



Department of Physics

A DST-FIST & UGC-SAP Assisted Department



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UNIVERSITY OF KASHMIR
SRINAGAR

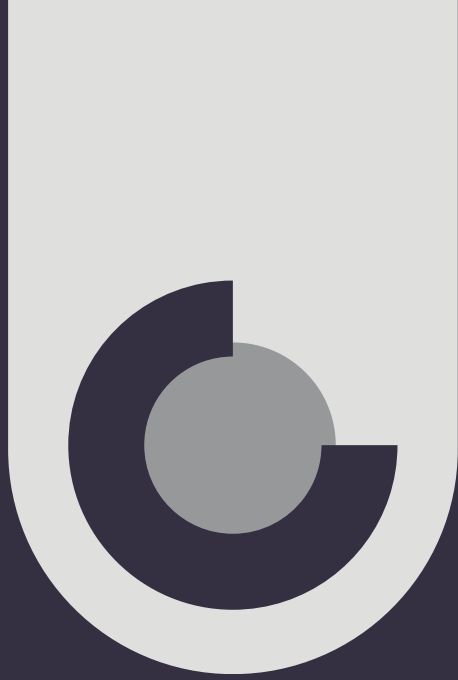


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Welcome Message

The Department of Physics at the University of Kashmir is a vibrant community of faculty, scholars, staff, students, and alumni, all committed to excellence in physics education and research. Physics explores the fundamental principles governing the universe, from subatomic particles to the cosmos itself. It unravels the mysteries of energy, matter, and natural laws, forming the foundation of scientific discovery and technological innovation. We invite you to explore our department and be part of this journey into the wonders of physics!



The Department of Physics is dedicated to providing a high-quality learning experience through its Master's and PhD programs. Excellence in teaching remains a core priority, with regular course updates and the introduction of new programs aligned with cutting-edge research. We continuously explore innovative teaching methodologies and platforms to enhance the learning experience.

Our faculty members conduct research across major domains of physics, spanning High Energy Physics, Nuclear Physics, Astrophysics, Condensed Matter Physics, Radiation Physics, Atmospheric Physics, Neutrino Physics, Nano Physics, and Quantum Computation. The department actively collaborates with leading national institutes, including the Tata Institute of Fundamental Research (TIFR) in Mumbai, the Inter-University Centre for Astronomy and Astrophysics (IUCAA) in Pune, the Saha Institute of Nuclear Physics (SINP) and the Variable Energy Cyclotron Centre (VECC) in Kolkata, and the Inter-University Accelerator Centre (IUAC) in New Delhi.

Our global partnerships extend to CERN in Geneva, FAIR in Germany, and Oak Ridge National Laboratory (ORNL) in the USA. The department has seen a steady rise in high-impact research publications and funding, reflecting its commitment to advancing scientific knowledge. Beyond research, our faculty also contribute significantly to administrative leadership and institutional development, shaping the future of physics education and innovation.



Vision Mission

Vision

The Department of Physics envisions being a center of excellence in education and research, fostering innovation, interdisciplinary collaboration, and industrial partnerships. By advancing scientific knowledge and technology, the department aims to contribute to global scientific progress and societal development.

Mission

- Provide high-quality education and research opportunities in physics.
- Continuously update and modernize curricula, laboratories, and teaching methodologies.
- Promote cutting-edge research in various physics domains through national and international collaborations.
- Facilitate student and faculty exchange programs with premier research institutions.
- Encourage scientific outreach and industry linkages to bridge the gap between academia and practical applications.
- Support and mentor young researchers to excel in their fields and contribute to global science.

Department History

1962

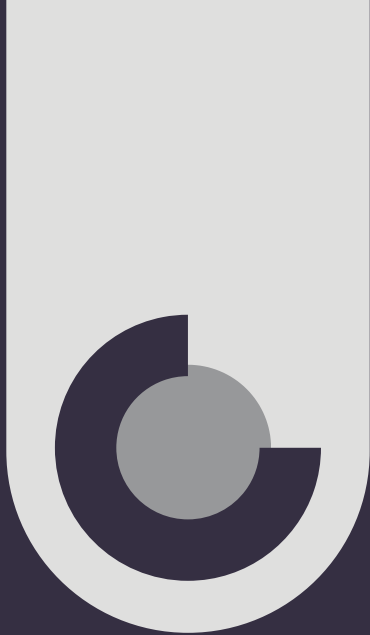
The Department of Physics was established in 1962 in the University Campus, Hazratbal, of the erstwhile Jammu and Kashmir University, Srinagar to impart teaching and training to the students from J & K State leading to the Master's degree in Physics. Prior to the establishment of the Department in the valley, desirous students from the state had to go outside the state to obtain their Master's degree. Of the 25 students inducted in a batch, admissions to 50% seats were reserved for candidates representing Jammu province and Kashmir province respectively. The admission policy continued till 1967 – 68 when Jammu & Kashmir University was bifurcated to respective Jammu University and Kashmir University in 1969. At present, 65 students are admitted every year for post-graduate studies.



2025

In 2025, the Department of Physics at the University of Kashmir stands as a thriving center of excellence in education and research, with a strong legacy of innovation and scientific contribution. With state-of-the-art laboratories, modern computational facilities, and global collaborations with institutions like CERN, ORNL, and TIFR, the department continues to push the boundaries of physics. Our faculty and scholars are actively engaged in cutting-edge research across diverse fields, contributing to high-impact publications and advancing knowledge in areas such as quantum computation, nuclear physics, and astrophysics. With a growing number of students securing positions in premier research institutes worldwide, the department remains committed to fostering scientific inquiry, interdisciplinary collaboration, and technological advancements that shape the future.

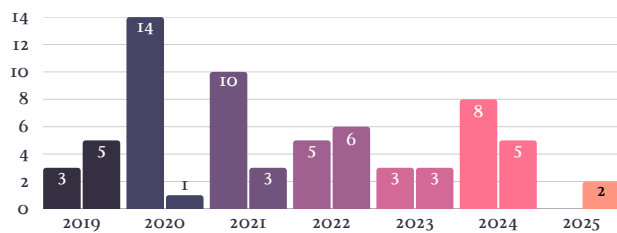




Student Profile

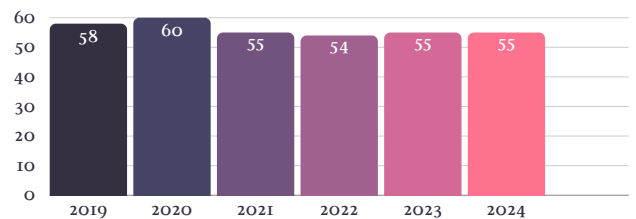
PhD Enrolled/Awarded

Department of Physics have always been proactive in research activities. A good number of PhD students have been enrolled and awarded from the department. Following is a brief summary of the research scholars.



MSc Students Passed

The teaching area of the department have always been appreciated and graded by various ranking organisations. Following is the profile of the Masters (MSc Physics) students passed out in recent years



Placements

Placements (From 2012 Till Date)	
Department	No of Students Selected
Higher Education Department - JKPS	29
School Education - JKPS	43
Banking Sector	Very Good Number of People
School Education - JKSSB	Lots of People as GLT
Other Department	Huge Number of Students

Competitive Exams

NET/JRF/GATE/JKSET/LASET/INSPIRE					
2019	2020	2021	2022	2023	2024
2	2	2	5	10	6

Student Progression

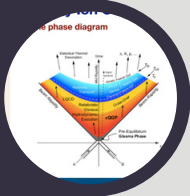
(Our Passed Students Going For Higher Studies Anywhere)

Student Progression		
Year	No of Students Joining PhD	No of Students Joining Post-Doc
2019	0	1
2020	3	1
2021	3	1
2022	3	1
2023	4	3
2024	1	2

Departmental

Departmental Fellowships to PhD Scholars			
Year	No of Fellowships	Amount Per Fellow Per Month	Total
2019	6	5000	360000
2020	6	5000	360000
2021	6	10000	720000
2022	6	10000	720000
2023	6	10000	720000
2024	6	10000	720000

Research Areas



High Energy Physics

The quest for inquiring high energy heavy ion collisions has grown significantly in recent years. These investigations have expanded our knowledge about the QGP medium and hence the early universe. Research in this branch of physics helps to explore the dynamics of heavy ion collisions.

Nanophysics

Growth/preparation & Characterization of nanoparticles and nanocomposite for various applications particularly in Environmental Remediation, Healthcare Solutions and Energy Applications



Radiation Physics

The Smart Rn-Duo, developed by BARC Mumbai, is a compact, advanced device used for the precise estimation of radon concentration in water and soil gas. It aids in radiation monitoring, environmental studies, and geophysical research, ensuring accurate radon assessment for health and safety evaluations.

Astrophysics

The Astrophysics Research Group investigates active galactic nuclei, galaxy clusters, and X-ray binaries, integrating theoretical modeling with observational analysis to explore their physical properties.



Atmospheric Physics

Airglow, Upper Atmospheric Dynamics, Atmospheric Gravity Waves, Lower Atmospheric Convection, Traveling Ionospheric Disturbances, Plasma Depletions, and Plasma Blobs.

Quantam Dynamics

Study of Decoherence and Entanglement
Non Equilibrium Theory
Quantum Measurement and Control
Quantum Teleportation

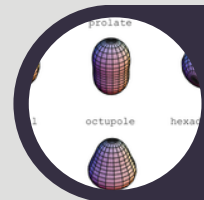


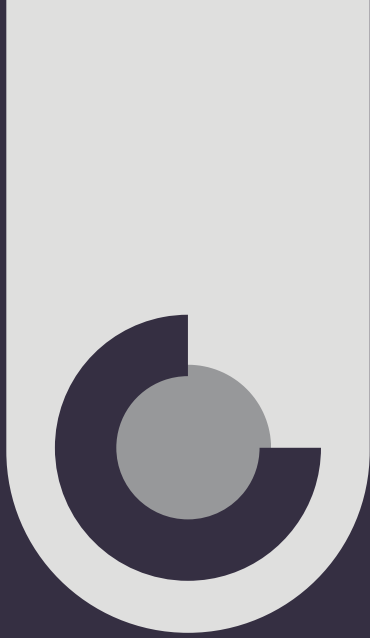
Solid State Physics

Synthesis & Characterization of MOFs and multiferroics for various applications.

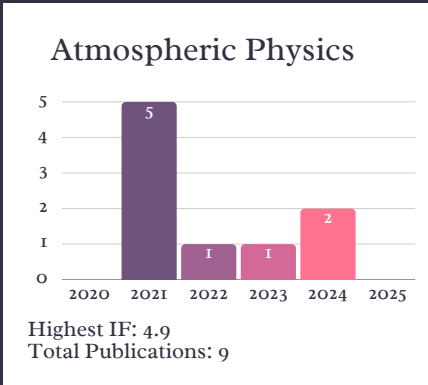
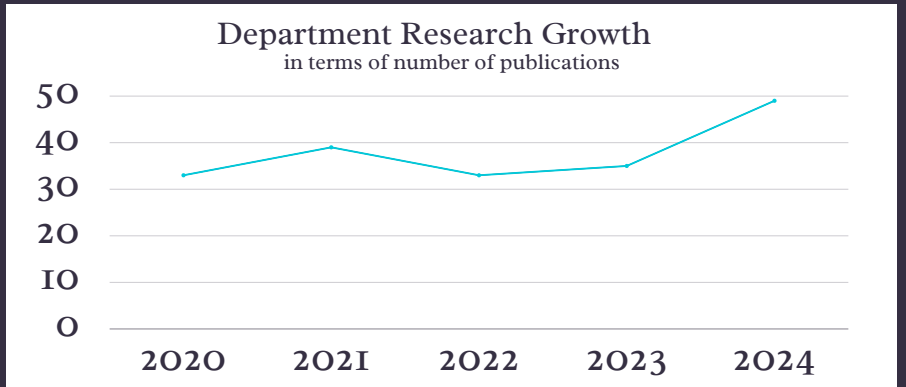
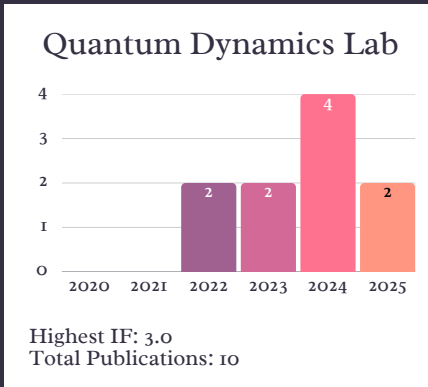
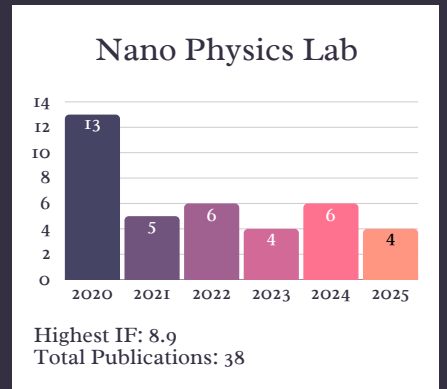
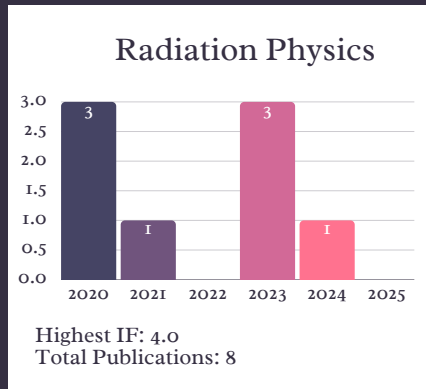
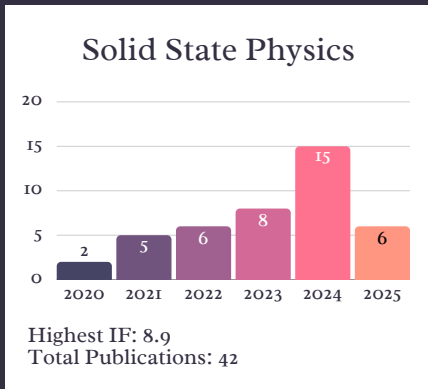
Nuclear Physics

Nuclear structure physics explores the properties and behavior of atomic nuclei, focusing on their shapes, energy levels, and interactions. It examines the underlying forces governing nucleons (protons and neutrons) using theoretical models like the shell model, mean-field approaches, and beyond-mean-field methods.



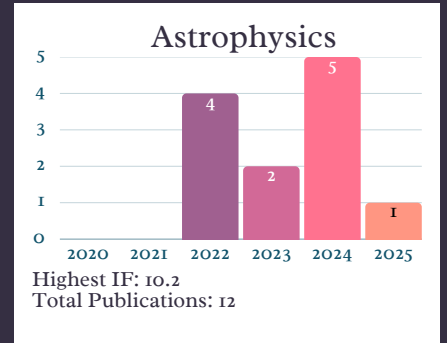
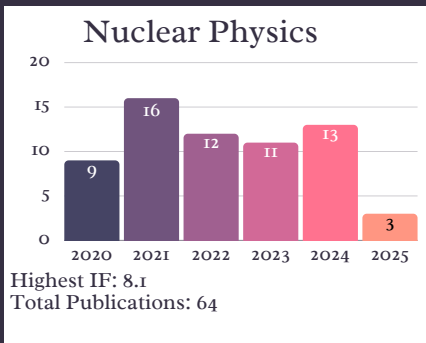
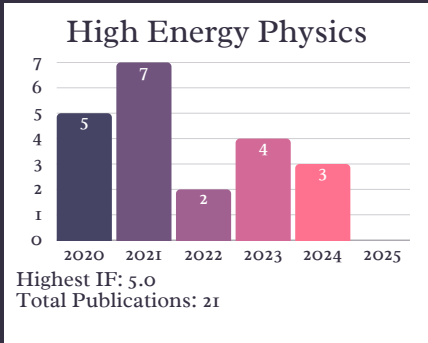


Research Profile



Recent Publications

Title	Lab	Journal	IF
Enhanced electrochemical performance of MoS ₂ @CdSe GO ternary heterostructures for asymmetric supercapacitors	Nanophysics	Journal of Energy Storage	8.9
Probing spectral evolution and intrinsic variability of Mn K α 421: A multi-epoch AstroSat study of X-ray spectra	Astrophysics	JHEAP	10.2
Dephasing effects on the low-energy dynamics of Phi 4 model	Quantum Dynamics	International Journal of Modern Physics B	2.6
Airglow-imager based observation of possible influences of subtropical mesospheric gravity waves on F-region ionosphere over Jammu & Kashmir, India	Atmospheric Physics	Scientific Reports	4.9
Increasing octupole collectivity across the Z=64 isotopic chain: B(E5) values in 150 Gd	Nuclear Physics	Physics Review Letters	8.1
Radiological assessment of Radon in ground water of the northernmost Kashmir Basin, Northwestern Himalaya	Radiation Physics	Environment Geochemistry and Health	4.0
Effect of Aluminium (Al)-doping on electrochemical performance of hydrothermally synthesized hematite (α -Al-Fe ₂ O ₃) nanospheres for supercapacitor applications.	Solid State Physics	Journal of Energy Storage	8.9
TMD evolution effect on $\cos 2\phi$ azimuthal asymmetry in a back-to-back production of J / ψ and a jet at the EIC	High Energy Physics	Physical Review D	5.0



Research Projects

Ongoing

Name of PI	Project Title	Year	Amount	Funding Agency
Prof. Manzoor Ahmad Malik	Radio and X-ray studies of non-thermal processes in galaxy clusters and galaxy group.	2022	22,03,542.00	SERB
Prof. Basharat Ahmad Want	Effect of different Excitation wavelength on the structural and optical properties of Europium doped nanoscale Zinc Oxide thin films. (3 YEARS)	2022	2,366,880.00	DST
Prof. Naseer Iqbal	Unveiling the high energy emission properties of blazars using astrosat observations	2021	14 lakhs.	ISRO
Prof. Waseem Bari	Measurement of Integral Vertical Intensity and Angular Distribution of Atmospheric Muons using a Cosmic Ray Telescope	2023	2500000	DST

Completed

Name of PI	Project Title	Year	Amount	Funding Agency
Dr Syed Shakeel Ahmad	A Study of radon, Thoron and their progeny level in Kashmir valley of J &K State	2016	33,20,700	DAE-BRNS
Prof. Basharat Ahmad Want	Investigations on ferroelectric and optical properties of some rare-earth based metal-organic frameworks (3 YEARS)	2021	5,484,400.00	SERB
Prof. Waseem Bari	R&D Efforts by University Groups for India Based Neutrino Observatory (INO) Project	2016	4884000.00	DST
Prof. Waseem Bari	India Based Neutrino Observatory (INO) Project	2014	870000	DST
Prof. Manzoor A. Malik	Studies on Atmospheric, Ionospheric and Space Science	2016	9.50 lacs +Airglow Imager on loan from NARL	NARL
Dr. Gowher Bashir Wakil (Coordinator)	SAP Program	2016	79.34 Lakh	UGC
Rubiya Samad/ Basharat Want	Preparation and characterization of ferroelectric-ferrite composites	2016	26.1 Lakh	DST
Ghulam Nabi Dar	Study of pure and ion embedded iron oxide nanostructure for sensing and removal of hazardous wastes from waste	2017	31.04 Lakh	DST
Prof. Manzoor A. Malik	X ray Study of Galaxy Clusters	2017	23.38 Lakh	ISRO RESPOND
Ghulam Nabi Dar	Effect of light and heavy ion irradiation on pure and transition metal doped iron oxide thin films	2018	UFR Funding - 6 Lakh	IUAC-UGC
Prof. Naseer Iqbal	Multi-wavelength studies of Rich and Poor Galaxy Clusters in an Expanding Universes	2016	6.51 Lakh	ISRO
Prof. Manzoor Malik	CMB Project	2013	16.68 Lakh	DST
Prof. Naseer Iqbal	Estimation of Diffuse Extra galactic background light through VHE Gamma ray observation of Blazars	2019	33,66,700.00	DAE BRNS

Post Doctoral Projects

Name of PI	Supervisor	Project Title	Year	Funding Agency
Dr. Showkat Hassan	Prof. Basharat Ahmad Want	Theoretical studies on lead-free inorganic halide lanthanide-based double pervskites for solar cell applications	2023	DST-ANRF
Dr. Nazir Ahmad Teli	Prof. Basharat Ahmad Want	A density functional theory study of lead free double perovskites for Spintronics, Optoelectronics and thermoelectric applications	2023	DST-ANRF
Dr. Mariyah Suddiqah	Prof. Waseem Bari	Probing gluon TMDs in J/psi and J/psi production i fcn ep pp collision)	2023	DST-ANRF
Dr. Abdul Gaffar Lone	Prof. Basharat Ahmad Want	Structural, Magnetic and Magnetoelectric properties of doped hematite systems.	2020	UGC

Research Facilities

Vibrating Sample Magnetometer

The Department of physics has a state of art 2.7 Tesla Vibrating Sample Magnetometer (VSM) Model MicroSense (USA) which is capable of working in the temperature range of - 95 oC to 700 oC. The availability of this advanced research equipment has made the Department indigenous in the field of experimental characterization of magnetic materials both bulk as well as at nanoscale.



DST-FIST

Department of Physics have recently (December 2024) been granted FIST assistance of INR 90 lac to improve the research infrastructure in the department. The grant shall be utilized to upgrade the HPC Facility, procure tools like Gaussian, QATK, MATLAB, Mathematica and purchase of Celestron Telescope along with High Resolution CCD Camera and Optical Tubes

HARL, Gulmarg

In Collaboration with Indian Network Weather Disturbances, Realtime detection of thunderstorms and other weather disturbances are studied at High Altitude Research Laboratory (HARL) situated at Gulmarg, J & K.



High Performance Computing Lab

The High Performance Computing Facility at University of Kashmir in the Department of physics has been set up with a grant from the University grants Commission, to provide super-computing access to university users across the country, and also to boost the ionosolid, nuclear physics and atomic physics simulation programs at KU. The facility is targeted at computational chemists, physicists and biologists in the university system, working in the areas of materials science, atmospheric physics, quantum dynamics and information, molecular physics and chemistry, radiation biology and nuclear physics.

Component	Specifications
Master/Login Node	2 x Intel Xeon Gold 5118 (12-Core, 2.3GHz), 128GB RAM, 2 x 240GB SSD, InfiniBand (56Gbps)
Compute Nodes	2 x Intel Xeon Silver 4116 (12-Core, 2.1GHz), 128GB RAM, 1TB SATA HDD, InfiniBand (56Gbps)
Storage	Lustre-based PFS, >40TB usable space, >2GB/s throughput
Interconnect	InfiniBand (56Gbps) using Mellanox HCA
Power Supply	Redundant hot-plug power supplies (80PLUS Platinum)



Atmospheric and Space Lab

The NARL all-sky CCD airglow imager was installed at the Department of Physics, University of Kashmir, Srinagar in 2017. We observe the night time airglow emissions on clear nights (cloud free and moonless). Five different interference filters measure the intensity variations at different wavelengths corresponding to the different altitudes (80-300 km). The density variations due to various perturbations in the atmosphere leading to atmospheric gravity waves are being tracked through these airglow observations. The gravity wave induced phenomena such as Travelling Ionospheric Disturbances (TIDs), plasma depletions, plasma blobs, etc are being detected by the airglow imager. These observations are very helpful in understanding the overall atmospheric and ionospheric dynamics. Further, the impact of the gravity waves on atmospheric dynamics and their generation mechanisms are being studied in addition to the troposphere-ionosphere coupling. Some of the major findings achieved through the airglow observations through the Srinagar airglow imager, with support from the other satellite data and modelling results, include the understanding of troposphere-ionosphere coupling and the effect of the lower atmospheric layers on the ionosphere. The direct observational evidences of the gravity waves originating in the lower atmosphere reaching to the ionospheric heights either primarily or secondarily, and thereby promoting the generation of ionospheric irregularities has also been demonstrated. Further, the role of local sources like convective activities in gravity wave generation in the lower atmospheric layers has been demonstrated through these observations which can better help in understanding of the links between the troposphere and ionosphere. More observations through this imager can help us to comprehend the complex dynamics of the atmosphere-ionosphere system, especially near the geomagnetic transition regions including Srinagar.



Collaborations & MOUs

People Involved	Field of Research	Agency	Nature	Year
Prof. Manzoor A. Malik	Atmospheric Physics	National Atmospheric Research laboratory	MOU	2016
Prof. Farooq A. Mir	High Energy Physics	Compressed Baryonic Matter (CBM) experiment at Facility for Antiproton and Ion Research (FAIR), Germany, VECC Kolkata, ALICE	Collaboration	2006
Prof. Waseem Bari	High Energy Physics	SINP Kolkata, TIFR Mumbai, NIT Durgapur, Radiation Oncology Department GMC Srinagar	Collaboration	2009
Prof. Naseer Iqbal	Astrophysics	IUCAA Pune, BARC Mumbai	Collaboration	2008
Prof. Basharat A. Want	Solid State Physics	Central University of Kashmir, National Taiwan University, Lovely Professional University, AMU, M S University of Baroda, Gurunanak University Hyderabad, NIT Srinagar	Collaboration	2010
Dr. Sajad Masood	Radiation Physics	Tongji University Shanghai, Punjab Technical University, Radiation Safety System Division BARC Mumbai	Collaboration	2010
Dr. Muzaffar Qadir Lone	Quantum Dynamics	NIT Srinagar, NIT Rourkela, ICTS Bangalore, SINP, NYU China, ICTS, IMSC Chennai	Collaboration	2013 - Present
Dr. Ghulam Nabi Dar	Material Science	IUAC Delhi, Imam Abdulrahman Bin Faisal University Dammam Saudi Arabia, Annamalai University, NIT Srinagar, SP College Srinagar	Collaboration	2012
Prof. Gowher Wakil/Dr. Nissar Ahmad	Atmospheric Physics	DRDO, IITM Pune	MOU	Under Process

SWOT Analysis



Weakness

- Limited industry collaborations due to a lower number of industries in the region.



Best Practices

- Strong emphasis on student development through internships.
- Educational outreach via YouTube lectures and digital platforms.
- Active involvement in science outreach programs to engage the community.
- Promotion and popularization of science to inspire young minds.



Future Plans

Launch an Integrated M.Sc. in Physics to attract and retain talented students. Strengthen industry partnerships in key areas:

Health Sector (Radiation Physics) – Collaboration with hospitals and research centers.

Artificial Intelligence (Intel, Tech Companies) – Exploring AI applications in physics research.

Power Plants & Renewable Energy – Engaging with the energy sector for applied research.

Metrology & Atmospheric Science – Working with meteorological departments on thunderstorms and climate studies.

Enhance high-end experimental facilities to support cutting-edge research.

Expand collaborations with national and international institutions to foster innovation and interdisciplinary research.



Thank You

The Department of Physics at the University of Kashmir remains dedicated to academic excellence, pioneering research, and technological innovation. With a strong foundation in theoretical and experimental physics, state-of-the-art facilities, and collaborations with leading national and international institutions, we continue to nurture the next generation of scientists and researchers. As we move forward, our commitment to advancing scientific knowledge, fostering industry partnerships, and inspiring young minds remains unwavering. We welcome aspiring physicists to join us in this journey of discovery and innovation, shaping the future of science and society.

Contact Information :

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