

DEPARTMENTAL ACTIVITIES (since July 2019):

1. 7th Father Verstraeten Memorial Lecture was delivered by Prof. Puragra Guha Thakurta, Chair and Professor/Astronomer, Department of Astronomy and Astrophysics UCO/Lick Observatory of California, Santa Cruz, USA on 30th August, 2019. The topic of his lecture was “Galaxies: Dark Matter, Cannibalism, Black Holes, Gravity Waves and the Periodic Table of Elements”.
2. Golden Jubilee of SXC-70 Physics Batch celebration was held on 21st January, 2020.
3. On 8th February, 2020 at Dr. Ranjan Ray Commemoration, Dr. Ananda Dasgupta, Associate Professor, Department of Physical Sciences, IISER, Kolkata delivered a lecture and Father Principal announced the name of computer centre for computational physics to be ‘Dr. Ranjan Ray centre for computational physics’. About 150 participants attended the meeting.
4. Physics Colloquium Lectures are organized on a regular basis by the department. The following lectures have been delivered since July 2019:
 - a. Dr. Shibaji Banerjee, Dept. of Physics, St. Xavier’s College, Kolkata delivered a talk on “Dark Matter May be Strange” on 19th July, 2019.
 - b. Dr. Tapas K. Das, Harish-Chandra Research Institute, Allahabad delivered a talk on “Portrait of a dark face” on 9th August, 2019.
 - c. On 27th September, 2019 Dr. Suchetana Chatterjee, Dept. of Physics, Presidency University delivered a talk on ‘Supermassive Black Holes and their Host Dark Matter Halos’.
 - d. Dr. Rituparno Goswami, Associate Professor, School of Mathematics Statistics and Computer Science, University of KwaZulu-Natal (Westville Campus), Durban 4000, delivered a talk on “Tweedledum and Tweedledee” on 17th January 2020.
 - e. Dr. Puragra Guha Thakurta, Professor, Department of Astronomy and Astrophysics UCO/Lick Observatory, University of California Santa Cruz, delivered a talk on “The Andromeda Galaxy: A Testbed for Studies of Dark Matter and Galaxy Interactions” on 22nd February 2020.
 - f. Dr. Oindrila Deb, Postdoctoral Researcher, Physics Department, University of Basel, Switzerland, delivered a talk on “The Birth of Topological Insulators” on 28th February, 2020.

Workshops and Faculty Development Programmes:

- a) A one-day international workshop on coarse geometry was organized on 16th August 2019 by the department of Physics in collaboration with Department of Mathematics of St. Xavier’s College, Kolkata. The speaker was Dr. Atish J. Mitra of Department of Mathematics, Montana Tech (University of Montana), USA.

b) On 29th August 2019 Department of Physics conducted national workshop on “Role of DFT in predicting electronic structures and reaction pathway” in collaboration with Department of Chemistry. Prof. Swapan K. Pati of JNCASR and Dr. Anoop Ayyappan of Dept. of Chemistry, IIT Kharagpur delivered lectures in the workshop.

c) In 16th and 17th December 2019 Department of Physics along with Department of Statistics in collaboration with IUCAA centre for astronomy research and development organized a two-day national seminar on “Application of Statistics in Natural Sciences”.

The invited speakers who delivered talk in the seminar were Prof. Mihir Arjunwadkar of Pune University, Prof. Saurabh Ghosh of ISI Kolkata, Prof. Supratik Pal of ISI Kolkata, Prof. Rajesh Kumble Naik of IISER Kolkata and Prof. Ayanendranath Basu of ISI Kolkata.

d) A two-day DBT sponsored Faculty Development Programme was organized on 10th and 11th January 2020 on Experimental Physics at Graduate Level: Scopes and Challenges.

Webinars Organized by the Department of Physics:

a) On 14th August 2020, Dr. Sayan Basu of University of Pretoria and SARAO, South Africa, delivered an online talk on the topic entitled “*A Slice of Heavens – Rising Above the Pandemic*”. It was followed by a students’ presentation organized by Xaverian Astronomical Society.

b) On 30th September 2020, Dr. Srubabati Goswami, FNA, Senior Professor at Theoretical Physics Division, Physical Research Laboratory (PRL), India, delivered an online talk in the National Webinar organized by the department on the topic entitled “*Neutrinos: From Impossible Dreams to Unreachable Stars*”.

Student Acheivements:

(Physics Hons. 2017-2020 batch)

Ayshi Mukherjee has obtained All India Rank 11 in Joint Admission Test (JAM) Physics paper. She also obtained All India Rank 12 in Joint Entrance Screening Test (JEST) Physics paper.

In the month of January 2020, the NGPE exam organized by IAPT was held in our college and she was one of the Top 25 students and hence, she qualified for the next level of the examination which was an experimental round. She was declared as a NGPE Gold Medalist and eligible for a cash prize of Rs. 20,000/-.

C B S Socrates, Anindita Sarkar and Ayantika Saha are also among the NGPE - 2020 National toppers.

Ayshi Mukherjee joined Tata Institute of Fundamental Research (Mumbai). Aryaa Dattamunsi and Rahul Saxena joined IIT(ISM) Dhanbad. Anindita Sarkar joined IIT Madras. Supritha Bhowmick joined IISER Pune. Ayantika Saha and Avishuman Ray joined IIT Kanpur. Aritra Paul joined IIT Bhubaneswar, Sounak Sengupta and Sharmistha Baidya joined IIT Guwahati, Tamoghna Roy joined ICTS, Bangalore, Debapriya Sil and Debangana Maji joined University of Calcutta, Biju Saha joined Jawaharlal Nehru University, Sounak Samanta joined IEST,

Shibpur, Ayaskanta Ghosh joined NIT, Warangal, Sarbajit Dutta joined JNCASR, Bangalore, Animesh Maji joined Benaras Hindu University, Writabrata Sengupta joined Presidency University, Kolkata (as JRF under Project Funded By Board of Research in Nuclear Sciences), Ilika Banerjee, Siddhartha Sen, Ankit Kumar Gupta, CBS Socrates, Apratim Ghosal and Hrishav Das are continuing there studies at St. Xavier's College (Autonomous), Kolkata.

Research Activities in the Department:

- 1) **Sarbari Guha** and Samarjit Chakraborty, published a paper on **24th March 2020** in **International Journal of Modern Physics D** (Vol. 29, issue 05 (2020) pp. 2050034.)
- 2) Samarjit Chakraborty and **Sarbari Guha**, published a paper on **27th November 2019** in **General Relativity and Gravitation** (Vol. 51, issue 11 (2019) pp. 158)
- 3) **Gayatri Banerjee**, published a paper on **30th August 2019** in **Materials Today Proceedings** (*Volume 18, Part 2, Pages 494 - 500*)
- 4) Atasi Chakraborty¹, Arup Chakraborty¹, **Soma Ghosh**², Indra Dasgupta¹, published a paper on **20th January 2020** in *Condensed Matter* (Volume – 32, Number – 16, Page – 165802 (9pp))
- 5) A paper of **Suparna Roychowdhury** is accepted in the year **2020** in **Journal of Applied and Computational Mathematics**.
- 6) Impact of varying preparation methods of colloidal suspensions on droplet desiccation patterns on hydrophobic and hydrophilic substrates
A Khatun, S Haque, S Tarafdar, **T Dutta**, **Physica Scripta** 96 (2), 025211, 2020, IF: 1.985
- 7) Understanding flow features in drying droplets via Euler characteristic surfaces—A topological tool
A Roy, RAI Haque, AJ Mitra, MD Choudhury, S Tarafdar, **T Dutta**, **Physics of Fluids** 32 (12) 123310, 2020, IF: 3.514
- 8) Desiccation cracks formed in Laponite® suspensions of varying pH: aid to analyzing clay microstructure.
S Haque, S Tarafdar, **T Dutta**, **Physica Scripta** 95 (8), 085703, 2020, IF: 1.985
- 9) Branched crack patterns in layers of Laponite® dried under electric fields: Evidence of power-laws and fractal scalin.
A Ghosh, **T Dutta**, S Tarafdar, AK Ghosh, *The European Physical Journal E* 43 (6), 1-6, 2020, IF: 1.812
- 10) Memory of rheological stress in polymers using Fractional Calculus.
A Bhattacharyya, P Nandi, S Hazra, **T Dutta**, arXiv preprint arXiv:2001.06620, 2020
- 11) Narrowing Desiccating Crack Patterns by an Azeotropic Solvent for the Fabrication of Nanomesh Electrodes
R Pujar, A Kumar, KDM Rao, S Sadhukhan, T Dutta, S Tarafdar, **Langmuir** 35 (49), 16130 -16135, 2019, IF: 3.557
- 12) A spring network simulation in three dimensions for designing optimal crack pattern template to fabricate transparent conducting electrodes.
S Sadhukhan, A Kumar, GU Kulkarni, S Tarafdar, **T Dutta**, **Bulletin of Materials Science** 42 (5), 1-14, 2019, IF: 1.392
- 13) Euler number and percolation threshold on a square lattice with diagonal connection probability and revisiting the island-mainland transition.
S Dutta, S Sen, T Khatun, **T Dutta**, S Tarafdar, **Frontiers in Physics** 7, 61, 2019, IF: 2.638
- 14) Evaporation of a droplet: From physics to applications

- D Zang, S Tarafdar, YY Tarasevich, MD Choudhury, **T Dutta**, **Physics Reports** 804, 1-56, 2019, IF: 25.798
- 15)** Formation of desiccation crack patterns in electric fields: a review
S Tarafdar, **T Dutta**, **Philosophical Transactions of the Royal Society A** 377 (2136), 20170398, 2019, IF: 3.093
- 16)** **Subhankar Ghosh**, published a paper on **1st May 2020** in **Materials Chemistry and Physics (SCI: Elsevier)** (Vol 246, P - 122802)
Title of the Paper: Optimization of Rare Earth (Er³⁺) Doping Level in Lead Zinc Phosphate Glass Through Judd-Ofelt Analysis
- 17)** Madhurima Pandey, Debasish Majumdar, Ashadul Halder, and **Shibaji Banerjee**, published a paper on **10th October 2019** in **Physics Letters B** (Volume 797, Page 134910)