Dr. Vineet Kumar Singh

Assistant Professor
Department of Physics
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Teaching Experience

Assistant Professor, Department of Physics, DDU Gorakhpur University, Gorakhpur, India	July 2018 – Till Now
Assistant Professor, Department of Physics, Rameshwar College, Muzaffarpur, India	Sept. 2017 – June 2018

Research Experience

Research Associate, Indian Institute of Science, Bangalore — Aug 2015 – Aug 2017

(Advisor: Prof. Sushobhan Avasthi)

- Crystalline-Si/Perovskite Tandem solar cell for High Efficiency Photovoltaics

Post Doctoral Fellow, Indian Institute of Science, Bangalore — June 2012 - June 2015

(Advisor: Prof. J. Nagaraju)

- Fabrication of silicon nanowires (NWs) Based Solar Cell

Education

D.Phil.	University of Allahabad, India Department of Physics Thesis Advisor: Dr. Pratima Chauhan Thesis Topic: Synthesis and Characterization of CdS nanoparticles and Application of some materials in Solar Cells.	April 2007 - March-2012
M.Sc.	University of Allahabad, India Department of Physics Specialization: Condensed Matter Physics	July 2004 - June 2006 (1st Division)
B.Sc.	University of Allahabad, India Department of Physics	July 2001- June 2004 (1st Division)

Awards and Honors

2023: UPCST project **(Rs. 13,36,000.00)**

2019: UGC Startup research grant **(Rs. 10,00000.00)**

2016: Nominated for best oral presentation in Photovoltaic Session in IUMRS-ICYRAM 2016.

2012: Dr. D.S. Kothari Postdoctoral Fellowship- University Grant Commission, India.

2010: Senior Research Fellowship- Council of Scientific and Industrial Research, India.

2008: Junior Research Fellowship- Council of Scientific and Industrial Research, India.

2007: D.Phil. Fellowship- University Grant Commission, India.

Skills and Expertise

- **Device Fabrication:** Proficient in micro-structures based radial p-n junction c-Si solar cells fabrication, homojunction and heterojunction formation. Experienced with clean-room process equipment, including operation, and optimization of tools for e-beam evaporation, atomic layer deposition, dry etching (RIE, DRIE), wet etching, photolithography, electron beam lithography, PECVD & LPCVD based film deposition etc.

- **Device Characterization:** Experienced with dark I-V measurement, illuminated I-V measurement, EQE measurements, UV-VIS spectroscopy, XRD, Raman and Photoluminescence measurements. I also have experiences in analyzing interface defects in hetero-junction structures, different bulk recombination calculation, Hall measurement, Laser induced beam current analysis, and deep level transient analysis etc.

- **Computational Skills:** Experienced with SCAPS-1D, Mathematica, Quantum Expresso (Burai), and Vesta. Using SCAPS-1D, I have modeled and simulated homojunction, heterojunction, perovskite/silicon, and perovskite/perovskite tandem solar cells (2T monolithic & 4T mechanically stacked).

Publications

1. **Vineet Kumar Singh**, Shalini Srivastava, Ajeet Kumar Singh, Madan Singh Chauhan, Shiv Poojan Patel, Ravi S Singh, Theoretical study of highly efficient all-inorganic Sb_2S_3-on-Si monolithically integrated (2-T) and mechanically stacked (4-T) tandem solar cells using SCAPS-1D, Environmental Science and Pollution Research, 30 (44) **(2023)** 98747-98759.

2. Ajeet Kumar Singh, Madan Singh Chauhan, Shiv Poojan Patel, Ravi S Singh, **Vineet Kumar Singh**, $MAPbI_3$-on-$CuInSe_2$ two-terminal monolithically integrated tandem solar cells: A theoretical investigation using SCAPS-1D, *Results in Optics*, 10 (**2023)** 100358.

3. Ajeet Kumar Singh, Rajan Walia, Madan Singh Chauhan, Ravi S Singh, **Vineet Kumar Singh**, Performance analysis of n-TiO2/p-Cu2O, n-TiO2/p-WS2/p-Cu2O, and n-TiO2/p-WS2 heterojunction solar cells through numerical modelling, Environmental Science and Pollution Research, 30 (44), **(2023)** 98718-98731.

4. Shalini Srivastava, Rajan Walia, Ravi S Singh, **Vineet Kumar Singh**, Numerical investigation of silicon heterojunction solar cell with zinc selenide as electron selective and nickel oxide as hole selective contacts, *Optical Materials*, 127 (**2022**) 112328.

5. **Vineet Kumar Singh**, Fabrication of n^+-poly-Si/p^+-c-Si tunnel diode using low- Pressure Chemical vapor deposition for photovoltaic applications, *Advanced Materials Letters*, 13 (2) (**2022**) 021693.

6. Shalini Srivastava, Shalini Singh, **Vineet Kumar Singh**, Bulk and interface defects analysis of n-CdS/p-Si heterojunction solar cell, *Optical Materials*, 111 (**2021**) 110687.

7. **Vineet Kumar Singh**, Jampana Nagaraju, Sushobhan Avasthi, Radial junction Silicon Solar Cells with Micro-Pillar Array and Planar Electrode Interface for Improved Photon Management and Carrier Extraction, *Current Applied Physics,* 19 (**2019**) 341-346.

8. **Vineet Kumar Singh**, Jampana. Nagaraju. Effect of Diffusion Parameters on the efficiency of c-Si Solar Cell, *Advanced Materials Letter,* 6 (**2015**) 600-606.

9. **Vineet Kumar Singh**, Pratima Chauhan, Sheo Kumar Mishra, Rajneesh K. Srivastava. Effect of Indium Doping and Annealing on Photoconducting Property of Wurtzite type CdS. *Electronic Materials Letters,* 8 (**2012**) 295-299.

10. **Vineet Kumar Singh**, Pratima Chauhan, K.K. Pandey. Study of Pressure Induced Phase transformation in CTAB capped CdS nanoparticles. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy,* 92 (**2012**) 64– 66.

11. A.K. Mishra, Nandini Garg, K.K. Pandey, **Vineet Singh**. Study Effect of the Surfactant CTAB on the high Pressure behavior of CdS nanoparticles. *Journal of Physics: Conference Series,* 377(**2012**) 012012.

12. **Vineet Singh**, P.K. Sharma, Pratima Chauhan. Synthesis of CdS Nanoparticles with Enhanced Optical Properties. *Materials Characterization*, 62 (**2011**) 43-52.

13. **Vineet Singh**, Prashant K Sharma, Pratima Chauhan. Surfactant mediated phase transformation of CdS nanoparticles. *Materials Chemistry and Physics*, 121 (**2010**) 202-207.

14. **Vineet Singh**, Pratima Chauhan. Structural and optical characterization of CdS Nanoparticles prepared by chemical precipitation method. *Journal of Physics and Chemistry of Solids*, 70 (**2009**) 1074-1079.

15. **V. Singh**, P. Chauhan, Synthesis and structural properties of wurtzite type CdS nanoparticles, Chalcogenide Letters, 6 (8) (2009) 421-426.

Professional Services

- Referee for the Journal of Physics and Chemistry of Solids.
- Member of the Materials Research Society of India.

References

1) **Prof. Pratima Chauhan**
(D.Phil. Supervisor)
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University of Allahabad, India-211 002,
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3) **Prof. Sushobhan Avasthi**
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Declaration

I certify that the above statements made by me are true, complete and correct to the best of my knowledge and belief.

Place: Gorakhpur

(Dr. Vineet Kumar Singh)