



# Physics Colloquium



Department of Physics, COMSATS Institute of Information Technology, Lahore

Motivated by scientific diversity, curiosity and an interactive exchange of ideas, the department of Physics, CIIT Lahore arranged colloquium dated November 12, 2014. The meeting was 5<sup>th</sup> of its kind in the series of colloquia arranged by the department. The event was structured to showcase ideas from various basic as well as applied research perspectives. To participate in the open scientific debate, colleagues from various fellow universities were invited. The aim behind the activity was to instigate student motivation to think out of the box to come up with innovative scientific ideas to put theory to practice.



The activity started with the opening remarks from **Prof. Dr. Mahmood Ahmad Bodla**, (Director, CIIT Lahore Campus), who intensified upon the dignified role of physics in revolutionizing the human survival. Prof. Bodla emphasized upon Physics to be the mother of all sciences. He emphasized upon how the knowledge of the field widens up the frontiers of our understanding of natural existence.

**Prof. Dr. Saleem Farooq Shaukat**, (Head, Department of Physics, CIIT Lahore) officially welcomed the guests and explained the objectives of the meeting. He further said that the department of Physics always encourages open dialogues upon the current crucial scientific issues and the colloquium is one of those series. A brief introduction of the faculty and the research avenues covered by the department was then presented.



The proceedings further continued with the guest talk by **Prof. Dr. M. Shahid Rafique**, (Chairman, Department of Physics, University of Engineering and Technology, Lahore) who deliberated upon the issue of the globally confronted issue of energy and fuel generation. He presented a solution to hydrogen fuel generation by inducing artificial photosynthesis in laboratory-designed Silicon based photovoltaics. The control parameters including surface area, catalytic activity, stability and charge mobility, which characterize the work performance of the artificial leaf structures, were also introduced. The aim is to produce low cost devices which would utilize the solar energy to dissociate hydrogen from water. The device efficiency can be enhanced by using various catalyst materials incorporated into porous electrodes.

Fuel & Energy

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### Matter & Radiations

The next keynote speaker was **Dr. Fareeha Hameed**, (Chairman, Forman Christian College University, Lahore) who spoke about the interaction of radiation with matter. She started by introducing various kinds of radiation including x-rays, electrons, neutrons and their respective interaction strengths. She stressed that the effects of the interaction of these radiations with various forms of matters can be exploited for various purposes including material imaging, structural detection, charge densities, and detection of in material homogeneities as well as medical benefits like tissue engineering. Dr. Hameed also spoke about the basic schematics of various radiation detectors. Among the many applied projects, she mentioned that the group has also been involved in the material studies gathered from Lahore Fort in joint collaboration with PINSTECH, Islamabad. The discussion gave a very comprehensive picture of the importance of the subject.



**Dr. Muhammad Fraz Bashir**, Assistant professor Dept Physics, CIIT gave a talk on the introduction to Space plasma and its Application. He mainly focused on the basics of space plasmas and current trends in the study of waves and instabilities related to the explanation and mechanism of solar wind impact on our earth by using the kinetic theory. He also highlighted how we can model the solar wind data using the exact numerical analysis and/or PIC simulation.

### Space Plasmas

### Neuro-Imaging

**Dr. Ayesha Anjum**, Assistant professor Physics Dept, CIIT Lahore, gave an introductory talk on Neuro-imaging and early diagnostics. The interest has been driven by the present need of early detection for different neurological disorders. She spoke about cerebral anatomy and different neuro-imaging modalities. She also mentioned the positron emission tomography (PET) imaging in conjunction with the classification methods can contribute in early diagnostics. She also highlighted how these techniques may help the doctors to improve their clinical results.



*The session was followed by a sumptuous lunch break in the Executive Café Lounge of the campus.*



*Group Photo Outside Executive Lounge*



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Quantum Gravity

The last talk of the session was delivered by **Dr. Babar Ahmad Qureshi**, (Assistant Professor, Department of Physics, Lahore University of Management Sciences). The lecture comprised the basic ideas governing the theory of quantum gravity. Dr. Qureshi stressed that the picture of gravity based upon Einstein's formulism of general relativity fails to comply with the principles of quantum mechanics. He described the physical origin of the concepts like black holes as well as Unruh effect can be well understood as a consequence of space-time curvature. To sum up, the theory of quantum gravity can't be completely explained based upon classical and semi-classical approaches and is still a matter of scientific debate.



*The ceremony closed with the distribution of mementos among the speakers, and a note of thanks followed by sumptuous tea.*



Picture Gallery of the Event

