



Indian Institute Of
Technology, Guwahati

Centre For Career Development

Department of
Physics

Department Brochure



About the Institute

Since **1994**, when it was founded as the sixth Indian Institute of Technology, IIT Guwahati has become one of the world's most dynamic universities in technology, innovation, and research. The campus lies on a 285-hectare parcel of land on the northern bank of Brahmaputra 20km from the city centre. The curriculum and courses at IIT Guwahati are constantly changing to meet global needs and allow students to explore their interests.

The Institute offers **B.Tech, B.Des, MA, M.Des, M.Tech, MS(R), MBA, M.Sc, and Ph.D** programmes in 11 Departments, 9 Centres, and 5 Schools in all major engineering, science, and humanities areas. Our students can broaden their studies with a 'Minor' degree, open and interdepartmental electives, audit courses, and inter-disciplinary research.

The institute's state-of-the-art laboratories and **National Centres of Research** have made it a hub for research and technical education.

Apart from world-class research, the faculty prepares students for professional problems by teaching them their fields conceptually. It also helps students participate in worldwide projects, which helps them become pioneers and leaders.

IIT Guwahati has **MoUs (Memoranda of Understanding)** with top international institutes for semester-based student-exchange programmes and summer internships, boosting global integration and broadening our students' perspectives.

In their holidays, students intern in industrial, managerial, and research fields at top international corporations and research labs, contributing greatly. The institute provides excellent extracurricular opportunities to help students develop holistically.

About the Department

Arguably the best academic centres for Physics studies in the northeast India, the Department of Physics provides the right ambiance for any physics student aspiring to build his/her career around Physics. With an excellent team of competent faculty involved in worldclass research, supported by some of the state-of-the-art research facilities, the Department has made its mark on the map of India and the Globe. Main research focus areas are Condensed Matter Physics, Laser and Photonics and High Energy Physics in both theoretical as well as experimental fronts. Beyond these, areas in theoretical physics including Gravitation, Astrophysics and Cosmology, Quantum Field Theory and Quantum Computation are also actively pursued by members of the Department.

Apart from frontline research, the Department offers two-year MSc programme in Physics (starting from 2000), and four-year BTech in Engineering Physics (starting from 2006).

The active PhD programme in the department is the backbone in supporting the research activities. The research is also supported by the post-doctoral fellows, selected through the institutes IPDF programme as well as through the National level NPDF scheme.





Head of Department
Dr Bosanta Boruah

Message from Head of the Department

The Department of Physics, Indian Institute of Technology Guwahati, is nearly thirty years old, and has made its mark at national and international levels. Based on the solid foundation of state of the art undergraduate and masters degree programmes, the department is thriving with cutting edge research done by 44 member strong faculty and over 200 research students. The department has lately gained remarkable visibility by producing brilliant undergraduate, masters and Ph.d. students who are employed in various world renowned institutes and industries as well as by being part of numerous collaborative efforts with the leading groups in the areas of condensed matter physics, laser and photonics, high energy physics and gravitation, cosmology and astrophysics. The department encourages young and brilliant minds to join various programmes of the department and engage themselves in interdisciplinary research by associating themselves with various focused research centres and Engineering departments of IIT Guwahati. Being a part of the premier technological school of the country, the department offers a broad spectrum of the fabulous innovations and applications of ideas in basic sciences to make an impact in the international arena. Our faculties, research staff and technical support staffs are always eager to explore new ideas and challenges associated with basic and applied physics problems which can make significant contributions to our understanding of the nature. We look forward to work with you and would highly appreciate your support in our journey.

Programs Offered

B Tech Engineering Physics

The department of physics started a four year B. Tech. Engineering Physics Program in 2006 to train the bright students as engineer along with essential knowledge on physics and applied physics. In this program, the courses are designed systematically to offer an overall knowledge of physics including experimental techniques with modern equipments. The department also offers specialized courses for the B. Tech. program to provide exposure to the advances in science and technology with deeper insight.

Masters of Science in Physics

The department of physics started a two year Master of Science (Physics) Program in 2000. This program is designed with equal emphasis on both classroom lectures and laboratory training with modern equipments.

Doctor of Philosophy

Ph. D. program is started in the department since August 1996 both in experimental as well as theoretical physics. Students in this program are trained through rigorous course work covering basic as well as advanced level courses before starting their research work. The major research areas in the department are Condensed Matter Physics (Theory and Experiment), Lasers and Photonics, Theoretical Physics, High Energy Physics and Astrophysics.

Course Structure

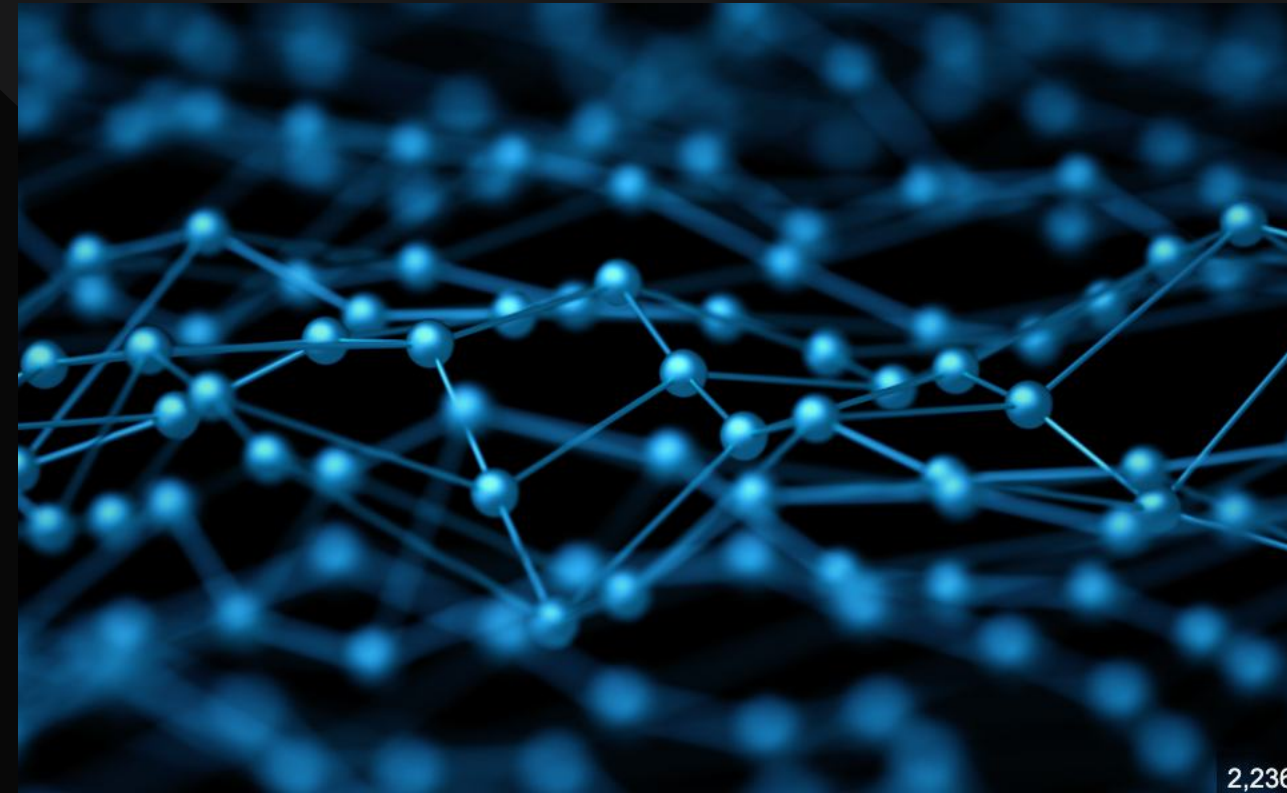
Core Courses

1. Quantum Mechanics
2. Classical Electrodynamics
3. Statistical Mechanics
4. Computer Programming with Numerical Programming
5. Digital Electronics and Microprocessors
6. Analog Electronics
7. Semiconductor
8. Solid State Physics
9. Nano-Electronics
10. Nuclear Physics
11. Optics
12. Lasers and Ultrafast Optics
13. Electronics Laboratory
14. General Physics Lab
15. Advanced Physics Lab

Elective Courses

1. Quantum Field Theory
2. Magnetisation and Superconductivity
3. Soft Condensed Matter
4. Quantum Optics
5. General Relativity
6. Condensed Matter Physics
7. Non-linear Optics
8. High Energy Physics
9. Laser Physics
10. Imaging and Fourier Optics
11. Laser Spectroscopy
12. Quantum Computation and Information
13. Spintronics: Physics and Technology
14. String Theory
15. Topological Phase of Matter

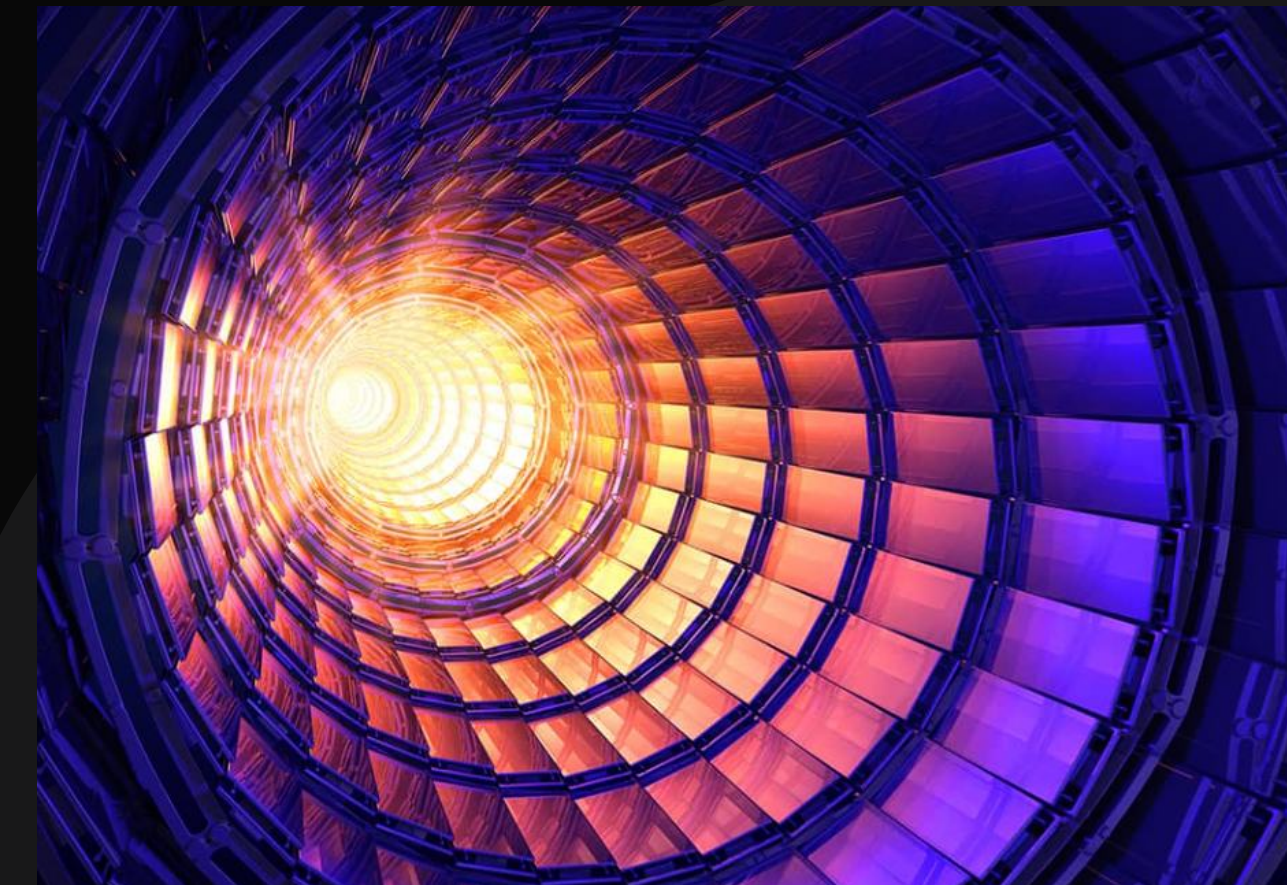
Areas of Research



Condensed Matter Physics



Gravity, Astrophysics and
Cosmology

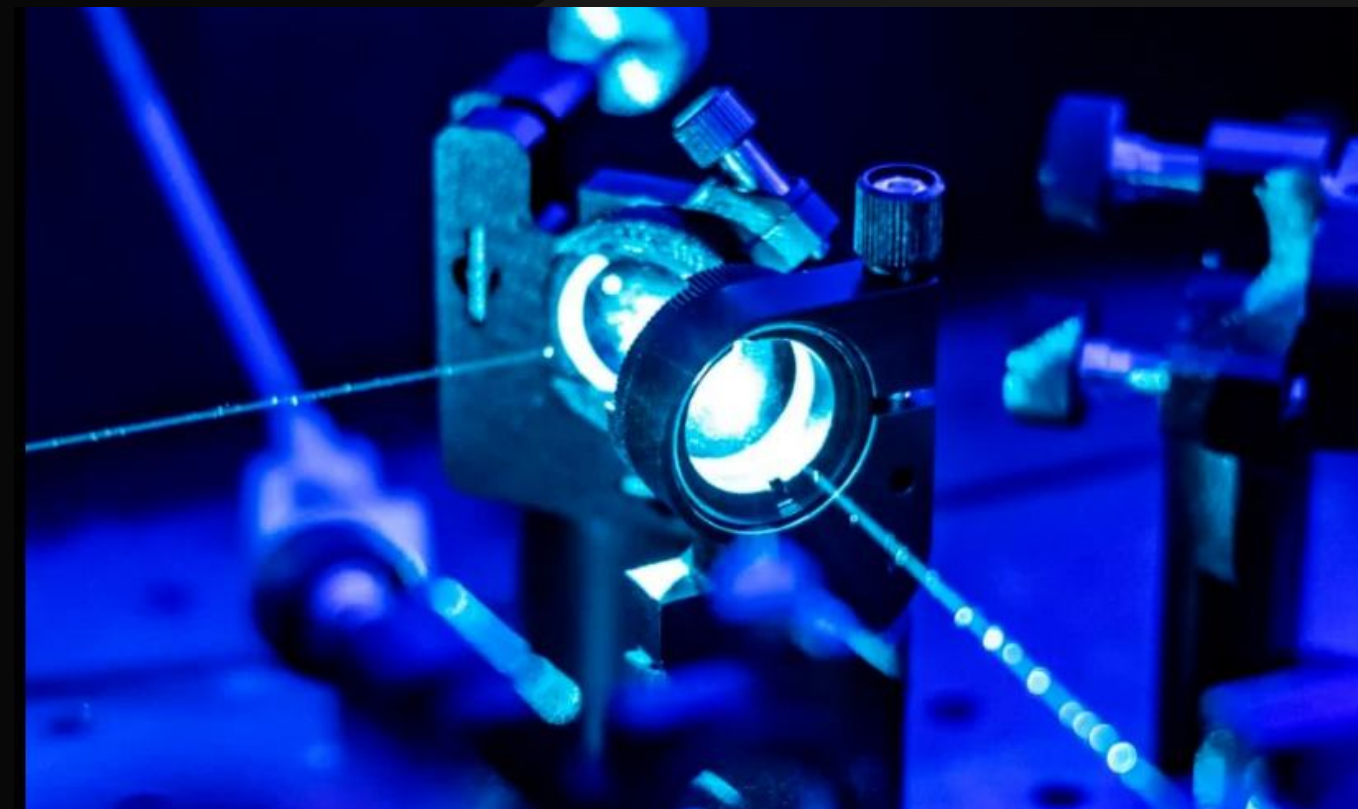


High Energy Physics

Areas of Research



Laser and Photonics



Quantum Optics and Quantum Technology

Achievements and Facilities

1. Last year, the department applied for two patents and was granted six.
2. Over 400 publications were produced by the department's research groups, with many appearing in journals such as Physical Review Letters, Physical Review A, Physical Review B, Physical Review Research, and Physical Review M.
3. Several students received notable awards, including ICGP fellowship NIMS Japan, Tsukuba, the Best Poster award, the Best Paper award at IICHE CHEMCON and sponsorships from the DST Nano-mission, Rutherford Appleton lab, etc.

There are a total of 29 labs in the department, out of which 24 are research labs while 5 are teaching labs.

Some of the research labs are:

Fiber Optic lab

Non-linear Optics lab

Material Science lab

Low Temperature Physics lab

Semiconductor lab

XRD lab

Integrated Quantum Photonics lab

Patents

Sl. No.	Name of Faculty and co researcher	Name	Date Applied/Granted	Application No.	Remarks
	Biswajit Pathak and B R Boruah	A Method and Device for Zonal Wavefront Sensing Via Sequential Spatially Shifted Grating Array Patterns	13/02/2024	Indian Patent No.: 510388	Granted
	Prof. D. Pamu & Apurba Das	Hydroxyapatite (HAP) Comprising of Mixed Polymorphs of Monoclinic and Hexagonal Phases Obtained by Sol-Gel	05/02/2024	Indian Patent No.: 507092	Granted
	Prof. D. Pamu, E. Radhika & Dr. T. Tiwari	Low Temperate Microwave Sintered Phase Pure ALN Ceramics Comprising	31/1/2024	Indian Patent No.: 505981	Granted
	P. K. Giri, Sanjoy Sur Roy, Koushik Ghosh and M. Meyyappan	An Electromagnetic Interference Shielding Film with High Green	22/01/2024	E-106/91/2024/KOL	Indian Patent (Applied)
	Santanu Konwar and B R Boruah	Free space optical communication system apparatus and a method thereof	29/12/2023	Indian Patent No.: 491998	Granted
	Prof. D. Pamu, Susmita Rabha & Apurba Das	Synthesis and Processing of ST Sputtering Target Material to Obtain	27/7/2023	Indian Patent No.: 440751	Granted
	Uday Narayan Maiti & Mr. Golam	Ultrafast development of crystallinity tuneable nanocatalysts over graphitization-controlled carbon nanostructure for	15/07/2023	202331062341	Applied
	Santanu Konwar and B R Boruah	Free space optical communication system apparatus and a method thereof	14/04/2023	Japanese Patent No.: JP,7263453, B	Granted

Awards and Honors

Sl. No.	Name of Faculty	Name of Award	Name of Institute/ Organization/ Foundation bestowing the	Reason for award	Form of Award (Citation/ Medal/ Cash etc)
	Prof. P. K. Giri	Senior Member	IEEE, USA	Contribution to the field of	Citation
	Prof. P. K. Giri	National Scholarship (Slovak)	National Scholarship Programme of the	Research visit to Slovakia University of Technology	Financial Support and citation
	Prof. Subhash Thota	Editorial Advisory	American Institute of Physics (AIP),	Contribution to the field of Applied	Citation
	Prof. Subhash Thota	DST Nanomission funding	Rutherford Appleton Laboratory ISIS Neutron and	Research visit to Rutherford Appleton Laboratory	Financial Support and citation
	Prof. Subhash Thota	DST Nanomission-RAL funding	Deutsches Elektronen-Synchrotron DESY	Research visit to PETRA-II Beamline of German Electron Synchrotron DESY	Financial Support and citation
	Dr. Ratnadwip Singha	INSPIRE faculty fellowship	Department of Science and Technology	Excellence in respective research field	Fellowship and research funding
	Dr. Binoy K. Hazra	INSPIRE Faculty Fellowship	Department of Science and Technology (DST)	To support the research	Research Grant for 5 years
	Dr. Binoy K. Hazra	Life Membership	Magnetics Society of India (MSI)	Contribution to the magnetism and spintronics research	Membership

Sponsored Projects

Title

Funding Agency

1. Development of New Techniques of Nano Writing Using Pulsed High Power Laser Interferometry

Ministry of Human Resource Human Development (MHRD)

2. Investigation of the Reentrant Disorder Behaviour and Catalytic Properties of Frustrated Pyrochlore Nanostructures

Science and Engineering Research Board (SERB), DST

3. Electrical, Optical and Thermal studies on Vanadium Pentoxide based glasses

Council of Scientific and Industrial Research (CSIR)

4. Controlled growth and studies on Semiconductor Nanowire Heterostructure for Solar Photovoltaic Applications.

Board of Research in Nuclear Sciences (BRNS)

Past Recruiters



Past Recruiters



Past Recruiters



Contact Details

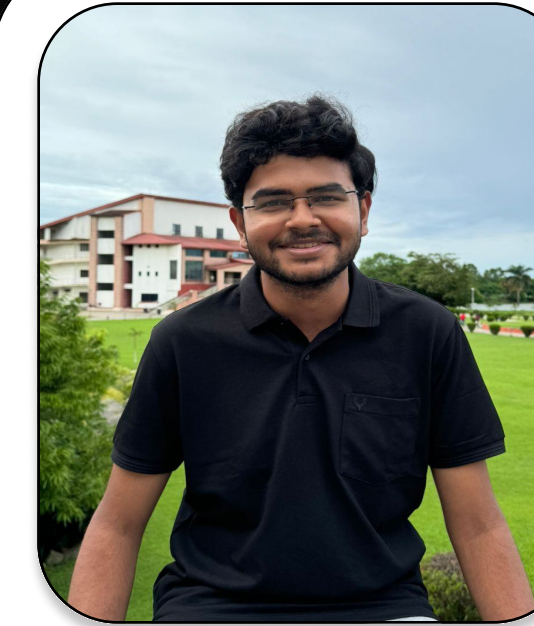


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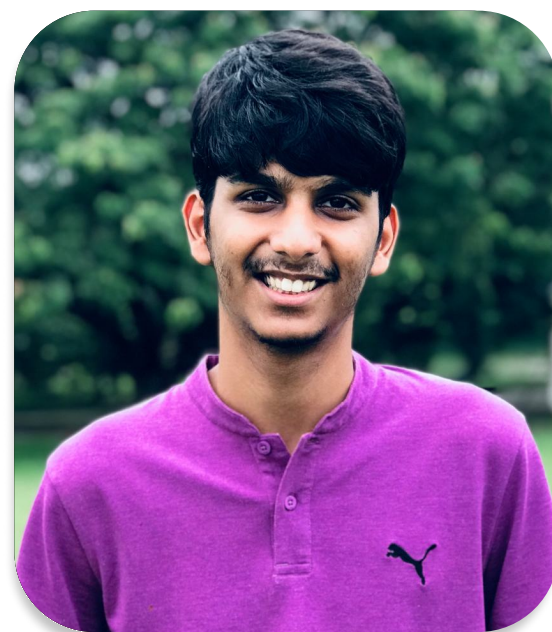


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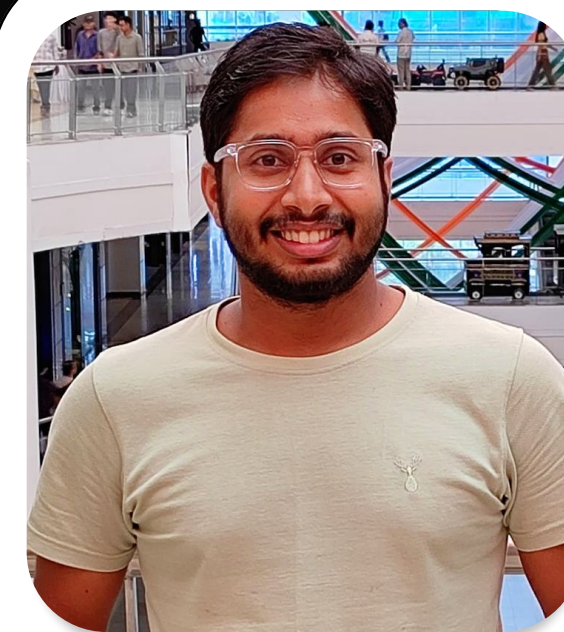
Overall
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