

Alankar Dutta

(he/him)

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👤 Dutta, A.

Nationality: India

About me

- 📌 I am currently an integrated Ph.D. (M.Sc. + Ph.D.) candidate at the Indian Institute of Science, Bangalore as a Prime Minister's Research Fellow supported by the Ministry of Education, Government of India.
- 📌 I am a Computational Astrophysicist interested in modeling and simulation of the multiphase gaseous environments around galaxies called the circumgalactic medium.

Education

- 2017 – present 📌 **Integrated M.Sc. + Ph.D., Indian Institute of Science, Bangalore, India**
Computational Astrophysics.
- 2014 – 2017 📌 **B.Sc. Physics (Major), Presidency University, Kolkata, India**
Undergraduate majoring in Physics.



Publications

- 1 **A. Dutta**, M. S. Bisht, P. Sharma, R. Ghosh, M. Roy, and B. B. Nath, "Beyond radial profiles: Using log-normal distributions to model the multiphase circumgalactic medium," *Monthly Notices of the Royal Astronomical Society*, stae977, Apr. 2024, ISSN: 0035-8711. 🔗 DOI: 10.1093/mnras/stae977. arXiv: 2310.03717.
- 2 R. Ghosh, **A. Dutta**, and P. Sharma, "Ram pressure stripping in clusters: Gravity can bind the ISM but not the CGM," *Monthly Notices of the Royal Astronomical Society*, stae1345, May 2024, ISSN: 0035-8711. 🔗 DOI: 10.1093/mnras/stae1345. arXiv: 2404.02035.
- 3 **A. Dutta**, P. Sharma, and D. Nelson, "Cooling flows around cold clouds in the circumgalactic medium: steady-state models and comparison with TNG50," *Monthly Notices of the Royal Astronomical Society*, vol. 510, no. 3, pp. 3561–3574, Mar. 2022. 🔗 DOI: 10.1093/mnras/stab3653. arXiv: 2107.02722 [astro-ph.GA].
- 4 V. Kanjilal, **A. Dutta**, and P. Sharma, "Growth and structure of multiphase gas in the cloud-crushing problem with cooling," *Monthly Notices of the Royal Astronomical Society*, vol. 501, no. 1, pp. 1143–1159, Feb. 2021. 🔗 DOI: 10.1093/mnras/staa3610. arXiv: 2009.00525 [astro-ph.GA].
- 5 **A. Dutta** and P. Sharma, "On Modeling CC85 Wind in an Expanding Local Box [non-peer reviewed]," *Research Notes of the American Astronomical Society*, vol. 3, no. 10, p. 148, Oct. 2019. 🔗 DOI: 10.3847/2515-5172/ab4bd8. arXiv: 1910.06339 [astro-ph.GA].
- 6 P. Chakraborty, S. Chatterjee, **A. Dutta**, and A. D. Myers, "Mean Occupation Function of High-redshift Quasars from the Planck Cluster Catalog," *Publications of the Astronomical Society of the Pacific*, vol. 130, no. 988, p. 064 001, Jun. 2018. 🔗 DOI: 10.1088/1538-3873/aaab3e. arXiv: 1801.06522 [astro-ph.GA].
- 7 **A. Dutta**, "X-ray environments of supermassive black holes [non-peer reviewed; undergraduate thesis]," May 2017. 🔗 DOI: 10.13140/RG.2.2.26190.97606.

Skills


Languages 📌 Proficient in Bengali (native), English and Hindi. Also knows German (A1).

Skills (continued)




- Coding  C/C++ , Python, L^AT_EX. Specialized in computational hydrodynamics. Leading code developer of AstroPlasma, an astrophysical plasma modeling interpolation package. Developed yt visualization frontend and Catalyst In-situ visualization for PLUTO. Developed parallel hdf5 io on IDEFIX.
- Misc.  Academic research, teaching, high-performance computing, GPU programming, data analysis, analysis of cosmological simulation data like Illustris TNG, and 3D data visualization. Tools/Codes used: PLUTO, Arepo, Cloudy, ParaView, ...

Conferences, workshops & research visits




Selected talks

- May 2024  *Observe Local Think Global: What Solar Observations can teach us about Multiphase Plasmas across Astrophysical Scales*, organized by **International Space Science Institute** at Bern, Switzerland (*online*)
- Mar 2024  Research School of Astronomy & Astrophysics, **Australian National University**, Canberra, Australia (*seminar; online*)
- Feb 2024  Astronomical Society of India Meeting, **ASI 2024, IISc Bangalore**, India
- Jun 2023  **European Southern Observatory**, Garching, Germany; CGM meeting (*seminar*)
 *Modelling of Multiphase Astrophysical Media*, organized by **Max Planck Institute for Astrophysics** at Kochel am See, Bavaria, Germany
- Mar 2023  *Observe Local Think Global: What Solar Observations can teach us about Multiphase Plasmas across Astrophysical Scales*, organized by **International Space Science Institute** at Bern, Switzerland
- Feb 2023  **University of Turin**, Torino, Italy (*seminar*)
 **Nicolaus Copernicus Astronomical Center**, Warsaw, Poland (*seminar*)
- Jan 2023  **Leibniz Institute for Astrophysics**, Potsdam, Germany (*seminar; online*)
 **Max Planck Institute for Astrophysics**, Garching, Germany; *Cosmology Seminar*
- Sept 2022  *What matter(s) around galaxies 2022: Connecting the dots between the CGM and the larger-scale environment*, organized by **Università Milano-Bicocca** at Champoluc, Aosta Valley, Italy
- Aug 2022  *6th ICM Theory and Computation Workshop*, **Niels Bohr Institute**, Copenhagen, Denmark
- Feb 2021  Alumni Seminar Series, **Presidency University**, Kolkata, India (*invited talk*)

Poster presentations



- Mar 2024  Annual PMRF symposium 2024, **IIT Indore**, India (*invited*)
- Mar 2022  Astronomical Society of India Meeting, **ASI 2022, IIT Roorkee**, India
- Feb 2020  Astronomical Society of India Meeting, **ASI 2020, IISER Tiupati**, India

Research visits




- Jan – Feb 2023  **Max Planck Institute for Astrophysics**, Garching, Germany *as a visiting student.*
- May – Aug 2019  **Max Planck Institute for Astrophysics**, Garching, Germany *as a visiting student.*
- Jun 2016  **Inter-University Centre for Astronomy and Astrophysics (IUCAA)**, Pune, India *as a visiting undergraduate student.*

Conferences, workshops & research visits (continued)







Workshops attended

- Jan 2021  *KITP Program: Fundamentals of Gaseous Halos*, **Kavli Institute for Theoretical Physics**, Santa Barbara, California, USA (online)
- Jan 2019  *Cosmology: The Next Decade*, **International Centre for Theoretical Sciences (ICTS)**, Bangalore, India





Professional services & teaching

- Jul 2023  Organized *hands-on sessions* in the Workshop on Computational MHD with the PLUTO code, **IISc Bangalore**, India on basics of PLUTO code, makefiles and software development using Git to about 60 beginning Ph.D. and advanced masters students.
- Feb/Mar 2019,20,23,24  Actively volunteered in the organization of *Open Day* at **IISc Bangalore**, India, a public science outreach program which hosts around 50,000 people throughout the day. Led demonstrations like reversible fluid flow experiments at low Reynolds number, and presented talks on multi-messenger astronomy.
- Nov 2019  Demonstration of science experiments to about 600 primary and high school students at **Kendriya Vidyalaya**, IISc, Bangalore, India as a part of International Astronomical Union (IAU) global project 'Astronomy day in school'.



Teaching

- Jan - Apr 2024  Teaching Assistance for NPTEL course on [Problem Solving Through Programming In C](#)
- Jan - May 2023  Teaching Assistance for Computational Physics course as a part of the two-year masters in the School of Astrophysics, Presidency University, Kolkata (online)
- Jul - Sep 2022  Teaching Assistance for NPTEL course on [Python for Data Science](#)
- Jan - May 2022  Teaching Assistance for a course on Computer applications, Kendriya Vidyalaya, IISc
- Jan - May 2021  Teaching Assistance for Computational Physics course, Department of Physics, IISc
- Jan - May 2020  Teaching Assistance for Intermediate Electromagnetism and the Quantum Physics of Radiation, Department of Physics, IISc

Fellowships & awards

- Aug 2024 - present  Max Planck Institute for Astrophysics Postdoctoral Fellowship
- Aug 2020 - present  Prime Minister's Research Fellowship awarded by the Ministry of Education, Government of India (Acceptance rate: 3.5% out of 3000 within institute)
- Aug 2017 - Jul 2020  Indian Institute of Science Fellowship for the Integrated Ph.D. program at the Department of Physical Sciences, IISc (0.3% out of 10000 to be selected in IISc Integrated Ph.D. program through JAM)
- Jan - Mar 2017  Qualified in JAM (rank 107), JEST (rank 36), TIFR-GS (declined offer from NCRA, Pune)

References

-  **Prateek Sharma**, Professor, Indian Institute of Science, Bangalore, India
 prateek@iisc.ac.in

References (continued)

- **Dylan Nelson**, Emmy Noether Research Group Leader, Institute for Theoretical Astrophysics, Heidelberg University, Germany
✉ dnelson@uni-heidelberg.de
- **Biman B. Nath**, Professor, Raman Research Institute, Bangalore, India
✉ biman@rri.res.in
- **Tiago Costa**, Academic Track Fellow, Newcastle University, Newcastle upon Tyne, UK
✉ tiago.costa@ncl.ac.uk
- **Suchetana Chatterjee**, Assistant Professor, Presidency University, Kolkata, India
✉ suchetana.physics@presiuniv.ac.in