

Newsletter FA-2017

Department of Physics

CIIT, Lahore



COMSATS

Institute of Information Technology, LAHORE

Editorial

The Department of Physics at COMSATS, Lahore was established in 2007 and is fully dedicated to impactful research and quality teaching. Our faculty consists of researchers working on different exciting ideas from fundamental to applied aspects of physics. Research efforts within our department include deciphering the fundamental laws and building blocks of nature, understanding and utilizing the behavior of magnetic materials, advancing optoelectronics techniques for use in communication devices and applications, building quantum optical devices for use in solar cells, studying and manufacturing new materials with novel properties using advanced techniques of material science and nano-technology for a host of future technology uses, understanding the world within our bodies via biophysical principles and finally, studying the properties of plasma. Our quest at COMSATS connects the smallest scales in nature (particle physics) to the largest scales in the cosmos (astrophysics) while the phenomena at scales ranging from nano to everyday scales are being revealed with applications for societal benefits.

Currently is a very exciting time for the department as we have attracted a record number of physics students to our BS program, the faculty have won 4 research grants from HEC's highly competitive NRPU program and other faculty have recently won various national and international acclaims for the efforts that have gone on in the department during last many years.

This newsletter will give you a flavor of the different academic and research accomplishments of the faculty and an insight into our physics world. Happy reading.

IN THIS ISSUE

- [Discovery of the Centaury: Gravitational waves](#)
 - [Projects and funding](#)
 - [Physics' Events](#)
 - [Physics Colloquium](#)
 - [Sports Events](#)
 - [Research publications in the year 2016-2017](#)
- [Research Rostrum](#)
 - [Awards and Achievements](#)
 - [Research Build Up](#)
 - [Open day Activity](#)
 - [Recreational Times](#)

Editorial Board

Dr. Shabna Nisar

Dr. Naima Amin

Dr. Ishrat Sultna

Dr. Nosheen Akbar

Dr. Ayesha Anjum

Dr. Amna Mir

Discovery of the Centaury: Gravitational Waves

By

Dr. Shabana Nisar

Despite the fact that there are literally millions of scientists world over who are engaged day and night in trying to answer various questions about the nature, it is only occasionally that an experiment is performed, or an observation is made, which reveals a fundamental aspect of nature that answers such universal questions which are related to how our universe works at the deepest level and as a whole. One set of such experiments were performed by Hertz, who by observational confirmation of Maxwell's electromagnetic waves, revolutionized our understanding of all matter and at the same time opened up the window to the technological advancements that are basis of our modern world.

Perhaps, an observation of similar grand proportion – as far as its importance for fundamental physics is concerned – was performed recently when LIGO (The Laser Interferometer Gravitational-Wave Observatory), an experiment based in USA, detected the gravitational waves for the first time in history. This observation directly confirmed Einstein's hundred-year-old assertion that the space is not merely an empty receptacle where physical objects exist but rather it is a dynamical object in its own right subject to change as per physical laws, much like everything else in study of physics.

According to Einstein's general theory of relativity, space (rather space-time) is very much like a fabric that can be bent by presence of massive objects and can sustain waves, much like waves of compression and expansion in a stretched sheet. Although, as per Einstein's theory, all gravitational phenomena are a result of curvature of space, just like electric and magnetic fields are responsible for electromagnetic phenomena, but a gravitational wave is a direct dynamical manifestation of curvature ripples produced in space-time and hence provides a direct confirmation of this conception of space, much like electromagnetic waves proved the reality of theoretical concepts of electric and magnetic fields. It is like knocking on a drum and then observing the vibrating skin directly.

However, due to weakness of gravity, observing gravitational waves is extremely hard and Einstein imagined that it would never be possible. It is a truly remarkable testament to the collaborative power of scientific community, and human will to encounter the impossible, that this feat has been made possible. The LIGO observatory consists of two independent interferometers, situated about 1000 miles apart, each one of which has arms stretching to 4 miles. An extremely stabilized and fine tuned laser beam is maintained through the long arms of the interferometer and made to interfere at a point. The beam is also bounced back and forth about a billion times before it is made to interfere with its other component. Through the use of highly sophisticated optics, state-of-the-art materials and stabilizing mechanism, the beam is held in perfect coherence. When a gravitational wave passes by, its main effect is to stretch and oscillate the space in a direction perpendicular to its propagation. As a result, the arms of the interferometer slightly change in the length thus changing the interference pattern. Working over last 40 years, LIGO has achieved such sensitivity that it can detect the change in length of the arms, which is 1 part in 10^{22} : that comes out to be a change of the size of a proton for the 4 km arm.

This mind-boggling precision was required to detect any realistic gravitational waves, as their effect is extremely weak. The event that was detected was identified as caused by merger of two spiraling black-holes a billion light years away from Earth. The gravitational waveforms, as constructed by oscillating pattern of interference matched perfectly at the two independent sites of LIGO, with the appropriate time-delay as gravitational wave traveled at speed of light from one site to the other. The pattern also matched well with the predictions of Einstein's general theory of relativity for such a merger of black holes.

With this observation, LIGO not only confirmed and revealed the basic nature of the space-time itself but also opened up a new window into looking at the universe. In future --and even now with LIGO's capabilities-- astronomical observations of various phenomena will be made through gravitational waves which were inaccessible to electromagnetic waves. Just as radio, x-ray and other electromagnetic waves opened up a whole new world of astronomy, the gravitational waves are expected to reveal such secrets about the heavens which no one had any idea of before. A brave new world is awaiting us.



ADMINISTRATIVE CHANGE

Our heartiest congratulations to **Prof. Dr. Saleem Farooq Shaukat** on assuming the responsibility of director COMSATS Sahiwal after a highly successful and transforming tenure at COMSATS Lahore.



We would also like to Congratulate and welcome **Dr Muhammad Ashfaq** (Associate Prof.) and **Dr Rizwan Raza** (Assistant Prof) on becoming the new HoD and associate HoD, respectively of the physics department.

Physics Research Rostrum



1. Dr. Hafiz Muhammad Ashfaq Ahmad delivered a talk on Third Generation Solar Cells as an invited speaker in a 'One day Symposium on Modern Trends in Physics Research ' held on May 11, 2017 at Government College University for Women, Sialkot.



2. Dr. Ghazanfar Abbas presented his research paper in 'Entitles in Collaborative Conference on 3D and Materials Research'(CC3DMR 2016) held on 20th June to 24th June, 2016 at Conventia, Incheon/ Seoul, South Korea. The conference was arranged by Kawangwoon University, Seoul, South Korea. The research work falls into the category of fuel cell technology and nano technology. This visit was fully funded by Higher Education Commission, HEC Pakistan via vide letter No. 249.05/TG/R&D/HEC/2016. He also visited the SUNGKYUNKWAN University, Korea and met with Prof. Wonyoung Lee to develop collaboration in future.

Dr. Ghazanfar Abbas, Assistant Professor, has also given a keynote talk titled "The Comprehensive Note on Advanced Energy Conversion Technologies" on 11th August, 2016 at 2nd National Conference Metallurgy and Materials organized by Department of Metallurgy and Materials, Mehran University of Engineering & Technology, Jamshoro, Sindh-Pakistan.

Dr. Muhammad Ashfaq Ahmad presented his research paper as ORAL presentation entitled "*A Simple and Facile Synthesis of Optically Cadmium Sulphide Nano-Structures*" at 4th International Conference on Nanotechnology, Nanomaterials & Thin Films for Energy Applications (NANOENERGY 2017) being held on 26th July to 28th July 2017 at Aalto University, Espoo/Helsinki, Finland. The research work falls into category of Nanomaterials for energy applications.

He has also visited Advanced Fuel Cells and Solar Cells Group in the Department of Energy Technology, Royal Institute of Technology, KTH, Stockholm, Sweden.



Dr. Ghazanfar Abbas presented his research paper as ORAL presentation entitled "*The Role of Advanced Energy Technologies for Next Generation (Solid Oxide Fuel Cell)*" at 4th International Conference on Nanotechnology, Nanomaterials & Thin Films for Energy Applications (NANOENERGY 2017) being held on 26th July to 28th July 2017 at Aalto University, Espoo/Helsinki, Finland. The Higher Education Commission, HEC Pakistan has awarded the travel grant. The research work falls into the category of fuel cell technology/advanced energy conversion technology and nano technology. He has developed research collaboration with **Prof. Peter Lund** for future research work.

He has also visited the Department of Energy Technology, Royal Institute of Technology, KTH, Stockholm, Sweden along with **Dr. Rizwan Raza**, **Dr. Muhammad Ashfaq Ahmad** and **Mr. Kaleem Ullah**. They have visited to Prof. Bin Zhu, Head of Advanced Fuel Cells and Solar Cells Group for future projects and collaboration.



Dr Ghazanfar Abbas delivered a talk on Fuel Cell Technology as an invited speaker in a One day Symposium on Modern Trends in Physics Research held on May 11, 2017 at Government College University for Women, Sialkot.



3. Dr. Muhammad Asif presented his research work in the 27th IEEE Symposium on Fusion Engineering (SOFE) held from 4-8 June, 2017 in Shanghai, China.



Dr. Shabana Nisar delivered an invited talk on Dec 06, 2016 titled "Ethics in Scientific Publishing" at a two day workshop at Punjab University, Lahore.

4. Dr. Shabana Nisar's work has been accepted for an oral presentation at **6th International Conference on New Frontiers in Physics ICNFP 2017**. This conference is one of the top conferences in the field of particle/high energy physics and will be held in Aug. in Creta, Athens. The talks will be given by the top physicists in the field including the researchers from Columbia university, USA; Imperial College, UK; CERN, Switzerland and DESY, Germany.

Dr. Shabana Nisar delivered a talk titled "Entropy of Horava-Lifshitz Black Holes" at the 13th International Symposium on Cosmology and Particle Astrophysics (CosPA 2016) held in Sydney, Australia from Nov. 28-Dec. 02, 2016. The other speakers included Dr. Lisa Randall (Harvard U.), Dr. Pat Scott (Imperial College London) and Dr. Eric Linder (UC Berkeley) etc.



Dr. Shabana Nisar presented her research work at 'High Sensitivity Experiments Beyond the Standard Model' held in Vietnam in Aug. 2016.

Dr. Shabana Nisar was an invited speaker at the "5th International School on LHC Physics" at NCP, Quaid-i-Azam universi-



5. Dr Naima Amin delivered a talk titled 'Radiation in Daily Life: How Much is Too Much' as an invited chief speaker on a one day Seminar held on 25th March, 2017 in The Department of Physics, Govt. Sadiq College Women University, Bahawalpur.



**"Science is not finished
until it is
communicated,"**
Mark Walport



6. Dr Rizwan Raza visited UK for an International conference on "NanoEnergy-2016" at University of Liverpool, UK and delivered a talk on July 27, 2016. The complete visit was funded by the Commonwealth early career research grant, UK and NANOS-MAT. During the visit, Dr Raza visited "Stephen Institute of Renewable Energy" and Birmingham Fuel cell research center for the future collaboration.

Invited/Contributed Talks delivered by Dr. Rizwan Raza

- Invited talk at Advanced Functional Materials, University of California, USA, August 2017.
- NanoEnergy, 26th July -29th July 2017, Aalto University, Finland.
- USPCAS-EP National Conference on Green Energy Technologies held at PC hotel, Peshawar, on May 18, 2017

- Nanoscience and Nanotechnology Workshop, September 2017, GCU, Lahore
- Functional-Catalyst symposium, UET, Lahore, 8th May 2017
- National Seminar on "Applications of Nanotechnology" on 15th March 2017. Garison University, Lahore, Pakistan, 2017 (MSNANO17)



5th International Conference on
Semiconductor Materials and
Nano-Devices, IUB, Pakistan
(ICSMAND-2017)



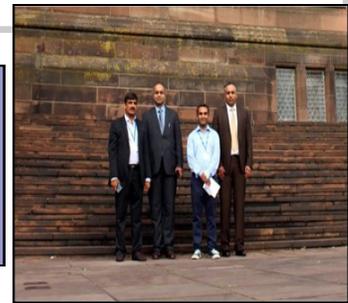
- International Conference on Materials Science and Nanotechnology, GC University, Faisalabad, Pakistan, 2017 (MSNANO17)

- 2nd International Chemistry Conference held on November 23-25, 2016 at AIOU, Islamabad, Pakistan
- 4th National Symposium on Frontiers in Physics, 21-23 November 2016 at GC University Lahore, Pakistan.
- Key Note/Invited Talk at a Symposium on “Functional Nanomaterials for Catalysis and Energy Conversion” Department of Chemistry on 16 May, 2016, UET Lahore, Pakistan

- Invention to Innovation Summit 16-17 November 2016, at Centre for Advanced Studies in Energy (USPCAS-E), University of Engineering & Technology (UET) Peshawar, Pakistan.
- National Training Workshop on Nanomaterials and One Day Symposium on Nanotechnology Research in Pakistan, NIBGE, Faisalabad, - Pakistan, 9th Nov, 2016
- Fourth International Conference on "Energy, Environment and Sustainable Development EESD2016, at MUET, Jamshoro (Sindh), Pakistan Nov.01– 3, 2016



International conference on “NanoEnergy-2016”, at University of Liverpool, UK, July 27, 2016



International Conference and Exhibition on Renewable Energy Technologies, Islamabad (18-20 October, 2016) organized by PCRET, Pakistan

7. Dr. Zahida Ehsan

participated in the “Fourth National Conference on Space Science & Technology” (NCSS&T-2016) during World Space Week on October 7th to 9th, 2016 as an invited speaker. The Institute of Space & Planetary Astrophysics (ISPA), University of Karachi, Pakistan organized the event.



Later she visited **SUPARCO** headquarters because a 90 million project on space weather monitoring has been launched;

however, they need people who can explain data with the theoretical models etc . She also participated in the **joint ICTP-IAEA College on Plasma Physics** held between 7 – 18 November , 2016, The Abdus Salam International Center for Theoretical Physics (ICTP) Trieste, Italy as a speaker and made presentation on dust in tokamak and crystals in plasma.



Projects and Funding



Our heartiest congratulations to all the faculty members.

Funding source	Title	faculty	Amount (millions)
NRPU-HEC	Study of Electrostatic modes in semiconductor Plasmas	Dr. Muhammad Jamil	---
NRPU-HEC	Development of magnetic nanostructure for energy efficient applications based on ultra strong permanent magnet and soft magnet.	Dr Yasir Rafique	3.69
NRPU-HEC	Study of charge transport properties of molecular devices.	Dr Abdul Sattar	3.9
NRPU-HEC	Fabrication of Nanocellulose and Conductive Polymer Based Flexible and Environmentally Safe Paper Electrodes for Development of Energy Storage Devices Via Indigenous Resources	Dr Aamir Razaq	4.23



AWARDS & ACHIEVEMENTS



Ranked the Number One Female Physicist

Pakistan Council for Science and Technology (PCST) has recently announced their ranking of scientists in different categories. In the 'Physics category', **Dr. Shabana Nisar** was ranked number one among the COMSATS, Lahore faculty and number one female Physicist in the 'Under-40-Physicsts' category.

Young Productive Scientists of Pakistan 2015-2016

Dr. Rizwan Raza has been ranked number one in Pakistan as a "Young Productive Scientists of Pakistan 2015-2016" under Engineering Science Category. This position is announced by Pakistan Council of Science and Technology (PCST).



Dr. Shabana Nisar has been invited by the Experimental High Energy Physics group at **Harvard University** for a year-long appointment as a visiting scholar. Harvard university is one of the best universities in the world with probably the best department of physics in the entire world. Working there is every physicist's dream and most probably Dr. Shabana will be the first Pakistani working with the experimental particle physics group at Harvard. This prestigious offer will not only be phenomenal for the particle physics group at COMSATS but will also be marvelous for the campus profile and future collaboration endeavors .

Dr Mukhtar Ahmad and Dr Rizwan Raza has been awarded Research Productivity Award 2016 announced in 2017 by Pakistan Council of Science and Technology .(PCST).



Dr Rizwan Raza has been awarded "Commonwealth Early Career Research Award 2016" by ACU member universities, which is one of the prestigious grants.



Dr. Shabana Nisar was awarded a travel grant of 245,000 by HEC to present her work at an international conference .

Dr. Shabana Nisar's BS physics research student , Waheed Ahmad, won a fully funded Scholarship , which covers his tuition fee, living expenses, insurance, relocation charges, offer in Astrophysics/Particle physics to study at University of Innsbruck, Austria. is considered very competitive and difficult to get in, and is among the top 100 physics programs in the world

Dr. Shabana Nisar's MS student, Raza Ur Rehman Mir, was judged to be the best participant and secured the first position at the LHC physics school at NCP last summer. It is the biggest student focused activity in particle physics in entire Pakistan and is organized by ICTP. The school was attended by students from all across Pakistan including QAU, NUST, CIIT Islamabad, LUMS, and all other areas of Pakistan; institutions with long tradition of particle physics and a large base of students and professor.

Record Admission

COMSATS Lahore had **record** admissions in **Fall2016** semester and similarly Physics Department had an intake of 82 students in the BS program and 44 students in the MS program in the Fall 2016 semester. The admission committee of Physics department, which included **Dr. Aamir Razaq, Dr. Saif ur Rehman, Dr. Fraz Bashir** and **Dr. Ayesha Anjum**, worked really hard to make this possible.



Events Organized by Physics Department

1. How Physicists Help Biologist

Physics Department arranged a seminar on 19 January, 2017 on the topic of "**How Physicists Help Biologists**". The talk was given by Dr. Shahid Qamar who is serving as a research associate in James Graham Brown Cancer Center, University of Louisville, USA.



Dr. Shahid has wide experience of working in fields of Computational Biology and Computational Toxicology, Breast Cancer and In Silico Modeling of Biological Molecules, Sar and Qsar Modeling of Molecules. It was a nice knowledge-sharing-opportunity for all students and faculty members who attended the seminar to benefit from his knowledge and expertise.

2. Advanced Energy Technology

Department of Physics organized a seminar on "**ADVANCED ENERGY TECHNOLOGY**" on Tuesday 14th of February, 2017. This talk was delivered by Prof. Bin Zhu who is the head of the Advanced Fuel Cell and Solar cell group KTH, Sweden. Dr Bin Zhou is a visiting professor in Aalto University, Finland; Guest professor for University of Science and Technology of China (USTC), and Southeast University Coordinator for EC-China NANOCOFC network.



Professor Zhou has devoted more than 25 years' efforts, both experimentally and theoretically, to develop a series of unique fuel cell technologies, which are expected to lead the next generation of advanced fuel cell technologies. A great number of student and faculty attended this seminar to gain knowledge about this advanced technique and benefit from Dr Zhou's expertise.

3. Engineers meet scientists day

Dr. Zahida Ehsan, Assistant Professor at Physics Department organized an event "**Engineers meet scientists day**" on June 19, 2017, in which junior students presented their projects including:





- Steam Engine
- Wireless Charger
- Automatic Car Parking Indicator
- Reactor



In this event **Dr. Zahoor Ahmad** from Pakistan Atomic Energy Commission delivered a lecture on nuclear fusion energy, GLAST, a mini tokamak which they have made and now moving forward with the help of Russia and China to be part of ITER project. In this project he shared how young engineers can contribute to the National Fusion Program of Pakistan. **Dr. Wajahat Qazi** from CIIT, Lahore, delivered a lecture on Computation engineering - bridge between engineering and physics sciences.

4. Seminar on "Wide Band Gap Semiconductors"

Department of Physics invited **Prof. Dr. Xiaodong Hu** to deliver a seminar on "Wide Band Gap semiconductors: Sub-micron Rod Ultra-high Sensitivity Mechanical Sensor" on 20th February, 2017. Dr Xiaodong Huo is Professor of Physics at Peking University, China.



He has worked in III-nitride semiconductors (AlN, GaN, InN and their alloys) growth and characterization, Laser diode, solid-state lighting and Nanophotonics. Professor Huo shared his knowledge with student and faculty members.

5. Experimental kit for the students

The NILOP of PAEC has developed an experimental kit for the students. The Member Science, **Dr. Javed Akhtar**, offered to introduce this to the faculty members and students of Physics Department at CIIT. The Department of Physics, CIIT, Islamabad arranged a seminar on Friday, Feb. 17, 2017. This seminar was broadcasted to Lahore campus through teleconferencing facility.

Research Buildup

Spin coater facility up and running

A spin coater facility is installed in the A-15 lab under the supervision of **Dr. Abdul Sattar** hosted by the physics department in September, 2016. The spin coater is up and running. The device has capability of reaching 12,000 rpm and is programmable to perform multi-step coating process.





Physics Colloquium



Physics Department, COMSATS Institute of Information Technology, Lahore

Physics Colloquium, in each semester, has become an **identity of the Department**. Subsequent to eight successful Physics Colloquiums, 9th Colloquium was organized by Physics Department, CIIT Lahore on 27 December, 2017 dedicated to **Erwin Schrödinger**. This one day activity consisted of popular lectures by renowned speakers who discussed various aspects of quantum mechanics and its implications. Experts from different Universities especially, from university of the Punjab, Govt. College University, FC College University, and University of the Lahore participated in the colloquium.



Prof. Dr. Qaisar Abbas, Director, CIIT, Lahore, was invited as the chief guest of the event. During his address, Prof. Qaisar Abbas appreciated the departmental effort to organize this event. He further stressed upon this exchange of scientific ideas to be tested on practical grounds thus to make the spell of such debates more effective and long term.



The colloquium was started with the Recitation from the Holy Quran followed by the opening remarks from **Prof. Dr. Hafiz Ashfaq Ahmad**, who explained the objectives of the event and gave a brief introduction of the department along with the welcome address.

Dr. Hamid Latif (FCUL) explained the Quantum Mechanics of Solar Cells. He started his talk by giving basic concepts of quantum mechanics and described quantum dot sensitized solar cells.

Dr. Zafar Iqbal (GCUL) talked about Classical and Quantum Plasmas and gave mathematical description of spin quantum plasmas in electrostatic modes. At the end he concluded that parate spin evolution system has revealed the existence of new waves. Spin effects appears on both electrostatic and electromagnetic wave.

Shakra Khurshid (Assistant Director IPO Regional Office, Lahore) gave a detailed Introduction to intellectual property rights. She explained different IP types like Patents, Trademarks, Copyrights, and Designs; Dr. Khurshid discussed importance of IP in universities and provided the basic information to register a patent.

The last talk of the session was delivered by **Dr. Usman Ilyas** (UETL). This talk was prepared to give the students an idea about the field of spintronics. Dr. Ilyas explained the basics of this field in a very effective way.



At the end of this one day activity, **Prof. Dr. Qaisar Abbas**, Director CIIT, Lahore inaugurated the Society for Clean and Renewable Energy Technology by cutting the Ribbon. The thematic idea of this society is to provide clean energy and clean water to the public of rural areas as well as for the societal benefits.



The purpose of this society is to bring researchers, students, as well as industrial and private organizations together from all over the world for the efficient use of renewable resources. The society especially focuses the public awareness in rural areas about the conservation of energy and exploiting the renewable energy resources. COMSATS has initiated to explore this area of interest to provide energy solution, conservation and environmental protection for the country.



Lunch and Refreshment were offered for the participants in order to boost the activity.

Physics open Day

Department of Physics organized PHYSICS OPEN DAY on 3rd of November, 2016.

Purpose of this open day was to make students to “Get to know anything and everything” about the Physics Department, CIIT Lahore. This open day has provided an opportunity to the students to chat with our alumni to get a first-hand experience of life at CIIT and ask our faculty details of their choice of programs/research. Students were given demonstration on the state-of-the-art equipment available in the Physics department of CIIT Lahore.



Hundreds of students from different colleges participated in this open day activity. Head of the department of physics started the ceremony by sharing vision, objective and available facilities in department with students.

All students were taken to undergraduate and graduates labs, where lab in-charges and coordinators introduced new world of science to the students. . Students were taken to the labs in different groups to talk and observe facilities in all labs. Students got opportunity to interact with the faculty and ask questions about the labs. They asked their queries about research, scope of work and career opportunity to our alumni.



Students have shown keen interest in learning about new fields.

Many of the students were interested in getting details about generous financial support that CIIT offer. All such details were provided to them by the DCO of the department. They were also entertained with lunch after their tour to the campus.

Event highlights:

- Programme Information Sessions
- Meeting with Faculty and Office Representatives
- Networking with Alumni
- Campus Tour
- Lunch reception





Students and faculty of physics department participated in sports actively on the sports week and got third position in all over sports. Here are some glimpses from this healthy sport activity in the department of physics.



The Physics department secured over all 4th position in Fall 2016 sports.



Along with sports activity in sports week, department of physics has also arranged Physics Super League in departmental level in which students of physics get opportunity to enjoy cricket along with their studies. Here are some glimpses of Physics super leagues 2.



Recreational Time

30 Kilometer Hike to Glimpse Village Life

Dr Zahida Ehsan, Assitant Professor, Department of Physics, has arranged a 30 KM hike with students to glimpse village life. Hikers started in the afternoon from campus and reached destination Aligarh Public School and College, Manga, Multan Road in 6 hours on Tuesday, July 11, 2017

Most of the hikers teach in different colleges and schools (e.g., Sahiwal, Okara, Borewala, Qasur, Nankana Sb etc.) and wished to organize such healthy activities in their respective institutions.



Dinner and Event Celebrations

Faculty of physics arranged different dinners and get-togethers to provide an opportunity to the faculty to share their ideas in a tension-free environment. Such dinners and gathering have provided an environment for the faculty to enhance the interaction between them and have a relax time together.



- **Dr. M.H. Ashfaq** (Head of Department of physics) gave a dinner to the faculty. Director of Lahore and sahiwal campus CIIT also joined the faculty for this dinner.
- A dinner buffet party at Monal restaurant was hosted by **Dr. Rizwan Raza** , **Dr. Ghanfar Abbas** , **Dr. Fraz Bashir** and **Dr Arslan Usman** .
- A lunch was arranged by **Dr. Muhammad Hammad Aziz** (on the completion of Postdoc) and **Dr. Amna Mir** (for joining CIIT on TTS).
- **Ms Mahrukh** has given an Ifftar Dinner to all faculty members on her successful completion of MS

Departmental Trip to Chitta Katha Lake Neelum Valley AJK



A departmental trip was arranged under the supervising of **Dr. Abdul Sattar** during the summer break. The adventurous hike tested the endurance and zeal of the participating members, and most of them completed it in style and honor. The Neelum valley is blessed with uniquely beautiful scenes and diverse fauna and flora, and are worth the effort.

A one-day trip was organized by Physics Department under the supervision of **Dr. Idrees** with students on 9th April, 2017 to Neela Wahn and Swaik Lake, Kalar Kahar.



IMPACT RESEARCH

Research publications

Faculty of department of physics has published almost 100 papers in ISI journals and total Impact factor of the journals is more than 260.68

- S. Anjum, H. Nazli, R. Khurram, Talat Zeeshan, S. Riaz, , **A. Usman**. “Role of Zn substitution on structural, magnetic and dielectric properties of Cu–Cr spinel ferrites. Indian Journal of Physics”. 90(8): 869-880.
- Muneeb Irshad, Khurram Siraj, **Rizwan Raza**, Anwar Ali, Pankaj Tiwari, Bin Zhu, **Asia Rafique**, Amjad Ali, **Muhammad Kaleem Ullah**, **Arslan Usman**. “A Brief Description of High Temperature Solid Oxide Fuel Cell’s Operation, Materials, Design, Fabrication Technologies and Performance”. Applied Science.6 (3):75.
- A. Afaq, A. Iqbal, A. Iftikhar, **M. Asif**.” Photodetachment spectrum of hydrogen negative ion near a spherical surface”. Canadian Journal of Physics.94 (2): 226-230.
- **M. Yasir Rafique**, Mujtaba Ellahi M. Zubair Iqbal Qurat-ul-ain Javed Liqing Pan.” Gram scale synthesis of single crystalline nano-octahedron of NiFe₂O₄: Magnetic and optical properties”. Materials Letters. 162(1): 269-272.
- **M. Yasir Rafique**.” Liqing Pan Asim Farid. From nano-dendrite to nano-sphere of Co_{100-x}Ni_x alloy: Composition dependent morphology, structure and magnetic properties”. Journal of Alloys and Compounds.656:443-451.
- A. Rasheed, **M. Jamil**, F. Areeb, M. Siddique and M. Salimullah. “How frequency hybrid instability in quantum magneto semiconductor plasmas”. Journal of Physics D: Applied Physics.49:175109.
- **Muhammad Ashfaq Ahmad**, Sehrish Azam, **Samia Aslam**, Syed Hamad Bukhari, **Ayesha Jamil**, **Faiza Mustafa**, **Salman Naeem Khan**. “Higher order squeezing as a measure of non-classicality”.Optik - International Journal for Light and Electron Opti.127:2992-2995.
- **Rizwan Raza**, **Nadeem Akram**, **Muhammad Sufyan Javed**, **Asia Rafique**, **Kaleem Ullah**, Amjad Ali, **M. Saleem**, Riaz Ahmad. “Fuel Cell Technology for Sustainable Development in Pakistan-An over-view “Renewable & Sustainable Energy Reviews.54:450-46.1
- **M.Sufyan**, **Rizwan Raza***, et al.” Electrochemical studies of perovskite cathode material for direct natural gas fuel cell”. International Journal of Hydrogen Energy.41 (4):3072-3078.
- M. Irshad, K, Siraj, **Rizwan Raza**, et al.” High performance of SDC and GDC core shell type composite electrolytes using methane as a fuel for low temperature SOFC”. AIP Advances.6 (1):25202.

- W. Dong, A. Yaqub, N. K. Janjua, **Rizwan Raza**, M. Afzal Bin Zhu. "All in One Multifunctional Perovskite Material for Next Generation SOFC". *Electrochimica Acta*. 193:225-230.
- **Majid Niaz Akhtar**, **M. Ahmad**, **Rizwan Raza**, **M. Saleem**, and M. Kashif. "Structural and Magnetic Properties of Yttrium Iron Garnet (YIG) and Yttrium Aluminum Iron Garnet (YAIG) Nanoferrites Prepared by Microemulsion Method." *Journal of Magnetism and Magnetic Materials*. 401:425-31
- Muhammad Rafi Raza, Faiz Ahmad, Norhamidi Muhamad, Abubakar Sulong, M.A. Omar, **Majid Niaz Akhtar**, M. Aslam." Effects of Solid Loading and Cooling Rate on Mechanical Properties and Corrosion Behaviour of Powder Injection Molded 316 L Stainless Steel". *Powder Technology*. 289:135-142.
- **Majid Niaz Akhtar**, A.B. Sulong, **Mukhtar Ahmad**, Muhammad Azhar Khan, **Akbar Ali**, M.U. I."Impacts of Gd–Ce on the structural, morphological and magnetic properties of garnet nanocrystalline ferrites synthesized via sol–gel route". *Journal of Alloys and Compounds*. 60:486-495.
- Ishtiaq Ahmad, Ghulam Murtaza, Sehrish Masood, M. Kanwal, Ghulam Mustafa, **Majid Niaz Akhtar**, Hafeez Ullah, **Mukhtar Ahmad**. "Effects of Pr-contents on the structural, magnetic and high frequency parameters of M-type hexagonal ferrites synthesized by sol–gel method". *Journal of Material Science: Materials in Electronics*. 27 (6):6193-6201.
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