Hitesh Kishore Das

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EDUCATION

PhD in Astrophysics (Ongoing)
Thesis title: The dynamics of multiphase gas in astrophysical media

International Max Planck Research School on Astrophysics (IMPRS)
Max Planck Institute for Astrophysics (MPA), Garching, Germany
Ludwig Maximilians University (LMU), Munich, Germany

Duration: Aug 2021-Present
Doctoral Advisor: Dr. Max Gronke
Formal supervisor: Prof. Volker Springel

Master of Science
Indian Institute of Science (IISc), Bengaluru, India
Major: Physics
Duration: Aug 2020 - July 2021

Bachelor of Science (Research)
Indian Institute of Science (IISc), Bengaluru, India
Major: Physics
Duration: Aug 2016 - July 2020

RESEARCH EXPERIENCE

- **Subgrid model for multiphase gas interactions** [FEB 2024 -]
  Collaborators: Rainer Weinberger, Dr. Max Gronke
  Max Planck Institute for Astrophysics, Garching

- **Three-phase gas in a turbulent medium** [MAY 2024 -]
  Project is led by Zewei “Jason” Wu from UChicago during his DAAD-RISE internship.
  Involved as the advisor for his internship, including framing the research proposal.
  Collaborators: Zewei “Jason” Wu, Dr. Max Gronke
  Max Planck Institute for Astrophysics, Garching

- **Linear and nonlinear evolution of thermal instability in 2D/3D** [MAR 2021 -]
  Collaborator: Dr. Prakriti Pal Choudhury, Prof. Prateek Sharma
  Physical Sciences, Indian Institute of Science, Bangalore

- **Survival, destruction and formation of cold molecular gas** [MAY 2023 - AUG 2023]
  Part of the work was done by Atal Agarwal from IIT Roorkee during his DAAD-WISE internship. I was involved in the intership as a co-supervisor.
  Collaborators: Atal Agarwal, Dr. Max Gronke
  Max Planck Institute for Astrophysics, Garching

- **Multiphase gas dynamics in Magnetised, turbulent medium** [SEP 2021 - JAN 2024]
  Collaborators: Dr. Max Gronke
  Max Planck Institute for Astrophysics, Garching

- **Role of temperature and metallicity in the evolution of thermal instability** [AUG 2019 - APR 2021]
  Part of Bachelors thesis project under the supervision of Prof. Prateek Sharma
  Collaborators: Dr. Prakriti Pal Choudhury, Prof. Prateek Sharma
  Physical Sciences, Indian Institute of Science, Bangalore

- *Computational Studies of Systems of Self-driven Particles [8 MAY 2019 – 12 JUL 2019]
  Internship under supervision of: Assoc. Prof. Massimo Pica Ciamarra
  School of Physical & Mathematical Sciences, Nanyang Technological University, Singapore

PUBLICATIONS

- Magnetic Fields in Multiphase Turbulence: Impacts on Dynamics and Structure

Hitesh Kishore Das, Max Gronke
Monthly Notices of the Royal Astronomical Society, Volume 527, Issue 1, January 2024, Pages 991–1013, **doi.org/10.1093/mnras/stad3125**
arXiv: **2307.06411**

- Shatter or not: role of temperature and metallicity in the evolution of thermal instability

Hitesh Kishore Das, Prakriti Pal Choudhury, Prateek Sharma
Journal: Monthly Notices of the Royal Astronomical Society, Volume 502, Issue 4, April 2021, Pages 4935–4952, **doi.org/10.1093/mnras/stab382**
arXiv: **2009.11317**

CONFERENCES AND SEMINARS

- **Talk** at Lars Hernquist group meeting at **Center for Astrophyiscs**, Harvard University on August 23, 2024.

- **Multiphase Madness: Resolving the CGM in Theory and Observations** (August 21-23, 2024). Gave a **talk** in-person at Center for Astrophysics, Harvard University, Cambridge.

- **Talk** at Computational Structure and Galaxy formation group meeting at **MIT Kavli Institute for Astrophyiscs** on August 19, 2024.

- **Talk** in GalRead at Peyton Hall, **Princeton University**, on August 16, 2024.

- **Team meeting for "Observe Local Think Global: What Solar Observations can teach us about Multiphase Plasmas across Astrophysical Scales"**
  (May 13-17, 2024)
  Presented my work. In-person at ISSI, Bern, Switzerland

- **Talk** in **Cosmology section meeting** at AIP, Potsdam, on May 8, 2024.

- **Annual Astronomical Society of India (ASI) meeting** 2024 (Jan 30-Feb 4, 2024).
  Presented a at IISc, Bangalore, India.

- **2023 IAP colloquium: New simulations for new problems in galaxy formation** (December 11-15, 2023). Gave a in-person at IAP, Paris, France.

- **MIST2023 : Cosmic turbulence and Magnetic fields** (September 24 - October 1, 2023) Gave a in-person at Cargese, Corsica, France.

- **Modelling of Multiphase Astrophysical Media** (May 30-June 2, 2023)
  Presented a ~15 min talk about my work. In-person at Aspenstein Castle, near Lake Kochel, Germany

- **MPA weekly Institute Seminar** (May 15, 2023)
  Presented a ~45 min talk about my work. In-person at MPA, Garching, Germany

- **52nd Saas-Fee winter School on "The Circum-Galactic Medium across cosmic time: an observational and modelling challenge"**
  (March 19-24, 2023)
  Presented a poster about my work. In-person at Les Diablerets, Switzerland

- **Team meeting for "Observe Local Think Global: What Solar Observations can teach us about Multiphase Plasmas across Astrophysical Scales"**
  (March 13-17, 2023)
  Presented an introduction for simulations in ICM/CGM, and my work. In-person at ISSI, Bern, Switzerland

- **The Multiphase Circumgalactic Medium** (February 26- March 3, 2023)
  Presented a ~15 min talk about my work. In-person at Ringberg Castle, Germany

- **Lyman-X Day: ORIGINS workshop** (October 5, 2022)
  Attended in-person at European Southern Observatory (ESO), Garching

- **The National Astronomy Meeting (NAM) 2022** (July 11-15, 2022)
  Attended virtually and submitted a poster for the parallel session "Non-equilibrium thermodynamics across scales: from the solar corona to the intracluster medium".

- **Gas Flows around Galaxies: ORIGINS workshop** (May 24, 2022)
  Presented my work in-person at MPA, Garching

- **Presision Presidency Physics Summit** (September 11-13, 2020)
  Organized by Presidency University, Kolkata
  Presented work done on Thermal Instability as a talk in the Undergraduate Symposium.

- **On the Origin, Nature, and Mixing of Multiphase Gas in Astrophysics** KITP online conference (October 15-16, 2020)
  Attended the conference virtually

- **IAP online Colloquium on Intracluster Medium/Circumgalactic medium** (June 22-26, 2020)
  Attended the conference virtually

MENTORING

- Fully **Supervised** the DAAD-RISE intership of Zewei "Jason" Wu (UChicago) at MPA, Garching between May - August 2024

- **Co-supervised** the DAAD-WISE intership of Atal Agarwal (IIT Roorkee) at MPA, Garching between May-August 2023

- **Mentored** Tapan Mayukh from LMU during their Masters thesis project at MPA during 2023-24 academic year

EXTRA-CURRICULAR AND OUTREACH EXPERIENCE

- **External PhD representative** at MPA (July 2024-)

- **13th IMPRS Symposium**
  Chair of the Local Organising Committee

- **IISc Undergraduate Astro Club**
  Delivered a talk on "Astrophysical media and their behaviour".

- **IISc Undergraduate Physics Club**
  Delivered a talk on "Special Relativity and Minkowski Diagrams".

- **Indian Instiute of Science Open Day**
  Constructed and demonstrated an experiment about Bernard convection cells on Sun.

- **Institute Fest - "Pravega"**
  Involved in planning and conducting events by Physics club for Pravega - 2016 and Pravega - 2017.

AWARDS AND FELLOWSHIPS

- **NTU-India Connect Research Fellowship** 2-month long intership opportunity at NTU, with funding for travel, accommodation and living costs. Funded by: Nanyang Technological University, Singapore (NTU) Duration: May 2019 – July 2019

- **Kishore Vaigyanik Protsahan Yojana** (KVPY) Fellowship}
  Funded by: Department of Science and Technology, Government of India

Stream: SX
Duration: 2016-2021

SKILLS

Compiled languages: C, C++
Hydrodynamic Simulation: AREPO, Athena++ , PLUTO
Interpreted languages: Python, Matlab, Mathematica
Others: LaTeX, ROOT, Bash scripting, High Performance Computing, LAMMPS, Madgraph 5, Pythia

LANGUAGE PROFICIENCY

- English (Proficient)
- Hindi (Proficient)
- Odia (Native)
- German (Beginner A1)

WORKED WITH

Dr. Max Gronke

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Prof. Prateek Sharma

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Indian Institute of Science, Bangalore, India
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Website: **www.physics.iisc.ernet.in/~prateek**

Dr. Rainer Weinberger

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