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Bipradeep Saha

Curriculum Vitae

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Profile

A third-year student of BS-MS Dual Degree Program with Physics as Major at Indian Institute of Science Education and Research – Kolkata. My objective is to create interest among the youngsters in the field of Science, especially in the field of Physics and Astronomy and to develop creative learning for lifelong knowledge.

Education

Aug. 2019 - Present **5 Year BS-MS Dual Degree**.
Indian Institute Of Science Education and Research Kolkata
Department : Physics
CGPA : 9.26/10 ≡ 3.70/4.0 (As of 5th semester)

2017 - 2019 **All India Senior Secondary Certificate Examinations**.
Vinay Nagar Bengali Sr. Secondary School, New Delhi
Affiliation : Central Board of Secondary Education (CBSE)
Score : 95%

Research Experiences

May. 20, 2021 - July. 30, 2021 **Project on Gravitational Waves and GW Data Analysis**.
Dr. Rajesh Kumble Nayak

During this project, where I learnt about Gravitational Waves(GW) and GW data analysis. I learnt about parameter estimation and the problems we faced while estimating Parameters. This project extensively used the python package PyCBC. I also learnt about Particle Swarm Optimization approach to parameter estimation

Dec. 28, 2020 - Jan. 09, 2021 **Radio Astronomy Winter School - 2020**.
Jointly Organised by **IUCAA - Pune** and **NCRA**

This was a short radio astronomy school where we learnt about the basics of radio astronomy and in the end presented a short presentation of data from GMRT. (The report and the presentation can be found here)

June 15, 2020 – Aug. 30, 2020 **Electron Acoustic Wave in two electrons populated, dense Fermi plasma with electron exchange and correlation effect**.
Dr. Swarniv Chandra

I attended the plasma physics workshop by Dr. Swarniv Chandra and worked on Quantum Plasmas. I obtained the Dispersion Relation for Electron Acoustic Wave in two electrons populated, dense Fermi plasma, and further worked to get the KdV equation for the same. I studied the dependence of solitary structures on various plasma parameters.

Projects Undertaken

Completed

(1) Electron Acoustic Wave in two electrons populated, dense Fermi plasma with electron exchange and correlation effect (Under Review for Publication)

(2) Multi-wavelength composition of Cas-A SNR

(3) Elemental Breakdown of SNR 386

(4) Spectral study of SNR DEM-L71 and review of old results(Project Page)

Ongoing

(1) Development of N-Body Simulation(Project Page)

(2) Search for galaxy clusters using Mesh search (Project Page)

(3) Expansion Study of Cas-A SNR

(4) Development of scripts for interactive command line based astronomical data analysis(Project Page)

Research Interests

- **General Astrophysics, Cosmology and General Relativity**
  Intested in the evolution of universe, how large scale structures were formed. How Dark matter and Dark energy plays its role in the present day evolution of universe
- **Theoretical Physics**
  Interested in Quantum Mechanics, Quantum Information and Technology and String Theory
- **Machine Learning and Deep Learning**
  Interested in how concepts of ML can be used to solve big data problems in astronomy and help solve earth based problems. Also interested in using ML for data analysis of large surveys like DES, LSST(upcoming), etc.

Technical Skills

- **Python** : Numpy, Astropy, Sci-Py, Matplotlib, Pandas
- **Matlab**
- **Basic Web-development** : HTML, CSS, Javascript
- LaTeX
- **Software** : Adobe Photoshop, Origin

Conferences & Workshop

Aug. 2021 Chandra Data Science Workshop-2021

Aug. 2020 SLAC Summer School in Astronomy

Sep. 2019 RAD@Home workshop at IISER-Kolkata

Awards

2020 International Astronomy and Astrophysics Competition (2020) – Bronze Honor

Scholastic and Curricular Achievements

2020 - 2021 Secretary of Science Club of IISER-Kolkata

2019 District topper (CBSE Higher Secondary Exams - 2019) (South West Delhi-New Delhi)

2016 - 2018 Taken part in multiple inter-school extempore and debate

2015 - 2017 Completed all ten levels of Brain-O-Brain skill development program (in Mental Arithmetic)

2014 - 2017 Taken Part in various national level Science and Mathematics Olympiads

Courses Taken

- Classical Mechanics, Introduction to Special Relativity
- Intermediate Quantum Mechanics
- Introduction to Thermal Physics
- Real Analysis (Robert G Bartle), Probability Theory (Sheldon M. Ross)
- For more details refer to teaching plan of IISER-Kolkata
  - 1^{st} Year: All level 1 courses of *Autumn 2019*, and *Spring 2020*
  - 2^{nd} Year: All level 2 DPS, DMS and DES course of *Autumn 2020*, and *Spring 2021*
  - 3^{rd} Year: All DPS Course, Numerical Analysis of *Autumn 2021*

Interests

Painting, Drawing, Photography(Astrophotography, Nature), Driving, Science Communication Activities

References

- **Dr. Rajesh Kumble Nayak**
  Department of Physical Sciences
  Professor
  Indian Institute of Science education and Research - Kolkata, India