

Curriculum Vitae



Dr. Deepak Kumar Sinha Ambast

Assistant Professor & HOD

Department of Physics

Gaya College of Engineering, Gaya

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Nationality: Indian

Marital Status: Married

EXPERIENCE

Head of the Department. Physics, Gaya College of Engineering, Gaya, India

- March, 2020-till date

Assistant Professor (Full-time contract), Gaya College of Engineering, Gaya, India

- January, 2018-till date

Postdoctoral Fellow, Weizmann Institute of Science, Rehovot, Israel

- January, 2016-June, 2017

EDUCATION

Doctor of Philosophy, Indian Institute of Science Education & Research Kolkata, India

- *Time-resolved study on thermo-optical nonlinearities in organic molecules.*
- Supervisor: Prof. Bipul Pal
- 2009-2016

Junior Research Fellow, Banaras Hindu University, Varanasi, India

- **DRDO** (Defence Research Development Organization, Govt. of India) sponsored research project at Department of Physics
- Supervisor: Prof. R. D. S. Yadava
- 2008-2009

Master of Science, Physics, Banaras Hindu University, Varanasi, India

- 2005-2007
- 6.69/10

Bachelor of Science, Physics, Banaras Hindu University, Varanasi, India

- 2002-2005
- 55.72%

RESEARCH INTERESTS / RESEARCH PROFILE

Nonlinear Optics

At IISER Kolkata (During PhD; 2009-2015): The various optical media have continued to reveal new physical insights with respect to observed nonlinear optical phenomena. The process of optimizing the material third-order nonlinear optical properties is complex from two points of view. Firstly, there is a need to understand third-order nonlinear optical effects from molecular designing approach and, secondly interpretation of experimental results needs to be addressed properly, because several third-order nonlinear optical phenomena happen to occur simultaneously. Thermal lensing effect and Kerr-effect are most important third-order nonlinear optical effect. Thermal lensing effect happens to occur due to laser heating of the interacting material and therefore, time-scale involved in this process is rather slow, usually in milli-seconds, while Kerr nonlinearity is faster and involved time scale is in picoseconds or sub-picoseconds. From an experimentalist point of view question of distinguishing among the various third-orders nonlinear optical phenomena can be addressed using time-resolved spectroscopic techniques. Therefore, various time-resolved experimental setups have been developed in the laboratory, tested against the referred sample and then used to study the nonlinear optical phenomena in various materials. The working principle of each experimental setup has been addressed with its applicability to describe the optical nonlinearity.

Nanophotonics, Metasurfaces design for desired optical properties

At Weizmann Institute of Science, Israel (During Postdoc; 2016-2017): During my postdoc study at Weizmann Institute of Science, Rehovot, Israel I was involved in the study of optimizing four-wave mixing signal in free-standing nanohole array of gold thin films. There, I get involved with nanofabrication processes for metamaterial design and simulation using Lumerical FDTD software.

At Gaya College of Engineering, Gaya (During Assistant Professor tenure; 2018-till date): I was engaged to develop the effective design and its characterization to tune the intrinsic resonance of metamaterial perfect absorber using the concept of phase transition in a topological insulator (TI: Bismuth Selenide, Bi_2Se_3) for the designed metamaterial in the near-infrared (NIR) region. For perfect absorber we design a metasurface having a complex unit cell consisting of eight pairs of Au nano-resonators that are separated from Au ground plane by a thin TI layer. It is expected that a large shift in the resonance wavelength can be obtained by switching Bi_2Se_3 between its trigonal and orthorhombic states and a strong absorbance is expected.

TECHNICAL EXPERTISE

Time-resolved Optical Setup, SEM Characterization, Chemical Etching, Cleanroom working experience, Lumerical FDTD simulation

AREAS OF TEACHING EXPERTISE

Semiconductor Physics, Mechanics, Electromagnetism, Quantum Mechanics, Nanophysics, Wave Optics, Solid State Physics & Devices, General Physics Laboratory courses

TEACHING EXPERIENCE

- From 04/01/2018- till date. Teaching experience of Physics theory and laboratory courses as an **Assistant Professor** for B. Tech program at Gaya college of Engineering (Govt. of Bihar), Gaya, India since January 2018. Selected through interview conducted at NIT Patna, India by NPIU under a **World Bank project of TEQIP-III. Secured an All India Rank 18 in this centralised recruitment process.**

- B. Tech student guidance for B. Tech projects (Two projects completed)
BCST-151, dated 24/02/2020
BCST-152, dated 24/02/2020
- Assisted project works of junior PhD students and also summer project students during my PhD tenure at IISER-Kolkata, India.
- **Teaching Assistant:** Electronics Laboratory (BS-MS integrated course), IISER-Kolkata for two semesters.

GRANTS

1. Engineering the tunable Au-Bi₂Se₃-Au metamaterial perfect absorber; NPIU-AICTE New Delhi; INR 5.36 Lacs; **PI**
2. Persistent Light Emitting Phosphors for Solid State Lighting Applications; AICTE –NPIU New Delhi; INR 10.98 Lacs; **CO-PI**
3. Design and fabrication of Electric power generation system through hand-pump mechanism, Bihar Council on Science & Technology, INR 10,000; **PI**
4. Design and Fabrication of stair climbing cart, Bihar Council on Science & Technology, INR 10,000; **PI**

JOURNAL REVIEWER (PEER RIVIEWED)

Advanced Materials Research, Optical Engineering

AWARDS / DISTINCTIONS

- Qualified in national level Joint Entrance Screening Test (**JEST-2007**) in Physics with **All India Rank-208**.

- Awarded **Junior Research Fellowship** (June 2009) by **CSIR-UGC** (Council of Scientific and Industrial Research-University Grant Commission), Govt. of India with **All India Rank-178**.
- Qualified national level **Graduate Aptitude Test in Engineering (Physics)** with all India **Rank 546** in 2009.

COMMUNITY INVOLVEMENT / ADMINISTRATIVE ACTIVITY / SERVICE

- **Head of the Department**, Physics, Gaya College of Engineering, Gaya, India since 18th March, 2020
- Member of **Laboratory Development Committee** at Gaya College of Engineering, Gaya, Bihar.
- Coordinator of **Equity Action Plan** at Gaya College of Engineering, Gaya, Bihar.
- Convener of **Institution's Innovation Council** at Gaya College of Engineering, Gaya, Bihar.
- **Coordinator Student Induction Program** 2019, 2020, 2021 & 2022 at Gaya College of Engineering, Gaya.
- Selected Member by the Department of Science and Technology, Govt. of Bihar, **Laboratory Development Committee** for the Engineering Colleges of Bihar.

FDP, WORKSHOP, SEMINAR, CONFERENCES ORGANISED

1. **Convener** of Faculty Development Program on Research Methodology, held at Gaya College of Engineering, Gaya during 7-11th of January 2019.

2. **Convener**, Workshop on IoT, held at Gaya College of Engineering, Gaya, 26-28th February 2019.
3. **Coordinator**, Training program on Skill and Personality Development, held at Gaya College of Engineering, Gaya, 22-27th July, 2019.
4. **Coordinator**, One-day workshop on IPR, held at Gaya College of Engineering, Gaya, 10th January, 2019.
5. **Coordinator**, One week online workshop on Literature & Engineering, held at Gaya College of Engineering, Gaya, 29th September, 2020.
6. **Organising Secretary**, International Conference, Innovative Developments in Engineering Applications (IDEA-2021), Gaya College of Engineering, Gaya, February, 08-10th February, 2021

PUBLICATIONS / PRESENTATIONS / ABSTRACTS

1. “*Self-assembly and nonlinear optical properties of a synthetic dipeptide*”, Suman Kumar Maity, Ravi Kumar, **Deepak K. S. Ambast**, Bipul Pal and Debasish Haldar, J. Mater. Chem., **22**, 22198, (2012)
2. “*Anomalous effects of ultradilute impurities on heat diffusion in liquids*”, **Deepak K. S. Ambast**, Richarj Mondal, Palas Baran Pati, Sanjio S. Zade, Bhavtosh Bansal and Bipul Pal, Optics Communications, **334**, 184–189, (2015)
3. “*Assembly, growth and nonlinear thermo-optical properties of nitropeptides*”, Santu Bera, **Deepak K. S. Ambast***, Bipul Pal and Debasish Haldar*, Phys. Chem. Chem. Phys., **17**, 16983-16990, (2015)

* : Corresponding Author

4. “Bulk saturable absorption in topological insulator thin films”, R. K Gopal[#], **Deepak K. S. Ambast[#]**, Saurabh Singh, Jit Sarkar, Bipul Pal and Chiranjib Mitra, Journal of Appl. Phys, **122** , 035705, (2017)

(This publication in Journal of Applied Physics has been selected as editor’s picks)

: Equal Contribution

5. Structural and optical properties of chromium doped zincgallate long persistent phosphor prepared by surfactant assisted hydrothermal method, Journal of Physics: Conference Series, Puja Kumari, Amba Mondal, Anil Kumar Choudhary and **Deepak K S Ambast**, **1913**, 012039 (2021).

6. Design of a stair climbing cart mechanism for heavy load lifting Vimlendu Vatsayan, Suryakant Kumar, **Deepak KS Ambast**, WEENTECH proceeding in Energy, Coventry, UK, 7 (1), 74-81

RESEARCH COLLABORATORS

1. **Dr. Manpuran Mahto**, Assistant Professor, Department of Electronics & Communication Engineering, NIT Patna
2. **Dr. Puja Kumari**, Department of Physics, Darbhanga College of Engineering, Darbhanga

OUTREACH ACTIVITIES

1. **External examiner** (in 2018) at Shershah College of Engineering, Sasaram, Bihar for Engineering Physics Course PH22101, Araybhatt Knowledge University, Patna
2. **Co-examiner** (in 2019) for Physics course PH101101, PH102101, PH105101, Araybhatt Knowledge University, Patna

MEMBERSHIP

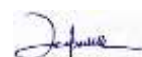
Material Research Society of India, (ID-LMB3335)

Indian Physics Association, (GEN/LM/13512)

Declaration

I do hereby solemnly declare that all the statement made are true to the best of my knowledge and belief. This resume correctly describes my qualifications and abilities.

Signature



REFERENCES

Prof. Bipul Pal (PhD Supervisor)

Professor

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India

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Professor

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