



DEPARTMENT OF PHYSICS

(DST-FIST ASSISTED)

UNIVERSITY OF KASHMIR

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.



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) |



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 studies at High Altitude Research Laboratory (HARL) situated at Gulmarg, J & K.



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 Kollata | Collaboration | |
| Prof. Waseem Bari | High Energy Physics | SINP Kolkata, TIFR Mumbai, NIT Durgapur, Radiation Oncology Department GMC Srinagar | Collaboration | |
| Prof. Naseer Iqbal | Astrophysics | IUCAA Pune, BARC Mumbai | Collaboration | |
| 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 | |
| Dr. Sajad Masood | Radiation Physics | Tongji University Shanghai, Punjab Technical University, Radiation Safety System Division BARC Mumbai | Collaboration | |
| Dr. Muzaffar Qadir Lone | Quantum Dynamics | NIT Srinagar, NIT Rourkela, ICTS Banglore, 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 | |
| Prof. Gowher Wakil/Dr. Nissar Ahmad | Atmospheric Physics | DRDO, IITM Pune | MOU | Under Process |