence at large Reynolds and Deborah numbers.
  M.E Rosti, P. Perlekar, and **D. Mitra**, *Science Advances,* 9 (11), eadd3831, (2023). (arXiv:2111.11224).
- Chaos and irreversibility of a flexible filament in periodically–driven Stokes flow.
  V. Agrawal and **D. Mitra**, *Physical Review E*, **106**, 025103, 2022, arXiv:2111.14638.
- Statistics of polymer extensions in turbulent channel flow
  F. Bagheri, **D. Mitra**, P. Perlekar and L. Brandt, *Phys. Rev. E* **86**, 056314 2012 (arXiv: 1011.3766).
- Direct numerical simulations of statistically steady, homogeneous, isotropic fluid turbulence with polymer additives.
  P. Perlekar, **D. Mitra** and R. Pandit. *Phys. Rev. E*, **82**, 066313 (2010), (arXiv:1008.0051)
- Manifestations of Drag Reduction by polymer additives in Decaying, Homogeneous, Isotropic Turbulence.
  P. Perlekar, **D. Mitra** and R. Pandit. *Phys. Rev. Lett.*, **97**, 264501 (2006). (arXiv:nlin/0609066)

## Applied Physics

### Machine Learning

- Forecasting Solar Cycle 25 with Physical Model-Validated Recurrent Neural Networks,
  A Espuña Fontcuberta, A Ghosh, S Chatterjee, **D Mitra**, D Nandy *Solar Physics* **298 (1)**, 1-19, (2023). ((arXiv:2005.12166)
- A Comparative Analysis of Machine Learning Models for Solar Flare Forecasting: Identifying High Performing Active Region Flare Indicators.
  S Sinha et al including **D Mitra**, *The Astrophysical Journal*, **935**, 45 (2022), arXiv:2204.05910.

- Role of response time of a Babcock-Leighton solar dynamo model in meridional flow-speed reconstruction by EnKF data assimilation.
  M. Dikpati, **D Mitra**, and J.L. Anderson *Advances in Space Research* **58 (8)**, 1589-1595, 2016).

- Data Assimilation in a Solar Dynamo Model Using Ensemble Kalman Filters: Sensitivity and Robustness in Reconstruction of Meridional Flow Speed.
  M. Dikpati, J.L. Anderson, and **D. Mitra**, *ApJ*, **828 (2)**, 91, 2016.

- Ensemble Kalman filter data assimilation in a Babcock-Leighton solar dynamo model: an observation system simulation experiment for reconstructing meridional flow-speed.
  M. Dikpati, J.L. Anderson, and **D. Mitra**, *Geophysical Research Letters*, **41**, 5361—5369, (2014); (arXiv:1408.5113).

### Numerical Techniques

- MeMC: A package for monte-carlo simulations of spherical shells. V Agrawal, V Pandey, H Kylhammar, A Dev, **D Mitra**, *Journal of Open Source Software*, **7(74)**, 4305, 2022, arXiv:2203.14551.

- The Pencil Code, a modular MPI code for partial differential equations and particles: multipurpose and multiuser-maintained.
  A. Brandenburg et al including **D. Mitra**, *Journal for Open Source Software* **6**, 2807 (2021), (arXiv:2009.08231).

## Gravitation, Cosmology & Astrophysics

### Planet formation

- Planetesimals on eccentric orbits erode rapidly.
  L Cedenblad, N Schaffer, A Johansen, B Mehlig, and **D Mitra** *The Astrophysical Journal*, **921** (2), 123 (2021). (arXiv:2011.14431)

- Erosion of planetesimals by gas flow
  N Schaffer, A Johansen, L Cedenblad, B Mehling, and **D Mitra** *A&A* **639**, A39 (2020). (arXiv:2005.07951).

- Can planetesimals form by collisional fusion ?
  **D. Mitra**, J. Wettlaufer, and A Brandenburg, *ApJ*, **773**, 120, (2013). (arXiv:1306.3672).

## Fluid Dynamics

### Drops and Bubbles

- Scale-by-scale energy transfers in bubbly flows.
  H. Narula, V. Pandey, **D. Mitra**, and P Perlekar. *Journal of Fluid Mechanics*, submitted; arXiv preprint arXiv:2506.07693.

- Coagulation drives turbulence in binary fluid mixtures.
  A. Bhatnagar, P. Perlekar, and **D. Mitra**. (arXiv:2109.09671)

- Kolmogorov turbulence co-exists with pseudo-turbulence in buoyancy-driven bubbly flows.
  V Pandey, **D Mitra**, and P Perlekar, *Phys. Rev. Lett.*, **108(3)**, L032601 (2023), arXiv:2204.04505.

- Turbulence modulation in buoyancy-driven bubbly flows.
  V Pandey, **D Mitra**, P Perlekar, *Journal of Fluid Mechanics*, **932**, A19, 2022 (arXiv:2105.04812)

### Geophysical Fluid Dynamics

- Interfacial waves in the presence of wind and current: an asymptotic study
  AF Bonfils, **D Mitra**, W Moon, JS Wettlaufer, *Journal of Fluid Mechanics*, **976**, A19 (2023) (arXiv:2211.02942).

- Asymptotic interpretation of the Miles mechanism of wind-wave instability.
  AF Bonfils, **D Mitra**, W Moon, JS Wettlaufer, *Journal of Fluid Mechanics*, **944**, A8, 2022, (arXiv:2107.06844)

### Compressible Flows

- Intermittency and non-universality of pair dispersion in isothermal compressible turbulence.
  S. De, **D Mitra**, and R. Pandit arXiv preprint arXiv:2504.17292.

- Uncovering the multifractality of Lagrangian pair dispersion in shock-dominated turbulence.
  S De, **D. Mitra** and R. Pandit, *Phys. Rev. Research. Letters*, **6**, L022032 (2024) arXiv:2311.06836.

- Dynamic multiscaling in stochastically forced Burgers turbulence.
  S De, **D Mitra**, and R Pandit, *Scientific Reports*, **13**, 7151 (2023). arXiv:2205.08969

### Porous media

- The breakdown of Darcy's law in a soft porous material.
  ME. Rosti, S. Pramanik, L. Brandt, and **D. Mitra**, *Soft Matter*, **16**, 939-944, 2020.(arXiv:1902.02505).

### Particle–laden flows

- Rate of formation of caustics in heavy particles advected by turbulence.
  A Bhatnagar, V Pandey, P Perlekar, and **D Mitra**, *Philosophical transactions of the royal society A*, **380 (2219)**, 20210086, (2022). (arXiv:2110.02568).

- Paths to caustic formation in turbulent aerosols.
  J Meibohm, V Pandey, A Bhatnagar, K Gustavsson, **D Mitra**, P Perlekar, and B Mehlig. *Physical Review Fluids* 6 (6), L062302 (2021)

- Clustering and energy spectra in two-dimensional dusty gas turbulence
  V. Pandey, **D. Mitra**, and P. Perlekar, *Phys. Rev. E*, **100** , 013114 , (2019). Selected as Editor's choice (arXiv:1902.05435).

- Relative velocities in bi-disperse turbulent aerosols: simulations and theory.
  A. Bhatnagar, K. Gustavsson, B. Mehlig, and **D. Mitra** *Phys. Rev. E.* 98, 063107 (2018). (arXiv:1809.10440)

- Topology of two-dimensional turbulent flows of dust and gas.
  **D. Mitra**, and P. Perlekar, *Phys. Rev. Fluid*, **3**, 044303, (2018).(arXiv:1711.03692).

- Heavy inertial particles in turbulent flows gain energy slowly but lose it rapidly.
  A. Bhatnagar, A. Gupta, **D. Mitra**, and R. Pandit, *Phys. Rev. E*, **97**(3), 033102, (2018). (arXiv:1711.06987).

- Statistics of the relative velocity of particles in turbulent flows: monodisperse particles.
  A. Bhatnagar, K. Gustavsson, and **D. Mitra**, *Phys. Rev. E.*, **97**(2), 023105, (2018). (arXiv:1710.04917).

- Turbophoresis in forced inhomogeneous turbulence, **D. Mitra**, N.E.L. Haugen, I Rogachevskii, *EPJ+*, **133** (2), 35, (2018). (arXiv:1603.00703).

- Deviation-angle and trajectory statistics for inertial particles in turbulence.
  A. Bhatnagar, A. Gupta, **D. Mitra**, P. Perlekar, M. Wilkinson, and R Pandit, *Phys. Rev. E* **94** (6), 063112 (2016).

- How long do particles spend in vortical regions in turbulent flows?
  A. Bhatnagar, A. Gupta, D. Mitra, R. Pandit, and P. Perlekar *Phys. Rev. E* 94 (5), 053119, (2016).

## Turbulence

- First-passage-time problem for tracers in turbulent flows applied to virus spreading.
  A.K. Verma, A. Bhatnagar, **D Mitra**, and R Pandit *Physical Review Research* **2** (3), 033239, 2020. (arXiv:2001.01260)

- Dynamics of Saturated Energy Condensation in Two-Dimensional Turbulence
  C-K. Chan, **D. Mitra**, A. Brandenburg, *Phys. Rev. E*, **85**, 036315 (2012). (arXiv: 1109.6937).

- Dynamic Multiscaling in Two-dimensional Fluid Turbulence.
  S. S. Ray, **D. Mitra**, P. Perlekar, R. Pandit, *Phys. Rev. Lett.*, **107**, 184503 (2011) (arXiv: 1105.5160).

- Persistence Problem in Two-Dimensional Fluid Turbulence.
  P. Perlekar, S. S. Ray, **D. Mitra**, and R. Pandit, *Phys. Rev. Lett*, **106**, 054501 (2011) (arXiv: 1009.1494).

- Numerical study of large-scale vorticity generation in shear-flow turbulence.
  P.J. Käpylä, **D. Mitra**, and A. Brandenburg, *Phys. Rev. E.*, **79**, 016302 (2009). (arXiv:0810.0833).

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  S.S. Ray, **D. Mitra**, and R. Pandit *New J. Phys.* **10**, 033003 (2008) (arXiv:0710.5678).

- Dynamic Multiscaling in Fluid Turbulence.
  R. Pandit, S.S. Ray and **D. Mitra**, *The European Physical Journal B* **64**, 463-469 (2008).(arXiv:0709.0893).

- Dynamics of Passive-Scalar Turbulence
  **D. Mitra** and R. Pandit, *Phys. Rev. Lett.*, **95**, 144501 (2005). (arXiv:nlin/0412013)

- Is multiscaling an artifact in the Stochastically Forced Burgers Equation ?
  **D. Mitra**, J. Bec, R. Pandit and U. Frisch. *Phys. Rev. Lett.*, **94**, 194501 (2005). (arXiv:nlin/0406049)

- Varieties of Dynamic Multiscaling in Fluid Turbulence.
  **D. Mitra** and R. Pandit. *Phys. Rev. Lett.* **93**, 024501 (2004). (arXiv:nlin/0309037)

- Statistics of active versus passive advections in magnetohydrodynamic turbulence. T. Gilbert and **D. Mitra** *Phys. Rev. E* **69**, 057301 (2004). (arXiv:nlin/0403017).

## Reacting flows

- The effect of turbulence on mass transfer rates of small inertial particles with surface reactions.
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- The effect of turbulent clustering on particle reactivity.
  J. Kruger, N.E.L. Haugen, **D. Mitra**, and T Lovas, *Proceedings of the Combustion Institute* **36 (2)**, 2333-2340, 2017.

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- Rheology of suspensions of viscoelastic spheres: Deformability as an effective volume fraction.
  M.E. Rosti, L. Brandt, and **D Mitra**, *Physical Review Fluids* **3(1)**, 012301, (2018) (arXiv:1709.04210).

- Rheology of confined non-Brownian suspensions W. Fornari, L. Brandt, P. Chaudhuri, C.U. Lopez, **D. Mitra**, and F Picano, *Phys. Rev. Lett.* **116 (1)**, 018301, (2016) (arXiv:1506.08722).

- Shear thickening in non-Brownian suspensions: an excluded volume effect.
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## Review articles

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  R. Pandit et al including **D. Mitra**, *Physics of Fluids* **29** (11), 111112, (2017).

- Dynamic Multiscaling in fluid turbulence : An Overview.
  **D. Mitra** and R. Pandit, *Physica A*, **318**, 179 (2003).

# Plasma Physics

## Helioseismology

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- Exact Analytical Solutions in Inhomogeneous Magnetic Fields for Linear Asteroseismic Waves.
  B.Tripathi and **D Mitra**, *The Astrophysical Journal*, **934(1)** 61, 2022. (arXiv:1812.06947).

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- Kazantsev dynamo in turbulent compressible flows.
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- A mean field dynamo from negative eddy diffusivity.
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- Scaling and intermittency in incoherent $\alpha$-shear dynamo.
  **D. Mitra** and A. Brandenburg, *Monthly Notices Roy. Astron. Soc.*, **420**, 2170-2177 (2012) (arXiv: 1107.2419 ).

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- Alleviating alpha quenching by solar wind and meridional flow.
  **D. Mitra**, D. Moss, R. Tavakol and A. Brandenburg, *Astronomy and Astrophysics* **526**, A138 (2011) (arXiv: 1008.4226).

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- Turbulent reconnection of magnetic bipoles in stratified turbulence S. Jabbari, A. Brandenburg, **D. Mitra**, N. Kleeorin, and I. Rogachevskii *Monthly Notices of the Royal Astronomical Society* **459 (4)**, 4046-4056, 2016.

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## Conference Proceedings

4. Reconstructing meridional flow speed variation by implementing EnKF/DART sequential data assimilation.
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