

## CURRICULUM VITAE

### **Dr. Vipul Kheraj**

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#### ➤ **ACADEMIC PROFILE**

- **Ph.D.** in **Applied Physics** on “**Development and Fabrication of High Power Laser Diode**” from The Maharaja Sayajirao University of Baroda, Vadodara, India in December-2008.
- **M.Sc.** in Physics from Department of Physics, Bhavnagar University, Bhavnagar, India in May-2004.
- **B.Sc.** in Physics from Sir P. P. Institute of Science, Bhavnagar University, Bhavnagar, India in April-2002.

#### ➤ **AWARDS/FELLOWSHIPS**

- **Fulbright-Nehru Postdoctoral Research Fellowship** 2013-14
- **DAE/BRNS Research Fellowship** for the project “Development of Processes for the Fabrication of High Power Laser Diodes” from July 2004 to December 2007.
- **Late Dr. Rohit Bhatt Gold Medal** and **Dr. R. V. Mehta Award** for securing highest mark in M.Sc (Physics) exams held in June-2004 at Department of Physics, Bhavnagar University, Bhavnagar.
- “**Minaxi Lalit Science Award**” for **Physics** in December 2001, organized by Gujarat Science Academy, Physical Research Laboratory (PRL), Ahmedabad.

#### ➤ **WORK EXPERIENCE**

- Currently **Fulbright-Nehru Postdoctoral Research Fellow** at the **University of Utah, USA** for one year from Sep 15, 2013 to Sep 14, 2014. My project aims at the study of new cost-effective materials for development of solar cell.
- Working as an **Assistant Professor** in Department of Applied Physics, Sardar Vallabhbhai National Institute of Technology (SVNIT), Surat, India since March 2009, where I am involved in teaching Physics at B.Tech and M.Sc. level as well as designing new curriculum for five year integrated M.Sc. Physics course.
- Worked as a Senior Research Fellow in DAE-BRNS project entitled “Development of Processes for Fabrication of High Power Laser Diodes” at Applied Physics Department, Faculty of Technology & Engineering, The Maharaja Sayajirao University of Baroda, Vadodara, India, from April 2006 to December 2007.
- Involved in development and optimization of growth and post-growth processing of high power Quantum-Well (QW) edge-emitting laser diodes using MOVPE (MOCVD) technique at RRCAT, Indore, India from August 2006 to June 2007.
- Life member of Indian Laser Association

#### ➤ **FUNDED RESEARCH PROJECT**

- **Principal Investigator** for a sponsored research project entitled “Development of Anti-Reflection Coatings for Fabrication of Superluminescent Light Emitting Diode”, Project Duration: 2011-2014, Funded by: BRNS, Government of India.

## ➤ RESEARCH INTERESTS

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- Thin-Film Solar Cells: Currently I am working on the materials for Thin-Film Solar Photovoltaics. I am interested to study the synthesis and properties of new low-cost, earth-abundant and non-toxic photovoltaic materials for its role as absorber in thin-film PV.
- Semiconductor Optoelectronic Devices, Nano-structured Materials.

## ➤ IMPORTANT TRAINING/SCHOOL/WORKSHOP

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- Attended and Presented Oral Talk at Workshop on **Photovoltaic Materials and Manufacturing Issues-II**, organized by **Material Research Society** and **National Renewable Energy Laboratory (NREL)** at **Denver, Colorado, USA**, during October 4-7, 2011.
- Attended and Presented Paper at **International Conference on Materials for Advanced Technology (ICMAT)**, organized by **Material Research Society, Singapore**, at **Singapore** during June 26 - July 01, 2011.
- Attended **International Summer School on Photovoltaics and New Concepts of Quantum Solar Energy Conversion (QUANTSOL)**, organized by **Helmholtz-Zentrum Berlin** from 18th to 25th Sep 2010 in Hirschegg, Kleinwalsertal, **Austria**.
- Carried out Summer School Project on “**Experimental Studies on Electron Cyclotron Resonance Breakdown**” during Summer School Programme-2003 at **Institute for Plasma Research**, Gandhinagar, Gujarat, India under the guidance of Prof. Dhiraj Bora.
- Attended and presented lab activity report on “Research Activities on Optoelectronic Materials and Devices at Department of Applied Physics” at Optoschool-08, organized by Tata Institute of Fundamental Research (TIFR) during July 27-August 02, 2008 at Mumbai, India.
- Apart from these, I have participated and presented my research work at various International workshops/conferences at Germany (KIT), Singapore (NUS), Poland (Gdansk University of Technology), etc.

## ➤ LIST OF A FEW SELECTED PUBLICATIONS

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### ⇒ Chapter in a Book:

- **Optimization of Facet-Coating for High-Power Laser Diodes**  
V.A. Kheraj and C. J. Panchal  
Chapter in Edited Book: “*Laser and Bose-Einstein Condensation Physics*”, Ed.: Man Mohan, Anil Kumar, A.B. Bhattacharje; Narosa Publishing House (2010) pp. 101-121

### ⇒ Journals:

- **Extraction of solar cell parameters from a single current-voltage characteristic using teaching learning based optimization algorithm**  
S. J. Patel, A. K. Panchal and **Vipul Kheraj**  
Applied Energy 119 (2014) pp. 384–393
- **Structural and Optical Properties of Silicon Thin-films Deposited by Hot-Wire Chemical Vapor Deposition: The Effects of Silane Concentrations**  
A.K. Panchal, V. Beladiya, **Vipul Kheraj**  
Thin Solid Films 542 (2013) pp. 139–143
- **Synthesis and characterisation of Copper Zinc Tin Sulphide (CZTS) compound for absorber material in solar-cells**  
**Vipul Kheraj**, K.K.Patel, S.J.Patel, D.V.Shah  
Journal of Crystal Growth 362 (2013) pp. 174–177
- **Effects of Annealing on Structural Properties of Copper Zinc Tin Sulphide (CZTS) Material**  
K.K. Patel, D.V. Shah, **Vipul Kheraj**  
Journal of Nano- and Electronic Physics 5 (2013) pp. 020311 - 020313

- **Solar Cell Parameters Extraction from a Current-Voltage Characteristic Using Genetic Algorithm**  
S.J. Patel, A.K. Panchal, **Vipul Kheraj**  
Journal of Nano- and Electronic Physics 5 (2013) pp. 020081 - 020083
- **Substrate Temperature Effect on Structural Properties of Bi<sub>2</sub>Te<sub>3</sub> Thin Films**  
B.S. Jariwala, D.V. Shah, **Vipul Kheraj**  
Journal of Nano- and Electronic Physics 3 (2011) pp. 101-105
- **Growth, structural and optical properties of copper indium diselenide thin films deposited by thermal evaporation method**  
N.M. Shah, C.J. Panchal, **V.A. Kheraj**, J.R. Ray, M.S. Desai  
Solar Energy 83 (5) (2009) pp. 753-760
- **Electrophysical properties of Cu/Cr and Fe/Cr film systems within elastic and plastic deformation range**  
S. Protsenko, D. Velykodnyi, **V. Kheraj**, M. Desai, C. Panchal, I. Protsenko  
Journal of Materials Science 44 (18) (2009) pp. 4905-4910
- **Simulation of Reflectivity Spectrum for Non-Absorbing Multilayer Optical Thin-Films**  
**V. A. Kheraj**, C. J. Panchal, M. S. Desai and V. Potbhare  
Pramana: Journal of Physics 72 (6) (2009) pp. 1011-1022
- **Structural, electrical and optical properties of copper indium diselenide thin films prepared by thermal evaporation**  
N.M. Shah, J.R. Ray, K.J. Patel, **V.A. Kheraj**, M.S. Desai, C.J. Panchal and B. Rehani  
Thin Solid Films 517 (13) (2009) pp. 3639-3644
- **Structural, optical and electrical properties of flash evaporated CIS thin films**  
N. M. Shah, C. J. Panchal, **V. A. Kheraj**, J. R. Ray and M. S. Desai  
Journal of Material Science 44 (2009) pp. 316-322.
- **Growth, structural, electrical and optical properties of the thermally evaporated tungsten trioxide (WO<sub>3</sub>) thin films**  
K. J. Patel, C. J. Panchal, **V. A. Kheraj**, M. S. Desai  
Materials Chemistry & Physics 114 (2009) pp. 475-478.
- **Barrier inhomogeneities in Au/CdSe thin film Schottky diodes**  
C. J. Panchal, M. S. Desai, **V.A. Kheraj**, K. J. Patel and N. Padha  
Semicond. Sci. Technol. 23 (2008) pp. 015003.
- **Optimization of facet coating for highly strained InGaAs quantum well lasers operating at 1200 nm**  
**V.A. Kheraj**, C.J. Panchal, P.K. Patel, B.M. Arora, T.K. Sharma  
Optics & Laser Technology 39 (7) (2007) pp. 1395-1399

⇒ **Conference Proceedings:**

- **Determination of refractive index and thickness of thin-film from reflectivity spectrum using genetic algorithm**  
Sanjaykumar J. Patel, **Vipul Kheraj**  
AIP Conf. Proc. 1536 (2013) pp. 509-510
- **Structural and optical properties of copper zinc tin sulphide (CZTS) material synthesized using binary sulphide precursors**  
K. K. Patel, D. V. Shah, **Vipul Kheraj**  
AIP Conf. Proc. 1512 (2012) pp. 1284-1285
- **Estimation of the Reliability and Junction Temperature of the InGaP 650 nm Quantum Well Laser Diode**  
G.G. Bhatt, C.J. Panchal, M.S. Desai, **V.A. Kheraj** T.K. Sharma  
Proceedings of XV International Workshop on the Physics of Semiconductor Devices (IWPSD-2009), New Delhi, December 15-19, 2009

- **In-situ reflectivity measurement for anti-reflection coating on laser diode facet**  
Chetan Panchal, **Vipul Kheraj**, Pravin Patel, Krupal Pandya and Tarun Kumar Sharma  
Proc. SPIE Vol. 6286, 62860H, Advances in Thin-Film Coatings for Optical Applications III; Michael J. Ellison; Ed. (2006)
- **Development of high power quantum well lasers at RRCAT**  
T. K. Sharma, Tapas Ganguli, V. K. Dixit, S. D. Singh, S. Pal, S. Porwal, Ravi Kumar, Alexander Khakha, R. Jangir, **Vipul Kheraj**, P. Rawat, and A. K. Nath  
Proc. of 6<sup>th</sup> DAE-BRNS National Laser Symposium, Dec 5-8, 2006, RRCAT, Indore.
- **Effect of facet reflectivities on high-power highly strained InGaAs quantum-well diode lasers operating at 1.2 $\mu$ m**  
C. J. Panchal, **V. A. Kheraj**, K. M. Patel, P. K. Patel, B. M. Arora, T. K. Sharma  
Proc. of SPIE Vol. 6028, p. 35-41, ICO20: Lasers and Laser Technologies; Y. C. Chen, Dianyuan Fan, Chunqing Gao, Shouhuan Zhou; Eds. (2005).

➤ **EXPERT LECTURES DELIVERED**

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- **"Emerging Materials for Thin-Film Solar PV; In Pursuit of Cost-Effective Clean Energy"** delivered at University Metropolitana, San Juan, Puerto Rico on March 14, 2014 as a part of OLF travel award by CIES and Fulbright Visiting Scholar program
- **"A Comparative Study on Synthesis of Quaternary Cu<sub>2</sub>ZnSnS<sub>4</sub> from Elemental and Binary-Sulphide Precursors"** delivered as an Invited speaker in Second International Symposium on Semiconductor Materials and Devices (ISSMD-2), organized by University of Jammu at Jammu during 31 Jan-02 Feb 2013.
- **"Virtual Instrumentation Approach for Semiconductor Materials Research"** delivered in a One Day course on Semiconductor Materials, Characterizations and Applications at University of Jammu, Jammu on 30th January 2013.
- **"Semiconductor Quantum Structures"** delivered in Einstein Lecture Series on Quantum Mechanics at Department of Applied Physics, SVNIT, Surat on Sep 08, 2011.
- **"Laser Diode: Fabrication & Characterization"** delivered in Staff Development Programme on Recent Trends in Material Science and Technology at Department of Applied Physics, SVNIT, Surat on December 08, 2009.
- **"Virtual Instrumentation using LabVIEW"** delivered in Staff Development Programme on Non-Destructive Testing at Department of Applied Physics, SVNIT, Surat on October 07, 2009.