Hitesh Kishore Das

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Education

PhD in Astrophysics (Ongoing)
Max Planck Institute for Astrophysics, Garching, Germany
Duration: 2021-Present

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

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

Senior Secondary (CBSE), 2016
Kendriya Vidyalaya No-4, Bhubaneswar, Odisha
Stream: Science
Date: 21/05/2016

Secondary (CBSE), 2014
Kendriya Vidyalaya No-4, Bhubaneswar, Odisha
Date: 20/05/2014

Research Experience

The dynamics of magnetized, multiphase gas in a turbulent environment [8 SEP 2021 - PRESENT]
Under the supervision of: Dr. Max Gronke
Max Planck Institute for Astrophysics

Role of temperature and metallicity in the evolution of thermal instability [1 AUG 2019 - PRESENT]
In this project we investigate the role of different parameters like metallicity and temperature in the growth of thermal instability. The project includes setting up and running simulation for study of thermal instabilities using PLUTO. This work led to some important insights into evolution of large-scale isochoric clouds. I presented the results as a short talk in Presision Presidency Physics Summit organized by Presidency University, Kolkata.

This project contributed towards my Bachelors thesis and led to a research paper in collaboration with Dr. Prakriti Pal Choudhury and Prof. Prateek Sharma:

"Shatter or not: role of temperature and metallicity in the evolution of thermal instability" (2020)
Hitesh Kishore Das, Prakriti Pal Choudhury, Prateek Sharma
(Under review in Monthly Notices of the Royal Astronomical Society)

Under supervision of: Assoc. Prof. Prateek Sharma
Physical Sciences, Indian Institute of Science, Bangalore

Computational Studies of Systems of Self-driven Particles
[8 MAY 2019 – 12 JUL 2019]
This project aimed at investigating the underlying physical origin of this "phase transition" via the development of appropriate computational models
Project included:
- Molecular dynamics code development (in LAMMPS), adapting existing code in the research group
- Reproduction of literature data
- Original investigation of the role of friction in the interparticle interaction

Under supervision of: Assoc. Prof. Massimo Pica Ciamarra
School of Physical & Mathematical Sciences, Nanyang Technological University, Singapore

Electrostatics of Spherical Topological Insulators
[1 MAY 2018 – 30 JUN 2018]
Theoretical derivation of electric and magnetic scalar potentials for different cases of electric and magnetic fields in presence of a spherical Topological Insulator.
(Near charged particle, constant electric and magnetic field, near electric dipole and near magnetic dipole)
Presented the project at 3^{rd} Annual Undergraduate Research showcase at IISc.

Under supervision of: Assoc. Prof. Subroto Mukerjee
Physical Sciences, Indian Institute of Science, Bangalore

Analysis of data from CERN 2010 open data and simulation of top pair production [1 MAY 2017 – 31 JUL 2017]
It consisted of accessing CERN 2010 open data using CernVM and analysing the data using C++ and Python code incorporating ROOT to plot Dimuon spectra, Trimuon spectra and other related plots.
High-energy particle physics event simulations of top pair production were done using Pythia 8.2 and Madgraph 5.

Under supervision of: Asst. Prof. Jyothsna Rani Komaragiri
Centre for High Energy Physics, Indian Institute of Science, Bangalore

Special Relativity (Reading Project)
[1 MAY 2017 – 31 JUL 2017]
Study of Special Relativity from the book "Special Relativity" by Robert Resnick.

Under supervision of: Asst. Prof. Jyothsna Rani Komaragiri
Centre for High Energy Physics, Indian Institute of Science, Bangalore

Elementary Particle Physics (Reading Project)
[1 MAY 2017 – 31 JUL 2017]
Study of Elementary Particle Physics from the book "Introduction to Elementary Particles" by David Griffith.

Under supervision of: Asst. Prof. Jyothsna Rani Komaragiri
Centre for High Energy Physics, Indian Institute of Science, Bangalore

Publications

Shatter or not: role of temperature and metallicity in the evolution of thermal instability
Hitesh Kishore Das, Prakriti Pal Choudhury, Prateek Sharma
arXiv: arxiv.org/abs/2009.11317
Journal: Under Review in Monthly Notices of the Royal Astronomical Society

Conferences and Seminars

Presision Presidency Physics Summit
organized by Presidency University, Kolkata
Presented work done on Thermal Instability as a talk in the Undergraduate Symposium - September 11-13, 2020
"On the Origin, Nature, and Mixing of Multiphase Gas in Astrophysics" KITP online conference
Attended the conference virtually - October 15-16, 2020
IAP online Colloquium on Intracluster Medium/Circumgalactic medium
Attended the conference virtually - June 22-26, 2020
Fluid Day at ICTS-TIFR, Bangalore, India
Attended the talks in person - January 20, 2020

Extra-curricular Experience

Undergraduate Physics Club
Delivered a talk on "Special Relativity and Minkowski Diagrams".
IISc Open Day
Constructed and demonstrated an experiment about Bernard cells, convection and convection cells in Sun
Demonstrated an experiment about Polarization of light
Institute Fest - "Pravega"
Involved in planning and conducting events by Physics club for Pravega - 2016 and Pravega - 2017.
Event coordinator of "Vacuum cannon" event in Pravega-2017

Awards and Fellowships

Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship
Funded by: Department of Science and Technology, Government of India
Stream: SX
Duration: 2016-2021
National Cyber Olympiad 2014-15
National Rank: 1 (in 11th standard)
Organised by: Science Olympiad Foundation
National Standard Examination in Astronomy, 2015
Got certificate for being in top 10% of the examination centre.
Organised by: Indian Association of Physics Teachers (IAPT)

Skills

C, C++	Python
PLUTO	LAMMPS
Madgraph 5	Pythia 8.2
ROOT	SQL
Mathematica	Matlab
High Performance Computing	Bash scripting
LaTeX	

Standardised Tests

GRE General: Total: **330**
Quantitative: 169
Verbal: 161
Analytical Writing: 4.0

TOEFL-iBT: Total: **108**
Reading: 29
Listening: 30
Speaking: 24
Writing: 25

GRE Subject: Score: **940 (89%ile) (Physics)**

Languages

English (Proficient)
Hindi (Proficient)
Odiya (Native)

References

Assoc. Prof. Prateek Sharma
Physical Sciences
Indian Institute of Science, Bangalore
Email: prateek@iisc.ac.in
http://www.physics.iisc.ernet.in/ prateek/

Assoc. Prof. Massimo Pica Ciamarra
Nanyang Associate Professor
School of Physical & Mathematical Sciences
Nanyang Technological University, Singapore
Email: massimo@ntu.edu.sg
https://sites.google.com/site/ciamarragroup/

Assoc. Prof. Subroto Mukerjee
Physical Sciences
Indian Institute of Science, Bangalore
Email: smukerjee@iisc.ac.in
physics.iisc.ernet.in/ smukerjee

Asst. Prof. Jyothsna Rani Komaragiri
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Indian Institute of Science, Bangalore
Email: jyothsna.komaragiri@gmail.com
chep.iisc.ac.in/Personnel/pages/jyothsna