Tanima Mondal

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Research Experience

Modelling of Gamma-ray Burst afterglow at very high energy

June 2020 - Present

Dept. Of Physics, IIT Kharaghpur

- Developing a numerical model of GRB afterglow emission at VHE regime.
- Verifying the spectral energy distribution (SED) and lightcurve of a particular GRB afterglow at very high frequency band.

Detection of Neutrino Oscillation Parameters with Hyper-K collaboration

Dec 2020 - Present

Dept. Of Physics, IIT Kharaghpur

- Started working with HK oscillation group to study neutrino oscillation parameters and existence of CP violation phase.
- Investigating the systematics of the detector in details to reproduce the basic sensitivity which will be impactful for Hype-K. The main aim of this work is to check whether it produces higher sensitivity or not.

Photometric Observations

June 2018 - Nov 2019

Fr. Eugene Lafont Observatory; St. Xavier's College Kolkata

- Executed Observational work for 4 months and successfully observed 3 clusters NGC2301, M35, M45.
- Conducted differential photometry, numerical analysis on the very-large Fits data file to produce a stellar evolution of the different observed cluster.
- Contribute to the setup of the Observation experiments and produced first scientific data from the Eugene Lafont Observatory; St. Xavier's College Kolkata.
- In the paper, we are proposing multiresolution image processing methods on noise polluted astronomical Cluster images along with stellar modelling. Moreover, the primary objective of this paper is to encourage astronomical observation for the institutes located in an urban area. The paper is in the process of publication on a peer-reviewed journal.

Work Experience

Research Intern

July 2021 – Present

TRIUMF, Canada's Particle accelerator centre

- I planed and taught undergrad and grad students on Star Cluster Photometry, details of Hurtzsprung Russel diagram and mentored related experimental works.

Visiting Researcher

July 2018 – Nov 2019

Dept. Of Physics, St. Xavier's College Kolkata

- I planed and taught undergrad and grad students on Star Cluster Photometry, details of Hurtzsprung Russel diagram and mentored related experimental works.

Summary

I am a Research Fellow in Indian Institute of Technology, Kharagpur. My broad area of research is on High Energy Astrophysics. I am interested in pursuing my doctoral research on High Energy physics, Astrophysics and Experimental Physics.

Technical Skill

Matlab, Python

Skilful in writing codes for the numerical solution of problems like Root finding, Interpolation, ODEs, PDEs and other.

Latex

Proficient in writing on Latex and designing presentations on Beamer.

Language Skill

Proficient in Reading, Writing and Speaking on English, Bengali, Hindi language.

Education

Ph.D Course Work — Jan 2020 – Dec 2020

Indian institute Of Technology Kharagpur

- I have acquired 9.40 CGPA in my One year course work as follows-

High energy Physics –	(EX)
Quantum Mechanics and Quantum Computing –	(EX)
Stimulation in collider Physics and Cosmology –	(EX)
Advance Mathematical Technique –	(A)
Astrophysics and Cosmology –	(B)

Master's of Science (M.Sc.) in Physics — 2016 - 2018

St. Xavier's College Kolkata (Calcutta University)

- Grade: First Class; 74.3% (CGPA 8.11)

Bachelor of Science (B.Sc.) in Physics — 2012 - 2015

Serampore College (Calcutta University)

- Grade: First Class

Higher Secondary (H.S) — 2012

W.B.C.H.S.E

- Subject: Beng, Eng, Physics, Chemistry, Maths, Bio
- Grade: A+

Secondary (Madhyamik) — 2010

W.B.B.S.E

- Subject: Beng(I, II), Eng, Phys, L.Sc, Math, Hist, Geo
- Grade: A+

Internship

- *Aim:* Developing an advanced deep learning techniques to maximally exploit data from future and existing water Cherenkov detectors.

  To explore this work, during this internship period, I am working under the supervision of Patrick de Perio, a renowned research scientist at TRIUMF, and Akira Konaka, an adjunct Professor of Physics and Astronomy at the University of Victoria.

Award and Recognition

- ✓ Selected for prestigious Prime Minster Research Fellowship on 2021.
- ✓ Mictac's Globalink Research Award for 'Deep Learning for Water Cherenkov Particle Detectors - Part 1'
- ✓ Certificate of Achievement for presenting a Poster in a National Seminar On Applications of Statistics in Natural Sciences, organized by Dept. of Statistics and Physics of St. Xavier's Kolkata in collaboration with IUCAA Centre for Astronomy Research and Development.
- ✓ Cleared National level Exam GATE-2019.
- ✓ Cleared All India IIT(ISM) Dhanbad M.Sc Examination in 2016.
- ✓ Stood 4th in Hooghly district in West Bengal Class IV standard scholarship (Britti Pariskha) in 2005.
- ✓ Got prizes for being 4th in VI, 2nd in VII-VIII and 4th in IX standard.
- ✓ Got a prize and a certificate for achieving the highest marks in the Science group in school at Secondary exam.
- ✓ Got MERIT CUM MEAN SCHOLARSHIP for both Secondary and Higher Secondary examination.

Leadership & Team Work

- ✓ Supervised a team to organize seminars & events in the department of Physics, St. Xavier's College.
- ✓ Mentored Undergrad and High school students academically in Physics.
- ✓ Helping to organize Blood donation camps, Polio Medicine distribution, and other social events in my locality.

School & workshops attended

- PHYSTAT-Systematics workshop from November 01st to 03rd and 10th November.
- Online School on Detector Simulation using GEANT4, Hosted by Inter University Accelerator Centre (IUAC) from 26th to 29th October, 2021.
- Online Workshop on Simulation Methods in Scientific Computing hosted by IIT Kharagpur from June 14-16, 2021.
- Joined AI Shiksha DL Course by IIT Goa from from June 2021 to August 2021.
- For gathering knowledge regarding my research topics, I joined NTHU/NCTS Astronomy Winter School on High Energy Astrophysics from January 18th-22nd.
- I also joined the XXXIX-th Meeting of the Astronomical Society of India, from 18-23 February 2021, Hosted jointly by ICTS-TIFR Bengaluru, IISER Mohali, IIT Indore and IUCAA Pune.
- Even I have also joined XXIV DAE-BRNS high energy physics symposium from December 14 -18, 2020, organized by the National Institute of Science Education and Research, Jatni, Odisha.
- I also attended an online precursor on 'Physics of the early Universe' from 31 August 2020 to 03 September 2020, hosted by ICTS TIFR.