Integrated Optics & Radio Photonics
Indian Scenario

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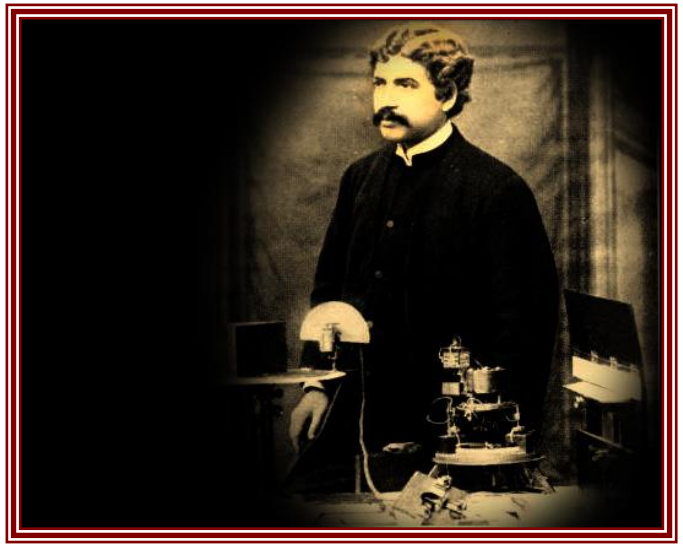
Modern Optics in India : Landmarks

Sir J. C. Bose (1858 – 1937 C.E.)

Millimeter wave sources and detectors

"Detector for Electrical Disturbances"
U.S. Patent 775, 840 (1904)



Sir C. V. Raman (1888 – 1970 C. E.)

Nobel Laureate

Raman Spectroscopy
Raman Scattering
Acousto-Optic Phenomenon

Integrated Optics

(i) Photonic Devices for Communication, e.g. Filters, Directional Couplers, Isolators etc.
(ii) Photonic Sensors

Activities:
(a)Simulation Studies
(b)Proof-of-Concept Experimentation
(c)Fabrication

Major Centres:
(i) Indian Institute of Technology, Madras
(ii) Indian Institute of Science, Bangalore
(iii)University of Calcutta (CU), Kolkata
(iv)Indian Institute of Technology. Roorkee
(v) Indian Institute of Technology, Kharagpur

Terahertz Science & Technology

Areas of Investigations:

(i) THz Spectroscopy
(ii) THz Imaging
(iii) THz Generation
(iv) THz Metrology

Major Centres of R&D Activities:

1. Indian Institute of Science, Bangalore
2. Tata Institute of Fundamental Research, Mumbai
3. Indian Institute of Technology, Bombay
4. National Physical Laboratory, New Delhi
5. Inter University Accelerator Centre, New Delhi
6. University of Hyderabad (UHyd)
7. Indian Institute of Technology, Kharagpur
8. Saha Institute of Nuclear Physics, Kolkata
9. Indian Institute of Technology, Bhubaneswar
10. Indian Institute of Science, Education & Research, Bhopal
11. Indian Institute of Science, Education & Research, Pune
12. Indian Institute of Technology, Guwahati

Major activities in related topics in India

I. Binary Optics in Micro-Optics & Photonics

[Diffractive optics – Computer generated/ Holographic/ Lithographic/ Micromachining/Laser plotting]

Analysis & Synthesis of 2D & 3D Light Structures by phase filters

Proof-of-concept Validation

Fabrication

Major Research Centres

- Indian Institute of Technology, New Delhi
- Instruments Research & Development Establishment, DOD, Dehradun
- University of Calcutta, Kolkata
- Central Scientific Instruments Organisation, CSIR, Chandigarh
- Centre for Advanced Technology, DAE, Indore

II. Freeform Optics & Conformal Optics in Photonics

Applications: Sensors, Trackers, Imaging & Illumination

Current state of activities

Analysis & Design (Dedicated Software Development)

Prototype Fabrication

Major Centres for R&D Activities

- Indian Institute of Technology, New Delhi
- University of Calcutta, Kolkata
- Instruments Research & Development Establishment, DOD, Dehradun
- Central Scientific Instruments Organisation, CSIR, Chandigarh
- Research Center Imarat, DOD, Hyderabad

III. <u>Adaptive Optics</u>

Application areas currently investigated:

(i) High resolution imaging through atmosphere in visible, mid-IR and far-IR wavebands

(ii) Ophthalmic imaging

<u>Major Centres of Activities:</u>

- ❖ Instruments Research Development Establishment, DOD, Dehradun
- ❖ Indian Institute of Space Science & Technology, DOS, Thiruvananthapuram
- ❖ University of Calcutta, Kolkata
- ❖ Inter University Centre for Astronomy & Astrophysics, Pune

IV. <u>Micro-Electro-Mechanical Systems (MEMS)</u>

Applications: sensors

Fabrication facilities:

Laser Electro-Optics Systems (LEOS),DOS, Bangalore

Thank You