Physics Academy of North East (PANE)

NEWSLETTER

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PANE

lets foster the tree of technology!

Editor: Nabendu Kr. Deb

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In This Issue ...

President's Message

It gives me immense pleasure to learn that the Physics Academy of North East (PANE) is bringing out its yearly publication of PANE Newsletter, Vol.6, No.1, April 2025, on the occasion of the Foundation Day Celebration of the Academy. PANE Newsletter has been the mouthpiece of the Academy since its inception, providing important information and ideas in the current issues and new research developments in the field of physical science.

It is indeed a matter of great satisfaction to note that the editor and his editorial team are making relentless efforts to publish this yearly PANE Newsletter which also signifies the enduring spirit of the Academy. We are fully confident that the Newsletter will provide a wonderful platform for all members of the Academy to come together for the exchange of innovative ideas and new knowledge among ourselves. The present issue of the Newsletter will serve as a good addition to learning and reading material to our esteemed members of the Academy.

Lastly the timely publication of the PANE Newsletter itself is an achievement of the PANE, which in turn proves the continuity, stability and resilience of the spirit of Physics Academy of North East.

I wish the publication a grand success.

Dr. N. Nimai Singh

General Secretary's Message

It has been a great honour to serve as the General Secretary following PANE's completion of glorious 25 years; and over the past one year the academy has seen significant transformations, with several initiatives and activities being successfully implemented.

The PANE constitution has been amended to foster greater inclusivity across Northeast India. Notably, all positions on the Executive Body (except for the General Secretary, Treasurer, and State Representatives due to operational constraints) are now open to members from all parts of the region. Additionally, provisions have been introduced for talent search examinations targeting school and undergraduate students. These exams aim to deepen young learners' understanding of physics while identifying the brightest physics talents in the region at an early stage, offering them encouragement and support where needed and feasible. Moreover, the concept of PANE Fellows has been introduced, with Fellows elected based on their exceptional contributions to advancing physics knowledge, promoting physics education, or applying physics for the benefit of society. The amended constitution will also ensure that the Regular PANE Conference is held every year, as far as possible. The permanent website exclusively for PANE is now there in place. The website is compatible with both mobile and computer.

The results of the inaugural North East India Physics Talent Search (NEIPTS) Examination, 2024, were announced on March 3, 2025. To prepare for the exam, students received study materials, and pre-examination teaching sessions were organized to clarify essential physics concepts. The talent search took place in two stages: the first stage involved an MCQ-based examination with negative marking for incorrect answers to select the Centre Toppers and finalists. These finalists consisted of the State Toppers and the top 20 candidates selected purely on merit. The exam was conducted at over 25 centres across Northeast India. The second stage consisted of online interviews to select the final 11 North East India Toppers.

We had the successful completion of the first-ever election of Fellows of PANE, with six distinguished individuals being elected. To execute this election, individuals who were Fellows of at least one of India's three major academies and were associated with Northeast India's physics education or research were earlier recommended by the by the EB to be the initial Fellows of PANE for making the first nominations for Fellows of PANE.

The PANE publication Fifty Years of Quarks and Gluons was published by Eastern Book House during this period and is now available on online platforms like Amazon. Additionally, PANE will soon publish a book featuring the biographies of renowned physicists from Northeast India, which is currently in the editing phase.

The XIV PANE Regular Conference, hosted by Tezpur University from November 12 to 14, 2024, was a resounding success, attracting a record number of participants from across the region and beyond to discuss the latest advancements and cutting-edge research in physics. I am also happy to mention that part of the conference proceedings will be published in the Journal of Subatomic Particles and Cosmology by Elsevier. Finally, I'm happy to mention that the first issue of the PANE Journal of Physics is almost ready for launch and will be released during the approaching Foundation Day Celebration.

In the past year, PANE has seen a 10% increase in life membership, and the financial situation of the organization has shown significant positive growth. We are committed to maintaining this upward trajectory in the future. Looking ahead, PANE plans to introduce several exciting new initiatives, including summer school programs and the establishment of a permanent office, along with many other developments.

Dr. Samrat Dey

Events ...

⟶ Silver Jubilee of Physics Academy of North East:

Physics Academy of North East (PANE) has celebrated its 25th Foundation Day at Pragjyotish College, Guwahati, on 6th April, 2023. In this special occasion, the academy has invited Prashanta Kr. Panigrahi, the Director of IISER Kolkata, as the chief guest to deliver the Foundation Day talk. Dr. Ranjan Kalita, Physics Department, Pragjyotish College, has introduced the speaker. Prof. Panigrahi has delivered an excellent talk titled "Indian Contributions to Science and Technology: A brief walk down the memory lane" explaining the contribution of Indian scientists to science and technology. He also spoke on "Recent Awards in Quantum Information". The session has been chaired by Prof. Debojit Sarma, Vice President, PANE. Earlier, Mr. Saumar Rajkhowa, the Head of Physics Department, Pragjyotish College, has welcomed the invited dignitaries while the Principal, Dr. Manoj Kr. Mahanta, has delivered the inaugural speech. Prof. A. Gohain Barua, the Executive President of PANE, has spoken about the history of PANE. Prof. Kushal Kalita, the General Secretary of PANE, has addressed the gathering and explained the aim and activities of PANE. Dr. Samrat Day, the Editor of PANE Newsletter and Joint Secretary of PANE, has spoken about the Newsletter which has got articles not only from across the world (from institutes of Northeast India to Fermilab, USA) but also from different age groups of physicists; the Newsletter has then been released by the dignitaries present in the dais. In the programme Prof. Jayanata Kr. Sarma, Tezpur University has been felicitated for translating "Philosophiae Naturalis Principia Mathematica" of Sir Isaac Newton to Assamese. Dr. Debajyoti Dutta, Publicity Secretary, PANE, has delivered the vote of thanks. The whole event has been anchored by Dr. Pranab Jyoti Bhuyan, Physics Department, Pragjyotish College. PANE members from Gauhati University, Tezpur University, Assam Don Bosco University, University of Science and Technology, Meghalaya, Cotton University, different colleges of Assam and other institutions have attended the grand celebration. The celebration has ended with a group photo and refreshment for all.

Events ...

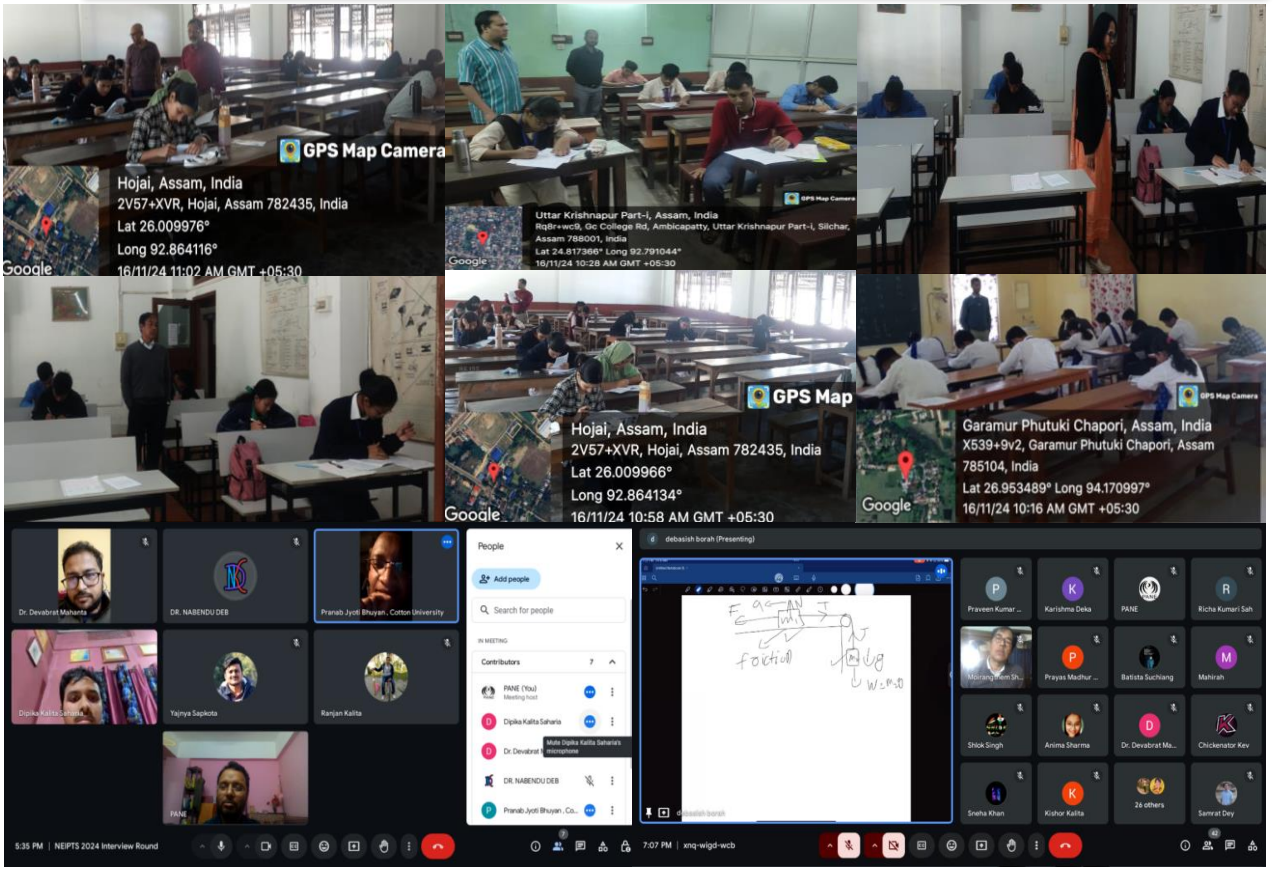
⟶ 26th Foundation Day of Physics Academy of North East:

26th Founday Day of Physics Academy of North East (PANE) has been celebrated at Department of Physics, B. Borooah College, Guwahati, on 6th April, 2024. In this special occasion, the academy has invited Prof. Jiban Jyoti Das, Cotton University, as the chief guest to deliver the Foundation Day talk on the topic "Prospects for a discovery class accelerator for North East". Dr. Samrat Dey, Physics Department, Pragjyotish College, has introduced the speaker. Prof. J.J. Das, an eminent scientist in the field of accelerator-based nuclear physics who spent most of his early career in the USA. He is one of the pioneers in planning the setup of the first particle accelerator of the Northeast India, has delivered an excellent talk explaining the concept of the accelerator and how its installation in the North-Eastern region will boost the research domain among the north eastern scholars and also it will be a boon for the geologists, microbiologists, medical sector and others of this north-eastern region working in this field. The session has been chaired by Prof. N. Nimai Singh, President, PANE who also delivered the welcome address. Prof. Kushal Kalita, the General Secretary of PANE, has addressed the gathering and presented a report on the previous activities of PANE. After the refreshment, the charge hand-over ceremony from the old to new PANE Executive Bodies took place under the chairmanship of Prof. N. Nimai Singh following which Dr. Samrat Day was formally constituted as a new General Secretary while Prof. N. Nimai Singh continues to serve as the president. The charge handover was carried out by Prof. A. Gohain Barua, Executive President, PANE. Dr. Dey then delivered a speech expressing his views and objectives to be carried out on the future tenure along with the new portfolio of PANE Executive Body. PANE members from Gauhati University, Tezpur University, Assam Don Bosco University, Cotton University, different colleges of Assam and other institutions have attended the celebration which was ended with a group photo.

Events ...

⟶ Inaugural North East India Physics Talent Search (NEIPTS) Exam, 2024:

The first ever North East India Physics Talent Search (NEIPTS) Examination, 2024, was successfully conducted and its result was announced on 3rd March, 2025. The exam was organized by the PANE with the dual objectives of enhancing physics understanding among young students and identifying the region's top physics talents at an early age to encourage their development. Dr. Yajnya Sapkota served as the examination coordinator. In preparation for the exam, students were provided with study materials; and pre-examination teaching sessions led by Dr. Debasish Bora from IIT, Guwahati, were organized to clarify key physics concepts. The talent search was carried out in two stages. The first stage involved an MCQ-based examination, which included negative marking for incorrect answers, to select the Centre and the State Toppers along with the top 20 candidates selected purely on merit. The exam was held across more than 25 centres in various states of North East India. In the second stage, finalists appeared in an online interview conducted by a panel consisting of Dr. Samrat Dey, Dr. Pranab Jyoti Bhuyan, Dr. Nabendu Deb, Dr. Ranjan Kalita, Dr. Yajnya Sapkota, and Dr. Devabrat Mahanta. This interview selected 11 North East India Toppers. They were Dibya Priyam Saharia (1st), Ayudh Baruah (2nd), Bhargav Ranjan Das (3rd), Adi Dohutia (4th), Sourav Das (7th), and Prayas Madhur Gogoi (8th) from *Assam*; Shlok Singh (10th) from *Mizoram;* and Diana Chongtham (5th), Priyadashini Nongmaithem (6th), WahengbamYaiphaba Singh (9th), and Mashiman Shinglai (10th) from *Manipur*. They will be felicitated in the upcoming 27th PANE Foundation Day at Cotton University. More details (centre and state toppers' list) are available in the website: *https://www.paneindia.co.in/neipt-2024/*



The r-process nucleosynthesis: experimental challenges and opportunities :

Dr. Rudra Narayan Sahoo,
INFN Bologna, Italy

"The r-process nucleosynthesis is one of the most fascinating astrophysical processes responsible for the formation of almost half of the heavy elements of the universe. This process is crucial for understanding the synthesis of elements like Gold, Uranium, and Platinum but production of these elements in a laboratory is not yet possible".

What is nucleosynthesis?

Nucleosynthesis is an ongoing process, still going on in stars and celestial environments, where elements are formed either by charged particle-induced reactions or neutron capture reactions. Nucleosynthesis is classified as (i) Big-Bang: Hydrogen, Helium and trace amount of Lithium are formed, (ii) Stellar: Almost all the elements of nature are formed, and (iii) Cosmic ray spallation: Beryllium and Boron with trace amount of Lithium are formed.

In the stars, elements up to Iron are formed by the charged particle-induced reaction, and beyond that, all the heavy elements are formed in the neutron capture reactions. Neutron capture reactions primarily proceed through the slow neutron capture process or s-process, and the rapid neutron capture process or r-process. In s-process, the neutron capture rate is smaller as compared to the beta decay constant, which means the nucleus must undergoes beta-decay after capturing one neutron, that results in the formation of all the elements along the beta stability valley [1,2]. In 2017, the LIGO and Virgo collaborations detected a neutron-star collision through gravitational waves [3]. This event provided the first direct observational evidence of the r-process [4], confirming that neutron-star mergers are responsible for producing heavy elements.

What is r-process nucleosynthesis?

In this process, the neutron capture rate is larger compared to the beta decay constant, where a nucleus captures many neutrons in a short time period before it undergoes beta decay. This process occurs in an explosive condition such as *supernova* and *neutron star mergers*, where the neutron flux is very high, on the order of 10^{31} *n/cm²/s* or more. Using accelerator facilities or nuclear reactors, we can achieve neutron flux up to $10^{15\text{-}16}$ *n/cm²/s*, which is suitable for s-process nucleosynthesis.

An experimental observation of such process is very crucial for the theoretical validation. The existence of heavy elements is observed by astronomers, but lack of experimental facility constraints to explore the r-process nucleosynthesis. We have few facilities worldwide to measure the cross-section for slow neutron capture, which is still difficult as neutrons need to be produced from nuclear reactions, and further, these neutrons are used for irradiation of a sample. The neutron flux for the s-process nucleosynthesis is around 10^{11}–10^{15} *n/cm²/s*, which can be produced by employing the accelerator facilities.

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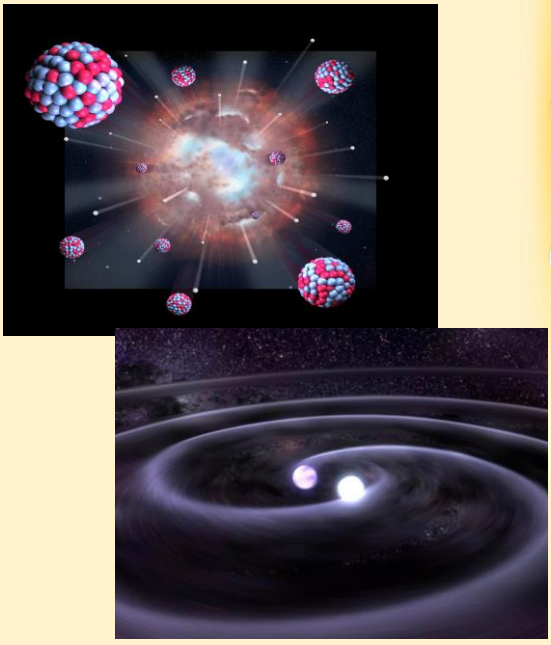

Fig. *Above: Artist's conception of a supernova in which various heavy elements are formed. Credit: Supernova illustration: Akihiro Ikeshita/ Particle CG: Naotsugu Mikami (NAOJ). Below: The merging of two neutron stars is expected produce both gravitational waves and a burst of gamma rays, as depicted in this NASA animation (opens a new tab)*

Challenges to design an experiment for r-process nucleosynthesis

Replicating extreme stellar conditions, high temperature, pressure, and neutron density, like in neutron star mergers and supernovae, in the lab is very challenging. This process produces short-lived isotopes that decay too quickly to study directly, requiring advanced detectors and simulations [2]. To perform an experiment in nuclear physics, an ion beam and a target are needed along with suitable detectors to detect the reaction residues for cross-section measurement.

Unlike that of charge particle-induced reactions, for the neutron capture experiments, we need a beam of neutrons and a suitable target and creating a neutron beam is difficult as neutrons are short-lived with a half-life is around 10.3 mins, and can not be accelerated as these are neutral. In the r-process, the target nucleus should capture more than one neutron simultaneously or one by one within an instant of time before it undergoes beta decay. Most of the elements undergo beta decay after capturing one neutron, constraining the simultaneous capture of more than two neutrons. Even if the lifetime of the daughter nuclei will be slightly longer, we can not irradiate neutrons for long time as longer irradiation destroys the sample by depositing a huge amount of energy, subsequently constraints to carry out further measurements.

An alternative way of approach is reverse kinematics, where we consider neutrons as the target and heavy elements as a projectile. Preparing the neutron target is even more difficult as neutrons are short-lived and we can not gather them together to prepare a target. However, it is convenient that we can prepare ion of the desired sample and accelerate them to induce a reaction. This approach is quite difficult for the r-process nucleosynthesis. The next possibility is that we can enhance the neutron density for multi-neutron capture, which could be feasible but not with the current accelerator facilities. One of the possibilities by the inertial confinement fusion using the laser beams. There we can produce stellar conditions with high neutron flux for an instant. Although this is a possible environment, we can not measure the reaction residues because they are exotic and short-lived. The National Ignition Facility in the USA is one of the facilities where we can create hot and dense plasma by fusing deuteron-triton, where expected neutron density is closer to the r-process nucleosynthesis [5]. For the first time, one of the attempts has been taken to study the neutron induced reactions in this hot and dense plasma [6].

The r-process involves a series of rapid neutron captures, and these rates must be known with great precision to model the nucleosynthesis. The uncertainty in these measurements is a significant barrier to creating accurate simulations of the process. In addition, modeling the r-process needs a solution of complex equations with high-performance computing systems. Although there is little chance, searching for a suitable candidate for the r-process experiment is quite difficult. The design of an experiment to produce r-process elements is one of the hot research topics in nuclear astrophysics due to the above theoretical and experimental issues, which need to overcome with consistent research and innovation. Therefore, scientists are exploring the indirect way to explore r-process nucleosynthesis by combining both theoretical calculations and experimental observations.

Indirect measurement of r-process nucleosynthesis

As there is no direct measurement available for the r-process nucleosynthesis, scientists focus on a different way of approach, where important nuclear physics parameters include neutron separation energies, β-decay rates, neutron capture rates, and information on the shell structure of r-process nuclei are needed for understanding the production of nuclei in an r-process site. Indirectly, the neutron capture cross-section is calculated by combining the nuclear level density, gamma-ray strength function, and nucleon-nucleus optical model potential. These parameters determine the gamma and neutron widths, consequently the capture cross-section [2,7].

References :

[1] E. M. Burbidge et al., Rev. Mod. Phys. 29, 547 (1957).
[2] A. Spyrou et al., Phys. Rev. Lett. 113, 232502 (2014).
[3] LIGO Scientific Collaboration and Virgo Collaboration, Phys. Rev. Lett. 119, 161101 (2017).
[4] D. Watson et al., Nature 574, 497 (2019).
[5] A. B. Zylstra et al., Nature 93, 542 (2022).
[6] M. Paul et al., EPJ Web of Conferences 279, 13004 (2023).
[7] T. Kajino et al., Progress in Particle and Nuclear Physics 107, 109 (2019).

Articles ...

Role of nuclear dissipation in heavy ion fusion-fission reactions :

Dr. Niraj K. Rai,
Dept. of Applied Science & Humanities, Government Engineering College, Kaimur-821102, Bihar

Dissipative phenomenon is a well-known feature in the dynamics of macroscopic systems. Signature of dissipation in strongly interacting small systems (like nucleus) has been revealed via the studies of nuclear dynamics [1]. During the collision of two heavy nuclei at ultra-relativistic energies, dissipation also plays a crucial role with extremely high densities and temperatures [2]. The nuclear dissipation in the mean-field region accounts for the coupling of the collective motion with the intrinsic nuclear degrees of freedom. It is very crucial to know the effect of dissipation to understand the one-body or two-body nature of nuclear viscosity.

Experimental measurements of pre-scission particle multiplicities (neutrons, light charged particles, giant dipole resonance (GDR) rays) are principle tool to investigate the nuclear dissipation [3-5]. The dynamical effect plays a crucial role in fusion-fission process and results by slowing the decay process of the compound nucleus. To understand the nuclear dissipation, the measurement of pre-scission neutron multiplicity is one of the most efficient probes. It was observed that the experimentally measured pre-scission neutron multiplicities were higher than the prediction of the standard statistical model of the compound nucleus [4,6]. Pre-scission charged particle and gamma ray measurements also show the similar behavior [3,5]. The excess yield in the multiplicities indicates the presence of a dynamical hindrance of the fission process, showing that the fission dynamics of an excited compound nucleus is dissipative in the nature at higher excitation energies.

Nuclear dissipation also affects the time scale of the fission process incorporating the fission delay in the process [7]. Fission time scale depends on the shell effects in the fission barrier height and the density of nuclear levels [8]. A detailed investigation of nuclear dissipation across the neighborhood of a closed-shell nucleus shows the effect of the shell closure. The shell closure effect on the nuclear dissipation was measured in the earlier work by measuring the evaporation residue cross-section of various nuclei having ≥ 126 neutrons [8]. The measurement of neutron multiplicity has been performed to observe the shell closure effect on the nuclear dissipation [9]. To understand how the mass asymmetry is affecting the nuclear dissipation in the fusion-fission process, the systematic study of the nuclear dissipation was performed with some already studied systems in the literature, populating the compound nucleus at near value of the mass number and excitation energy [10]. The statistical model calculation for the above mentioned systems, and the calculated value of the M_{pre} was matched with their experimental value by changing the dissipation parameter β. The required value of the dissipation parameter β was plotted with respect to the entrance channel mass asymmetry, and it was pointed out that for the lower value of the mass asymmetry higher value of the dissipation parameter is required.

It was mentioned that during the formation of the compound nucleus, nuclear dissipation depends on the Coulomb factor Z_PZ_T, and it increases with the increasing value of the Z_PZ_T. Because at the higher excitation energy the maximum contribution of the neutron multiplicity is from the formation process therefore it was tried to verify this theoretical investigation. The required value of the dissipation parameter β is plotted with respect to the Coulomb factor Z_PZ_T, it was concluded that in the fusion-fission process, nuclear dissipation increases with the increasing value Z_PZ_T

Recently, the influence of various properties of the target-projectile combination such as the fissility parameter and N/Z of the compound system were investigated to extract a systematic trend of the nuclear dissipation strength [11] which increases with the increasing value of the N/Z, and decreases with the increasing value of fissility for the nuclei of proton magic number Z = 82 and the neutron magic number N = 126. Nuclear dissipation also shows a strong dependence on the excitation energy.

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Articles ...

The higher values of β in the energy range 50–60 MeV indicate a strong dissipation effect due to the dominating nature of the shell effect and a clear systematics of the nuclear dissipation has not been observed in this energy range.

References:

[1] K. Davies et al., Phys. Rev. C 13, 2385 (1976).
[2] T. Schafer et al., Rep. Prog. Phys. 72, 126001 (2009).
[3] J. Lestone, Phys. Rev. Lett. 70, 2245 (1993).
[4] J. Cabrera et al., Phys. Rev. C 68, 034613 (2003).
[5] I. Dioszegi et al., Phys. Rev. C 61, 024613 (2000).
[6] D. Hilscher et al., Ann. Phys. (Paris) 17, 471 (1992).
[7] A. Saxena et al., Phys. Rev. C 49, 932 (1994).
[8] B. Back et al., Phys. Rev. C 60, 044602 (1999).
[9] V. Singh et al., Phys. Rev. C 86, 014609 (2012).
[10] N. Rai et al., Phys. Rev. C 100, 014614 (2019).
[11] N. Rai et al., Brazilian Journal of Phys., 55, 82 (2025).

⟶ Inaugural Induction of the Fellows of PANE, 2024:

Following are the delegates elected as the Fellows of PANE for the first time in the year 2024. The formal induction ceremony of presenting the list of the elected Fellows and their appointment procedure will take place during 27th PANE Foundation Day at Cotton University on 7th April, 2025. More details including the regulations of selection for PANE Fellows are available on the official website of the Fellows: *www.paneindia.co.in/fellows/.*

PANE Fellows

Prof. Bhupendra Nath Goswami

Prof. Jitendra Nath Goswami

Prof. Dhruba J. Saikia

Prof. Sudhakar Panda

Prof. Soumitra Sengupta

Dr. Raghumani Singh Ningthoujam

Prof. Joyanti Chutia

Prof. Prabodh Shukla

Prof. Dilip Kumar Choudhury

Prof. N. Nimai Singh

Prof. Pravat Kumar Giri

Prof. Bipul Bhuyan

Dr. Bibhas Ranjan Majhi

Dr. Debasish Borah

Events ...

⟶ XIVth Biennial PANE National Conference, 2024 :

The 14th biennial national conference of PANE were held at the Department of Physics, Tezpur University during 12-14, November 2024 with Prof. Gazi Ameen Ahmed and Prof. Pabitra Nath as the Event Co-ordinators. The 3-day prestigious academic event brought together renowned physicists, researchers, and students from across the region and beyond to delve into the latest advancements and cutting-edge research in the field of physics. The keynote address, as Bipindas Memorial oration, was delivered by Prof. Dhruba J. Saikia, FNASc, Professor at the National Centre for Radio Astrophysics (NCRA) of the Tata Institute of Fundamental Research (TIFR) and former Vice Chancellor of Cotton College State University, on the topic "Radio-loud active galactic nuclei: an overview and current challenges". The plenary talk was delivered by the renowned Indian Theoretical Physicist, Prof. Daya Shankar Kulshreshtha on "Gravity, Supergravity and Quantum Gravity". Speaking on the occasion, Prof R.R. Hoque, Vice Chancellor, in-charge of the Tezpur University appreciated the PANE forum saying that the platform gives opportunity for exchange of knowledge, which in turn fuels scientific advancements. Prof N. N. Singh, President, PANE and Dr. Samrat Dey, Secretary, PANE explained the positive role played by PANE for the promotion of Physics Research and Education in the entire North-East and the future roadmap of the forum. During the occasion, the university conferred Bipinpal Das Memorial Award to Prof. Saikia. Late Bipinpal Das was an academician per excellence and an astute parliamentarian. Aditi Bhuyan, daughter of late Bipinpal Das, gave away the honour to Prof Saikia. A book titled "*Fifty years of Quarks and Gluons*" written by Prof. Dilip Kumar Choudhury, Retired Professor, Department of Physics, Gauhati University was also released on the occasion. The book, edited by Dr. Ranjit Choudhury, was published by Eastern Book House (EBH). Prof. Choudhury has dedicated this manuscript to his supervisor Prof. Asoke Nath Mitra, a famous theoretical physicist of India. Earlier, the event coordinators, shared the activities planned for the conference as well as some of the key research areas the department is working. In the conference, 165 participants registered for paper presentations (both oral and poster) along with 21 invited talks. Three best Oral and Poster (each) presenters were awarded. Publication of some selected contributed papers is in progress in the journal, 'Journal of Subatomic Particles and Cosmology' (from ScienceDirect.com by Elsevier) and others will be published in the form of book chapters. The 15th regular national conference of PANE, instead of biennial conference, as recommended by EB, will be held at Nagaland University, Nagaland in the year 2025.

Events ...

International Conference on Frontiers in Pure and Applied Physics:

The 3-day International Conference on Frontiers in Pure and Applied Physics (ICFPAP-2024), organized by the Department of Physics, University of Science and Technology Meghalaya (USTM) in association with the PANE, was held from February 29 to March 2, 2024, at the USTM Campus. The valedictory session at NKC auditorium featured prominent guests, including Prof. Katsunori Wakabayashi (Kwansei Gakuin University, Japan), Dr. Santanu K. Maiti (Indian Statistical Institute, Kolkata), Prof. Kushal Kalita (Gauhati University & General Secretary, PANE), and Prof. Enamul Karim (Dean, School of Applied Sciences, USTM).

The conference received an enthusiastic response with 246 research paper abstracts submitted. Researchers from Japan, Bangladesh, Brazil, Turkey, Spain, Taiwan, and India made 239 presentations across nine research areas, including 92 poster and 135 oral presentations. The valedictory session concluded with the distribution of prizes for the best presentations and certificates of participation.

Distinguished speakers included Prof. Wakabayashi, Prof. Kazi Hanium Maria (University of Dhaka, Bangladesh), Prof. Anurup Gohain Boruah (Executive President of PANE), Prof. A.F. Santos (Universidade Federal de Mato Grosso, Brazil), Dr. Ali Ovgun (Eastern Mediterranean University, Turkey), Dr. Santanu K. Maiti, Prof. Pankaj A Joshi (Ahmedabad University, Gujarat), and Dr. Debashis Banerjee (Senior Scientist, VECC, Kolkata).

News by Dr. Faizuddin Ahmed, USTM

Upcoming Event

XVth PANE Conference 2025

The XVth Regular PANE Conference (RPC), to be held in 2025, will be organised by the Department of Physics, Nagaland University, Lumami, by the month of November, 2025 (exact dates yet to be finalised). As per the information provided by the State Executive member of PANE from Nagaland, Dr. Shanta Singh Naorem, Nagaland University, the preparations for the conference are underway, and the Vice Chancellor of Nagaland University has assured his full support for the event. The Organizing committee for the conference and the appropriate publisher for the conference proceedings will be updated very soon. As per the news, the process has already begun for the formation of the various committees for the conference in the last executive meeting of PANE held on 9th March, 2025. The first announcement along with the conference poster is supposed to be released soon. For more details, keep browsing the official PANE website provided in the header of this page.

Editor's Desk

Reflecting on a Year of Growth and Innovation in the Realm of PANE

As we embark into another promising year, PANE continues to make significant strides in fostering excellence in research, education, and professional engagement. The past year has been a testament to our unwavering commitment to advancing knowledge, as we successfully organized several impactful events and witnessed ground breaking research contributions from our esteemed members. Over the last 12 months, PANE has hosted a series of events including conference that have brought together professionals from various fields. These events have served as vital platforms for collaborations, learning and exchange of innovative ideas. Some of the key highlights include brainstorming sessions to come out with the inaugural PANE Journals of Physics; organizing successfully two rounds of the Talent search examinations for the young physics talents in the north-eastern regions for the first time; introducing the concept of PANE fellows towards recognition of the outstanding scientists; etc. to name a few. Each of these events reinforced our mission of bridging academia with real-world applications, enabling our members to stay ahead in their respective fields. In parallel with these events, PANE members have made notable contributions to research as reflected in the research publications in the esteemed journals. The past year saw an array of insightful research articles that push the boundaries of innovation and scientific inquiries. These publications underscore the commitment of PANE members to advancing knowledge and shaping the future of our industry. Their dedication to rigorous research continues to enhance our collective understanding and drive meaningful progress. As we celebrate these achievements, we also recognize that the journey of learning and innovation is ongoing. Few selected meaningful and informative articles from world-wide found the place in this edition of newsletter. The coming months promise even more opportunities for collaboration, growth, and discovery. We encourage all members to stay engaged, contribute actively, and participate in our upcoming initiatives. Together, let us continue to push the frontiers of knowledge and make a lasing impact in our field. Finally, I would like to acknowledge all the members involved directly and indirectly in lending a helping hands towards the successful release of this issue of newsletter.

Upcoming Events

⟶ Release of PANE Journal of Physics

In the horizon, interesting events are coming up, including the release of the first ever issue of the PANE journal of Physics (PJP), 2025, which will take place during the 27th PANE Foundation Day ceremony at Cotton University. The PJP is a peer-reviewed e-journal committed to publishing scholarly research in broad areas of Physics, Astronomy and other related areas. The Academy aims to publish two issues every year covering both invited and contributory articles. Special issues will also be published to include proceedings of the conferences held in the north-eastern region of India. The accepted articles after peer-review will be published in the PANE website. In this inaugural edition, several interesting cutting-edge research articles will be published, edited by the renowned personnels, Dr. Debasish Borah of IIT, Guwahati and Dr. Debajyoti Dutta of Bhattadev University, Pathsala. The Editor-in-Chief of PJP is the President of PANE, Dr. N. Nimai Singh. The online version of PJP will be available in the PANE website, *www.paneindia.co.in*.

⟶ 27th Foundation Day of PANE

27th PANE Foundation Day ceremony of Physics Academy of North East (PANE) will be organized jointly by the Department of Physics, Cotton University (CU), Guwahati, and PANE, to be held on 7th April, 2025 (Monday) at KBR Auditorium, CU. The event will feature distinguished dignitaries, including the Vice Chancellor of CU as the Chief Guest. A special highlight of the day will be the Foundation Day Lecture by Prof. Soumitra Sengupta, Amal Kumar Raychaudhuri Chair Professor at IACS, Kolkata, on the topic "Quantum Mechanics in Gravity". This year's celebration will be historic as it will launch the academy's research journal, the PANE Journal of Physics (PJP); distributing prizes to the toppers of the North East India Physics Talent Search 2024, and presenting the list of PANE Fellows of 2024 along with the appointment procedure for new Fellows of PANE.

PANE NEWSLETTER

Snippets from Print Media in North East

The Assam Tribune Date 13 Apr 2024

PANE foundation day

GUWAHATI, April 12: The 26th foundation day celebration of Physics Academy of the North East (PANE) was held on April 6, at the B Borooah College, a press release stated.

The foundation day lecture was delivered by Prof JJ Das of Cotton University, an eminent scientist in the field of accelerator-based nuclear physics who spent most of his early career in the USA. He is one of the pioneers in planning the setup of the first particle accelerator of the Northeast India.

Prof N Nimai Singh, president of PANE delivered the welcome address and Prof Kushal Kalita, general secretary presented a report on the previous activities of PANE. A charge handover ceremony was also held where the new executive body was formally constituted with Dr Samrat Dey becoming the new general secretary while Prof N Nimai Singh continues to serve as the president.

The Arunachal Times

STATE NEWS | READERS FORUM | EDITORIAL | RING SIDE VIEW | MONDAY MUSING | SPARK | E-PAPER | ARCHIVES

North East India Physics Talent Search

September 14, 2024

ITANAGAR, 13 Sep: With an aim to identify young physics talents of Northeast India, the Physics Academy of the North East will conduct the North East India Physics Talent Search (NEIPTS), 2024 examination for the students enrolled in Class 11 science.

In the first phase, an MCQ-based examination will be held on 26 October at 25 centres across the region.

Candidates can register themselves at paneindia.co.in/neipt-2024 on or before 5 October. Once registered, the candidates will be given a pre-examination guidance from teachers of IITs, universities and other higher educational institutes.

One hundred students, including 10 state toppers from each of the eight states, will qualify for the second phase, which will be an interview round.

Ten students will finally be declared the Northeast toppers, and will receive certificates and cash prizes.

"Further academic assistance may also be provided to them in the future," NEIPTS 2047 coordinator Dr Yajnya Sapkota said in a release.

The Assam Tribune Date 15 Sep 2024

NE India physics talent search exam

GUWAHATI, Sept 14: Physics Academy of the North East (PANE) is going to conduct the North East India Physics Talent Search (NEIPTS) 2024 examination for students enrolled in the Science stream in Class XI, stated a press release.

The first phase, an MCQ-based exam, will be held on October 26. NEIPTS 2024 will be held in 25 centres across the Northeast. Candidates may register themselves at the PANE website by October 5.

They will be given pre-exam guidance from teachers of IITs, universities, and other higher education institutes. A total of 100 students in order of merit, including 10 State toppers from each of the 8 states, shall qualify for the second phase – an interview round.

A total of 10 students will finally be declared Northeast toppers and will receive certificates and cash prizes.

২১ ছেপ্টেম্বৰ, ২০২৪ শনিবাৰ, গুৱাহাটী

উত্তৰ-পুব ভাৰত পদাৰ্থ বিজ্ঞান প্ৰতিভা সন্ধানী পৰীক্ষা

'আমাৰ অসম'ৰ মহানগৰ বাৰ্তা, ২০ ছেপ্টেম্বৰ ঃ উচ্চতৰ মাধ্যমিক প্ৰথম বৰ্ষৰ বিজ্ঞান শাখাত পদাৰ্থ বিজ্ঞানক বিষয় হিচাপে লৈ অধ্যয়নৰত ছাত্ৰ-ছাত্ৰীসকলৰ বাবে 'ফিজি' একাডেমি অব দ্যা নৰ্থ ইষ্ট' এ পোন প্ৰথমবাৰৰ বাবে অহা অক্টোবৰ মাহত উত্তৰ-পুব ভাৰত পদাৰ্থ বিজ্ঞান প্ৰতিভা সন্ধানী পৰীক্ষা-২০২৪ অনুষ্ঠিত কৰিবলৈ সকলোধৰণৰ প্ৰস্তুতি সম্পূৰ্ণ কৰিছে। উত্তৰ-পুব ভাৰতৰ যুব প্ৰজন্মক পদাৰ্থ বিজ্ঞানৰ ক্ষেত্ৰখনৰ প্ৰতিউৎসাহিত কৰা আৰু ছাত্ৰ-ছাত্ৰীসকলৰ মাজত প্ৰতিভাৰ সন্ধান কৰাৰ উদ্দেশ্যে আয়োজন কৰিবলৈ লোৱা এই পৰীক্ষা দুটা পৰ্যায়ত অনুষ্ঠিত হ'ব। ইয়াৰে প্ৰথম পৰ্যায়ৰ পৰীক্ষাটো চলিত ২০২৪ বৰ্ষৰ ২৬ অক্টোবৰত সমগ্ৰ উত্তৰ-পূৰ্বাঞ্চলৰ মুঠ ২৫টা পৰীক্ষা কেন্দ্ৰত অনুষ্ঠিত কৰা হ'ব আৰু এই পৰ্যায়ত বহু বিকল্পভিত্তিক প্ৰশ্নৰ জৰিয়তে মেধাৰ ভিত্তিত উত্তৰ-পূৰ্বাঞ্চলৰ আঠখন বাছনি প্ৰতিষ্ঠানৰপৰা শীৰ্ষস্থান লাভ কৰা প্ৰথম ১০গৰাকী ছাত্ৰ-ছাত্ৰীক সামৰি মুঠ ১০০ গৰাকী প্ৰাৰ্থীক দ্বিতীয় পৰ্যায়লৈ বাছনি কৰা হ'ব। দ্বিতীয় পৰ্যায়ত এক সাক্ষাৎকাৰৰ জৰিয়তে মুঠ ১০ গৰাকী ছাত্ৰ-ছাত্ৰীক উত্তৰ- পূৰ্বাঞ্চলৰ শীৰ্ষ মেধাবী হিচাপে ঘোষণা কৰাৰ লগতে নগদ ধন আৰু প্ৰমাণপত্ৰৰে সম্বৰ্ধনা জনোৱা হ'ব। ইচ্ছুক প্ৰাৰ্থীসকলে অহা ৫ অক্টোবৰ, ২০২৪ৰ ভিতৰত paneindia.co.inউneipt-2024 এই লিংকত গৈ নিজৰ নাম পঞ্জীয়ন কৰিব পাৰিব।

ফিজিক্স একাডেমী অব্ দা নৰ্থ-ইষ্টৰ উদ্যোগ

উত্তৰ-পূব ভাৰত পদাৰ্থ বিজ্ঞান প্ৰতিভাসন্ধানী পৰীক্ষা

গুৱাহাটী, ২০ ছেপ্টেম্বৰ ঃ উচ্চতৰ মাধ্যমিক প্ৰথম বৰ্ষৰ বিজ্ঞান শাখাত পদাৰ্থ বিজ্ঞানক বিষয় হিচাপে লৈ অধ্যয়নৰত ছাত্ৰ-ছাত্ৰীসকলৰ বাবে 'ফিজিক্স একাডেমী অব্ নৰ্থইষ্ট', সংক্ষেপে PANE-ৰ পোনপ্ৰথমবাৰৰ বাবে অহা অক্টোবৰ মাহত উত্তৰ-পূব ভাৰত পদাৰ্থ বিজ্ঞান প্ৰতিভাসন্ধানী পৰীক্ষা-২০২৪ আয়োজন কৰিছে। এই পৰীক্ষা দুটা পৰ্যায়ত অনুষ্ঠিত হ'ব। ইয়াৰে প্ৰথম পৰ্যায়ৰ পৰীক্ষাটো

২৬ অক্টোবৰত উত্তৰ-পূৰ্বাঞ্চলৰ ২৫ টা কেন্দ্ৰত হ'ব পৰীক্ষা

চলিত বৰ্ষৰ ২৬ অক্টোবৰত উত্তৰ-পূৰ্বাঞ্চলৰ মুঠ ২৫টা পৰীক্ষা কেন্দ্ৰত অনুষ্ঠিত হ'ব। এই পৰ্যায়ত বহু বিকল্পভিত্তিক প্ৰশ্নৰ জৰিয়তে মেধাৰ ভিত্তিত উত্তৰ-পূৰ্বাঞ্চলৰ আঠখন বাছনি প্ৰতিষ্ঠানৰ পৰা শীৰ্ষস্থান লাভ কৰা প্ৰথম ১০ গৰাকী ছাত্ৰ-ছাত্ৰীক সামৰি মুঠ ১০০ গৰাকী প্ৰাৰ্থীক দ্বিতীয় পৰ্যায়লৈ বাছনি কৰা হ'ব। দ্বিতীয় পৰ্যায়ত এক সাক্ষাৎকাৰৰ জৰিয়তে মুঠ ১০ গৰাকী ছাত্ৰ-ছাত্ৰীক উত্তৰ- পূৰ্বাঞ্চলৰ শীৰ্ষ মেধাবী হিচাপে ঘোষণা কৰাৰ লগতে নগদ ধন আৰু প্ৰমাণপত্ৰৰে সম্বৰ্ধনা জনোৱা হ'ব। ইচ্ছুক প্ৰাৰ্থীসকলে অহা ৫ অক্টোবৰ, ২০২৪ৰ ভিতৰত paneindia.co.in/neipt-2024 লিংকত গৈ নিজৰ নাম পঞ্জীয়ন কৰিব পাৰিব। পঞ্জীয়নকৃত প্ৰাৰ্থীসকলক পাছে পাছে টি. বিভিন্ন বিশ্ববিদ্যালয় আৰু অন্যান্য উচ্চ শিক্ষা প্ৰতিষ্ঠানৰ শিক্ষকৰ দ্বাৰা পৰীক্ষা সম্বন্ধীয় প্ৰয়োজনীয় দিহা-পৰামর্শ দিয়া হ'ব বুলি উত্তৰ-পূব ভাৰত পদাৰ্থ বিজ্ঞান প্ৰতিভাসন্ধানী পৰীক্ষাৰ সমন্বয়ক তথা 'ফিজিক্স একাডেমী অব্ দা নৰ্থ-ইষ্ট'ৰ প্ৰচাৰ সম্পাদক ড' যজ্ঞ সাপকোটে জনাইছে দিয়ে।

Asomiya Protidin

The Assam Tribune Date 26 Oct 2024

GD Baruah

DOOMDOOMA, Oct 25: Dr Gaurangdhar Baruah, an internationally renowned optical scientist and former professor of Physics, Dibrugarh University, passed away at his residence at Uchamati Bharat Bhumij Road of Doomdooma town on Wednesday night. He was 81.

Prof Baruah was born on March 1, 1943. An alumnus of Hoonlal HS School, Doomdooma, he passed the matriculation examination in 1957 and the ISC examination from JB College, Jorhat, in 1959. He did his BSc from Cotton College (now Cotton University) in 1962 and obtained his MSc degree in Physics with First Class marks from Gauhati University in 1964.

Thereafter, after spending some time in association with Nobel laureate Sir CV Raman in his laboratory in Bengaluru, he went to Banaras Hindu University (BHU) to do research in molecular spectroscopy and obtained his PhD degree in 1969. He joined the faculty of the Department of Physics, Dibrugarh University, in 1973 and taught there until 2008. Along with teaching, he conducted research in molecular spectroscopy, laser Physics and quantum optics. He came into prominence after doing high-quality research on the discovery of the phenomenon known as 'Purkinje effect and bioluminescence of fireflies', which was able to attract the attention of the scientific community around the world.

He is survived by his wife, one son, and two daughters. – Correspondent

Poknapham

POKNAPHAM Edition Sep 29, 2024 Page No. 4

NE Physicists meet at Tezpur University

OUR CORRESPONDENT

TEZPUR, Nov 13: Department of Physics, Tezpur University commenced the 14th Biennial Conference of the Physics Academy of the North-East (PANE-2024) from November 12. The two-day prestigious academic event brought together renowned physicists, researchers, and students from across the region and beyond to delve into the latest advancements and cutting-edge research in the field of physics. The Physics Academy of North-east is the largest science academy of Northeast India. This is also one of the oldest academies of the region.

Prof. Dhruba J. Saikia, former Vice Chancellor, Cotton College State University and currently professor at Tata Institute of Fundamental Research, Prof N Nimai Singh, President, PANE, Prof D S Kulshrestha, a noted theoretical physicist, and Dr. Samrat Dey, Secretary PANE, Pragjyotish College were present on the occasion.

Speaking on the occasion, Prof RR Hoque, Vice Chancellor, in charge of the University appreciated the PANE forum saying that the platform gives opportunity for exchange of knowledge, which in turns fuels scientific advancements.

Prof Singh, President, PANE and Dr. Samrat Dey, Secretary PANE explained the positive role played by PANE for the promotion of Physics Research and Education in the entire North-East and the future roadmap of the forum. During the occasion, the university conferred Bipinpal Das Memorial Award to Prof Dhruba J Saikia. Late Bipinpal Das was an academician per excellence and an astute parliamentarian. Aditi Bhuyan, daughter of late Bipinpal Das gave away the honour to Prof Saikia.

Later Prof Saikia delivered Bipinpal Das Memorial oration on the topic, "Radio galaxies and quasars: an overview and current challenges".

A book titled "Fifty years of Quarks and Gluons" written by Prof. Dilip Kumar Choudhury, Retired Professor, Department of Physics, Gauhati University was also released on the occasion.

Earlier, Prof Pabitra Nath, Head of the Department and Prof Gazi Ameen Ahmed, event coordinator, shared the activities planned for the conference as well as some of the key research areas the department is working.

The Sentinel

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PANE

Promoting physics education and research in North-East India since 1998

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