Applied Science Department

One Day Lecture Series Report

(12-03-2016)

One day seminar was organized by **department of Applied Sciences** on 12th March 2016. It includes four speakers the first speaker Prof. Bhaskar Mitra, IIT Delhi, delivered his talk on MEMS devices for Internet of things. Micro-Electro-Mechanical Systems, or MEMS, is a technology that in its most general form can be defined as miniaturized mechanical and electro-mechanical elements (i.e., devices and structures) that are made using the techniques of microfabrication. While the electronics are fabricated using integrated circuit (IC) process sequences (e.g., CMOS, Bipolar, or BICMOS processes), the micromechanical components are fabricated using compatible "micromachining" processes that selectively etch away parts of the silicon wafer or add new structural layers to form the mechanical and electromechanical devices. It is even more interesting if MEMS can be merged not only with microelectronics, but with other technologies such as photonics, nanotechnology, etc. This is sometimes called "heterogeneous integration." Clearly, these technologies are filled with numerous commercial market opportunities.

The series of talk contained 2nd lecture delivered by Prof. Kehar Singh IIT Delhi on the topic From Physics to Optical Engineering. He explain the importance of optical engineering in research and other fields of engineering. Prof. Kehar singh compares the research data of india w.r.t china and other countries. The important feature of a diffraction grating is that the interference maxima will not be in the form of broad bands but rather very thin, bright lines. We can show this by calculating the halfwidth of the central maximum. (Figure 6.4 shows what we mean by half-width). The brightness of the line drops to zero in the direction in which the N slits have an interference minimum. As N is usually a very large number, the situation is very similar to diffraction by a single slit of width N d. The light emitted by a sample of a substance may be split up effectively by passing it through a diffraction grating, since the direction of each interference maximum depends on wavelength.

The third lecture was delivered by Dr. Rajender Singh, IIT Delhi, on the topic GaN Based Nanopillar Arrays for Nano Scale Device Applications. Dr. Rajender singh emphasis on nanotechnology and material science. He compared different substrate temperatures and different chlorine-based etch chemistries to fabricate high quality GaN nanopillars. Room temperature photoluminescence and Raman scattering measurements were carried to study the presence of surface defect and strain relaxation on these nanostructures, respectively. Substantial strain relaxations were observed in these structures from room temperature Raman spectroscopy measurements. Room 2 temperature Photoluminescence spectroscopy shows the presence of whispering gallery modes from these the nano disks structures. Direct band-gap gallium nitride (GaN) nanopillar arrays have attracted tremendous research interest for potential device applications. Using topdown approach, uniform GaN nanopillar arrays have been fabricated through a combination of lithography and large area etching using inductively coupled plasma tools.

The fourth talk was delivered by Dr. Bharti Arora, The Northcap University, Gurgoan on the topic Insight into Structural Polymorphism of DNA.


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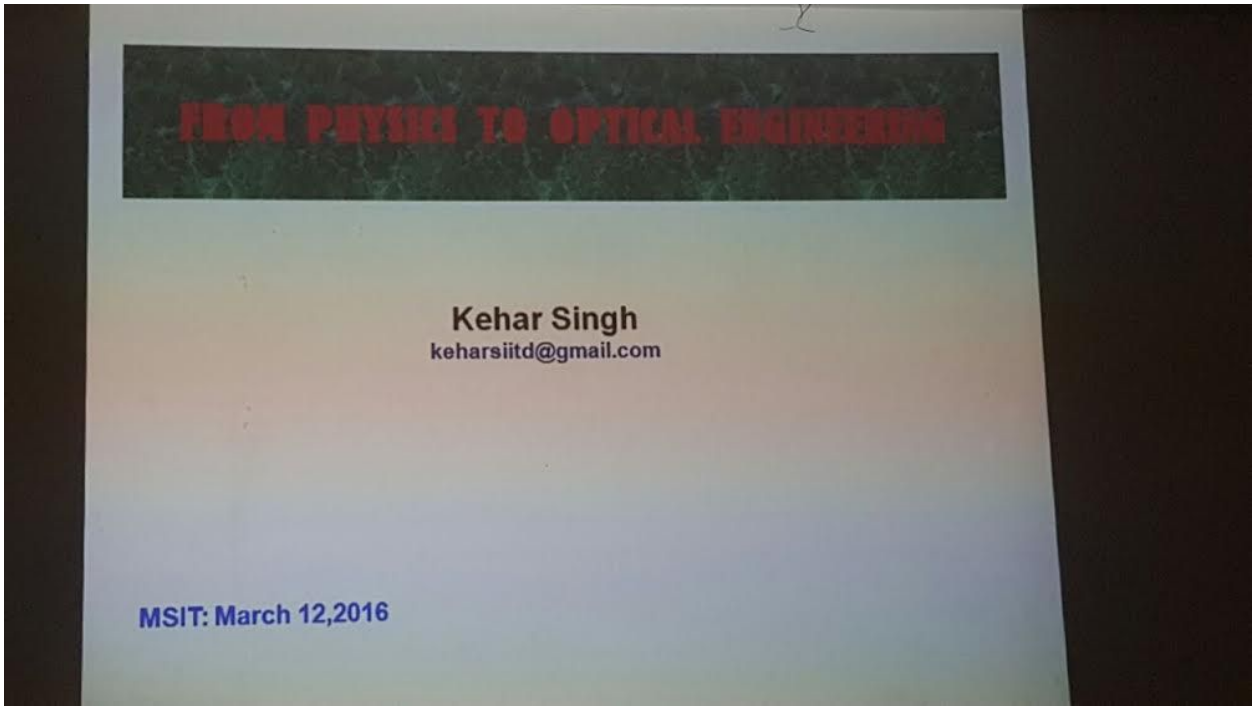
Historical timeline of MEMS


Trillion Sensors: From Scarcity to Abundance with MEMS
Dr. Bhaskar Mitra
Assistant Professor, IIT Delhi
Indian Institute of Technology, Delhi


FROM PHYSICS TO OPTICAL ENGINEERING
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