

## **MVJCE- Physics Department – Guest Lecture- Oct 2024**

The Department of Physics organized a “Guest Lecture” for the first-year Engineering students on 9<sup>th</sup> October 2024, 1:30 to 4:00 pm. The Guest Speaker was Dr. Ganesan, Indian Institute of Science (IISc), Bangalore. The topic of the talk was on “Chalcogenide based Solar Energy Materials and Photodetectors”. The Physics Cycle students of all branches have actively participated in this session. Around 400 students had taken active participation in the event.

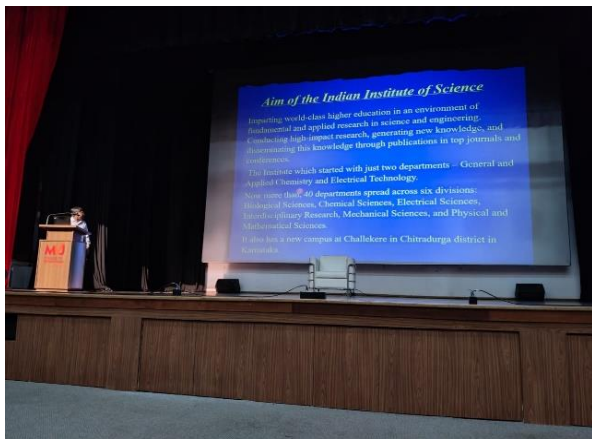


The department has made the necessary arrangement for the commencement of Guest Lecture at MVJCE Auditorium, MVJCE. A session began with a welcome address by Dr. Debalina, Associate Professor of Physics. She has started the session by inviting the guest of honour Dr. R. Ganesan, Principal Scientific Officer, Department of Physics, IISc, Bangalore. She introduced the chief guest before the students and faculty members.

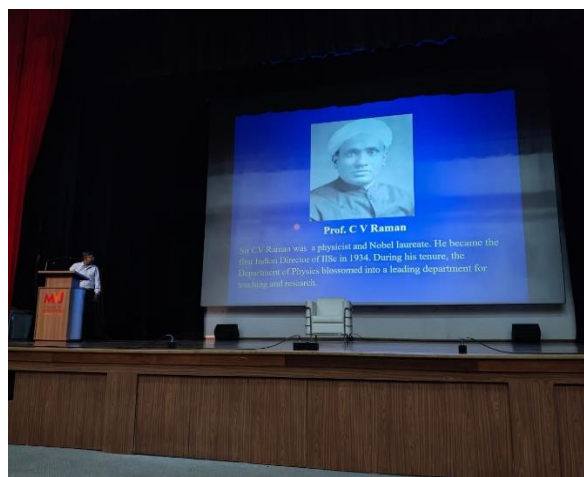
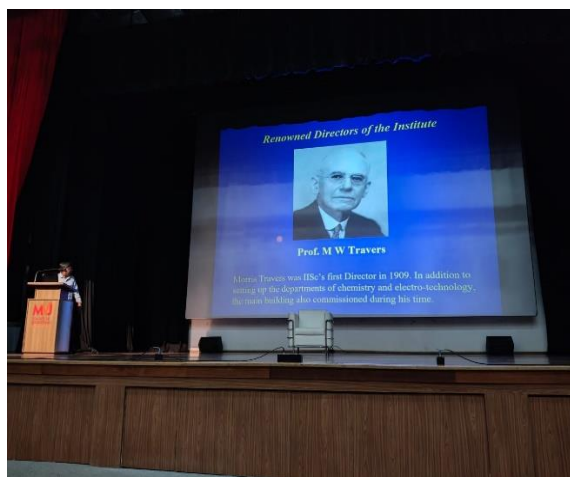
Dr. R. Ganesan has started his career since 1980 to till date at IISc, Bangalore. He has more than 30 years of research experience in Chalcogenide based solar energy materials. He has executed



several R&D and consultancy projects funded by governmental and other non-governmental agencies. He has more than 50 publications in national and international journals.



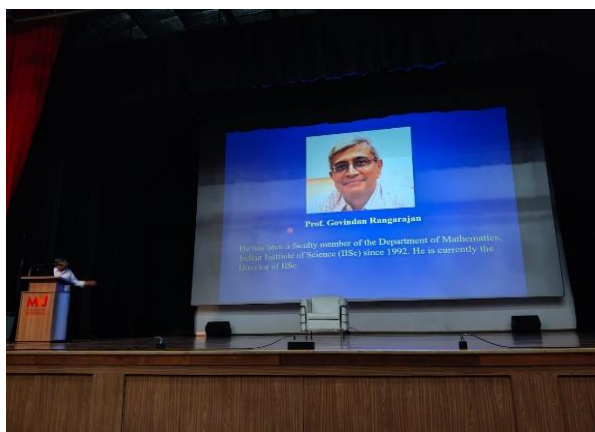
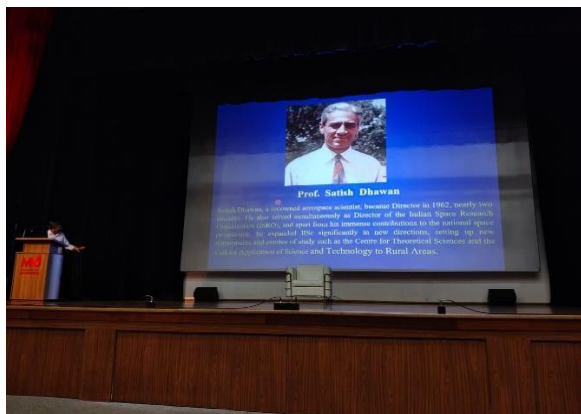
Dr. R. Ganesan began his talk with a brief history of IISc including aim and vision. IISc is imparting world-class higher education in an environment of fundamental and applied research in science and engineering. Conducting high-impact research, generating new knowledge, and disseminating this knowledge through publications.



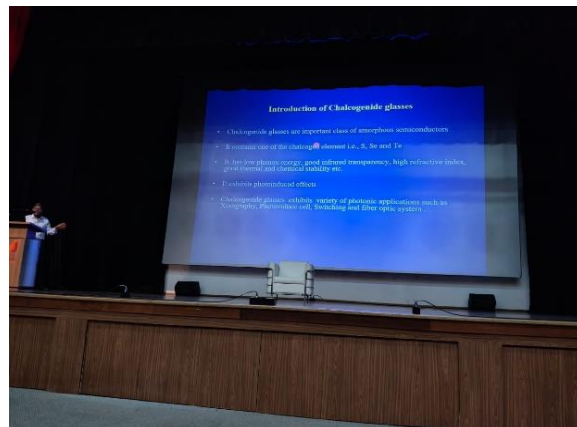
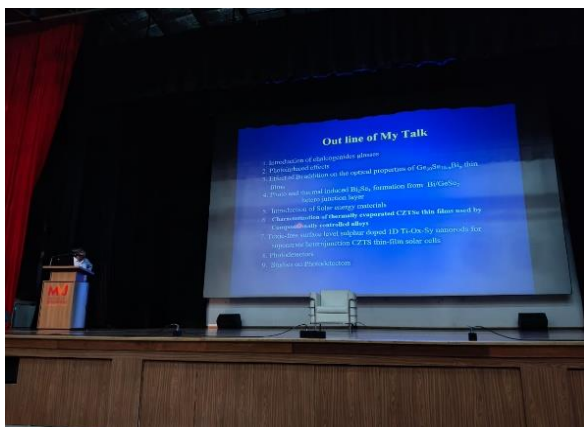
The speaker has highlighted the directors who all are associated with IISc from the inception to till date. He started with Prof. M.W. Travers, who was IISc's first Director in 1909 with commissioned the main building and setting up the department of Chemistry and Electro-Technology. Followed by Prof. C.V. Raman, a Physicist and a Nobel Laureate, was the first Indian Director of IISc in 1934. During his tenure, the department of Physics blossomed into a leading department for teaching and research. Prof. Sathis Dhawan, a renowned aerospace Scientist, became Director in 1962. Simultaneously he served as Director of the ISRO. He helped to setting up new departments, Centre



for Theoretical Sciences and the Cell for Application of Science and Technology to rural areas. Prof. CNR Rao, a renowned Chemist and Bharat Ratna Awardee took over as the Director in 1984. Prof. Govindan Rangarajan, has been a faculty of Mathematics since 1992 and currently serving as the Director.



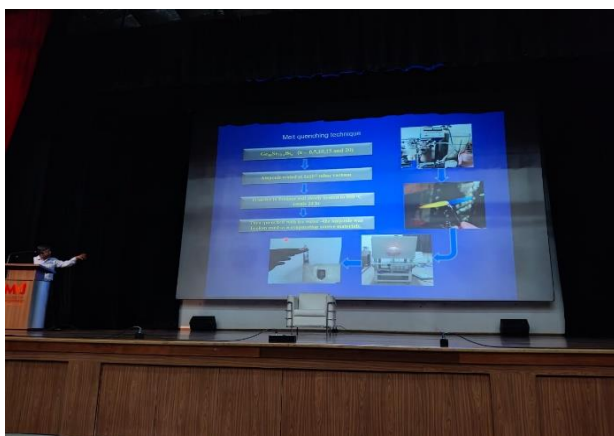
Dr. R. Ganesan, has explained about the Chalcogenide glasses, effect of Bi addition on the optical properties, Solar energy, CZTSe Material properties, Photo detectors. The detailed explanations with images also displayed.



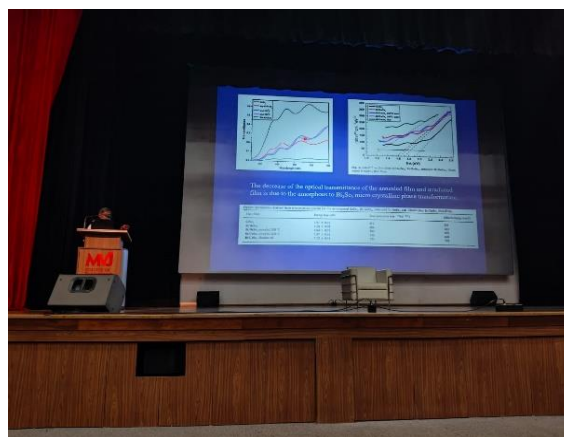


The concepts of Chalcogenide glasses with its essential role in various areas has been explained in detail. The talk also included a detailed explanation on various methods involved for Chalcogenide glasses study and developments.

The speaker emphasis the complete working principle of Melt Quenching Technique for the preparation of Chalcogenide materials. It is one of the important technique for the Chalcogenide materials with phase pure.



Also, highlighted the application of Chalcogenide materials in grating, microlenses, Photovoltaics and IR based fibers.

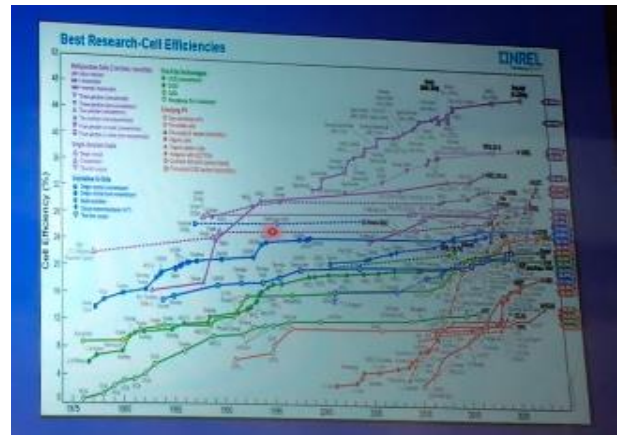
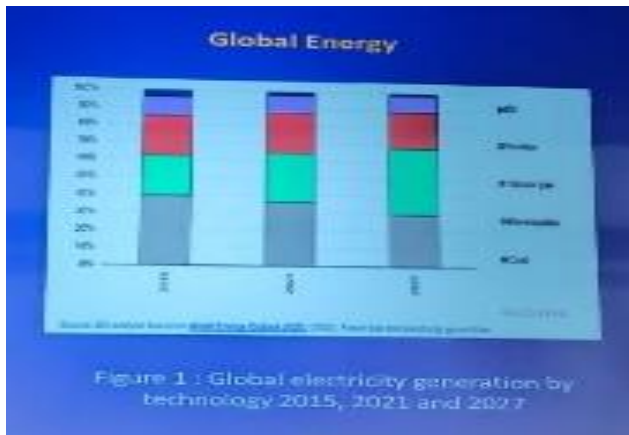


Additionally, he has discussed about the historical developments in solar cells and showed the various methods for producing. Followed by he has showed the various applications based on BiSe and studied the optical properties, which is shown in above Figure.

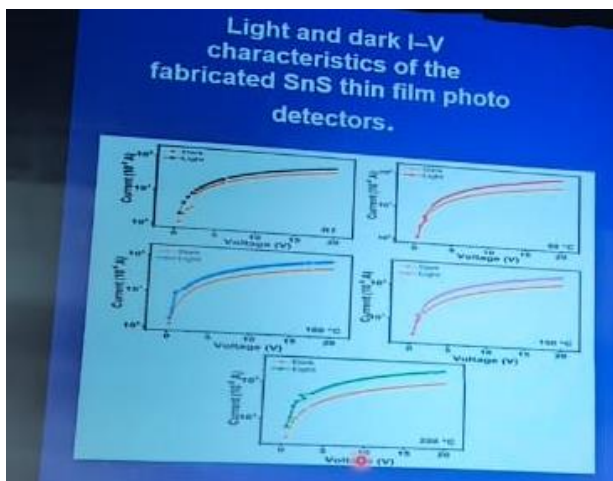
The requirement, advantages, disadvantages and challenges of the emerging materials also discussed in detail. The global electric generation by technological developments in 2015, 2021 and future (2027) and the solar cell efficiency of the different solar cell generation for various materials



as shown in the following Figures. The emerging photovoltaic based on Perovskite/ Si Tandem solar cells showed the highest solar cell efficiency (33.7%).



He gave a brief overview of the photo detectors related research work which was executed under his supervision at IISc, Bangalore. He finally shown the few results based on SnS photo detectors.



The lecture also discussed about the possibilities with challenges of advanced level of photo detectors its applications in real-time like imaging, electronics, environmental monitoring, optical communication, aerospace, military, and security inspections.

He highlighted the importance and relevance based on photodetectors in the syllabus for engineering students.



After his lecture, 20 minutes time given to students for interaction with Chief Guest. The students have actively participated during the interaction session and expressed their doubts and got them clarified by our Chief Guest.

The lecture was concluded with a vote of thanks by Dr. Debalina. The Speaker was honoured by Dr. Bharath, HoD, Department of Physics, MVJCE with a Bouquet.



A prime objective of the Guest lecture was to create an exposure among the first year students to explore the advanced level theoretical and experimental based knowledge with recent applications. The lecture was highly informative towards the fundamentals of Chalcogenide materials and its applications. This lecture facilitates an opportunity for the engineering students to learn about Chalcogenide with research aspects and prospects in engineering fields. This lecture helped the engineering students to understand the concept of Chalcogenide materials for various applications.