THREE DAYS SCIENCE ACADEMIES’ LECTURE WORKSHOP
ON
“SOME RECENT TRENDS IN PHYSICS”

07-09 September, 2016

Sponsored and Supported
By

Indian Academy of Sciences, Bangalore

Indian National Science Academy, New Delhi

The National Academy of Sciences, Allahabad

Hosted By

DEPARTMENT OF SCIENCE AND HUMANITIES (PHYSICS)

(An Autonomous Institution Affiliated to Anna University)
(Re-accredited with “A” Grade by NAAC, An ISO 9001:2008 Certified Institution)
COIMBATORE – 641 049 TAMIL NADU, INDIA

Convener
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Co-ordinator
Dr. R. Balamurugan,
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A REPORT ON THE PROGRAMME

A three days Science Academies’ Lecture workshop on “Some Recent Trends in Physics” was organized by the Department of Science and Humanities (Physics) at Kumaraguru College of Technology in Coimbatore on 07-09, Sep 2016. The Workshop was sponsored and supported by Indian Academy of Sciences, Bangalore, Indian National Science Academy, New Delhi and The National Academy of Sciences, Allahabad. The workshop was organized for the following objectives:

- To create awareness among the students about the initiatives (Internships, Fellowships) of various academies in India.
- To impart the knowledge of science to budding students, enable them to take up the research carrier in a perspective manner.
- To develop a strong interpersonal relationship between the host institution and national laboratories across the country.
- To motivate the students, young researchers and faculties to visualize the current trends of research in theoretical and experimental physics.

Chief Guest address by Prof. M. Lakshmanan (Convener)
Special Address by Dr. V. Subramanian, Senior Principal Scientist, CLRI

Around 200 participants predominantly PG Physics students, research scholars and few faculties from Sri Ramakrishana Mission Vidyalaya College of Arts and Science, Kongunadu College of Arts and Science, Govt Arts and Science college Coimbatore, PSGR Krishnammal College of Arts and Science, PSG College of Arts and Science, NGM College of Arts and Science(Pollachi), Chikkana Govt Arts College(Tiruppur), Kandasamy Kandars College (Velur-Namakkal), Avinashilingam Deemed University, Bharathiar University attended the event.

Inaugural function: A part of the audience at Sir.C.V. Raman Hall in KCT

The programme was started with prayer at 9:30 am on the first day followed by welcome address by HOD S&H, Dr.T.Arunachalam. Dr.R.S.Kumar, Principal KCT, gave his felicitations. Dr.V.Subramanian, Senoir Principal Scientist, CLRI in his address highlighted the initiatives of Science Academies for the empowerment of science education in India. Followed by him, Prof. M.Lakshmanan, Convener of the workshop emphasized the importance of basic science for the meaningful transformation of tomorrows engineering and technological
advancements in society. He also enlightened the gathering by narrating the contribution of Michael Faraday’s electromagnetic induction. Dr.R.Balamurugan Co-ordinator of the workshop proposed the vote of thanks.
On the first day, Prof. M. Lakshmanan delivered two lectures on Nanoferromagnetism. He focused mainly on spintronics, where the devices are based on electron spin and spin currents. He listed the merits of spin based devices, like compactness, faster, energy efficient, versatile than other devices. The speaker pointed out the inadequacy like low power output. He also explained the ‘Spin transfer is modesty of current demanded by metal structure’ by Slonczewski J.C.

He emphasized the importance of spin transfer mechanisms by his equations of damped force oscillations (non linear physics) and operators of quantum mechanics. By taking metal thin film stack arrangement, he explained the Giant Magneto Resistance principle in which a drastic variation in resistance was observed. Even though topics are in higher order mathematics, a rapt attention was witnessed among the gathering. Students also posed some intellectual questions and clarified their doubts.
Followed by the first session, Dr. V. Subramanian, Senior Principal Scientist, Chemical Laboratory, Central Leather Research Institute delivered two lectures on the topics “Principles and Applications of Molecular Modeling” and “Prediction of Molecular Properties using Abinitio and Density Functional methods”. He explained the electron system, Hatree fock, electron co relation, semi empirical density functional method and vibrational dependence of molecular polarization and poly atomic molecules. The speaker has shown the bio -world via quantum ideas like eigen values, selection rules and harmonic vibrations. The speaker suggested some books to be followed by the students. His dynamic session in a very large gathering ended with lot of deliberations.
On the second day, Professor M.N. Ponnusamy delivered two lectures on “Crystal Structures of Hemoglobin derived from Mammalian & Avian Species” and “Crystal Structures of Regulatory and Storage Proteins”. These topics mostly related with biophysics and central dogma of molecular biology. He explained some fundamental concepts on protein and different types of Amino acids. He explained formation of peptide bond from amino acids. Detailed information was given about the tetrameric proteins role in carrying oxygen from lungs to tissues and also bringing back Co₂ from tissues to lungs.

The speaker emphasized the role of G.N. Ramachandran, one of the legendary Indian biophysicist. Next part of the speech went on protein engineering, gene regulation, and prokaryote & eukaryote, attenuation and anti- termination.

Prof. M.N. Ponnusamy gave the lecture on Crystal Structures of Regulatory and Storage Proteins

A portion of audience hearing the speech in the second day session
Professor P.Kolandaivel delivered lectures on “Non-Covalent Interactions” and “Amoloyd Beta Peptide-Alzheimer disease”. Various types of complex bonding structures were explained by the speaker with simple illustrations. Information about Symptoms of Alzheimer disease (AD), a common form dementia like memory loss, loss of thinking ability, misplacing things, drugs required to cure AD spell bound the audience. An emphasis was given about the research on Amoloyd Beta Peptide. Awareness about the AD (Alzheimer Disease) really gave a cautioned the future generation.
Prof. K. Porsezian shows the latest scanning methods in his speech

On third day, Prof. K. Porsezian delivered the lectures on “Introduction to Nonlinear optics and materials” and “Revolution in Light based Optical Fiber Communication”. Optical parametric oscillation and optical parametric amplification concepts were explained to the core. The speaker gave the information about the Tera-Hertz scanning which is going to replace the current X ray scanning. The role of Lithium Niobate in the future communication system was illustrated with interesting visuals. He also highlighted the merits of optical fiber communication and the role of optical solitons in information exchange. He talked about the upcoming free phone call facilities by using 0.0001% of band width.

A galore of audience listening the lecture of Dr.K.Porsezian
Prof. K. Jeganathan gave the presentations on Nanowires: Fundamentals to applications

Prof. K. Jeganathan gave the presentations on “Nanowires: Fundamentals to applications” and “Historical perspective of solid state lighting”. He explained the prediction of Moores’ law which says the revolution of microelectronic industries. The speaker elucidated how the physical, chemical, mechanical, structural and electrical characteristics of materials got transformed when they are reduced to nano dimensions. A precise discussion went on synthesis and characterization of nanowires and its applications. While tracing the historical perspective of solid state lighting, the speaker mentioned the role of upcoming LEDs with low power consumption instead of compact fluorescent lamp (CFL).

Valedictory address by Prof. K. Porsezian
In the valedictory session, Professor M.N.Ponnusamy stressed the importance of science for constructive purposes. Prof. K. Porsezian explained the various fellowships available for research aspirants in India. Prof. K. Jeganathan congratulated the organizers for arranging this event. In the feedback session the participants’ whole heartedly appreciated and thanked the Science Academies, the convener and organizers for arranging this informative lectures and hospitality provided. Dr.R.Balamurugan coordinator of the workshop proposed the vote of thanks. The programme ended with National Anthem.