

**(Self-Declared Document)**

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Designation	<i>ASSISTANT PROFESSOR</i>
Name of the Department	<i>PHYSICS</i>
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**Educational Qualification:**

Degree Name	Institute	Year of passing/awarded
B. Sc. (Physics Honours)	Vidyasagar University	2006
M. Sc. (Physics)	Indian Institute of Technology Bombay	2008
Ph. D.	Institute of Physics, Bhubaneswar (Homi Bhabha National Institute)	2016

**Career Profile/Teaching Experience:**

**Two years post-doctorate @ IIT Kharagpur (2016-2018)**

**One-year post-doctorate (PBC Postdoctoral Fellow) @ Bar-Ilan University, Israel (2018-2019)**

**Six months post-doctorate (Research Professor) @ Yonsei University, S. Korea (2019-2020)**

**3.5 years of teaching experience @ Belda College (2020 onwards)**

**Specialization/Research Area:**

**[1] Growth of low-dimensional semiconducting and metal-semiconductor hetero-structures using Chemical and Physical vapor deposition systems (CVD, PVD, MBE, OMBD etc.).**

**[2] Electron Microscopy [Transmission electron microscopy (TEM) and Scanning electron microscopy (SEM)] and corresponding analytical techniques.**

**[3] Inorganic 2D layered van der waals materials and oxide semiconductor based electronic (FET) and optoelectronic device applications (Photodetectors and Solar Cells).**

**[4] Organic semiconductor based flexible electronic devices for wearable healthcare applications.**

**[5] Functional nanomaterial based Synaptic Memristor and Optoelectronic Devices.**

**Course/ Subject Taught**

Electricity and Magnetism (UG); Mathematical Physics-I, II, III (UG); Mechanics; Electrical Circuits and Network Skills (UG); Solid State Physics (UG); Quantum Mechanics and Applications (UG); Renewable Energy and Energy Harvesting (UG); Digital, Analog Circuits and Instrumentation (UG); Electromagnetic Theory (UG); Statistical Mechanics (UG); Experimental Techniques (UG); Mathematical Physics-I (PG/PHS 101.1); Advanced Practical-I (PG/PHS 296); Statistical Mechanics – I (PG/PHS 301.2); Advanced Practical-II (PG/PHS 395); Advanced Condensed Matter Physics – II (PG Special Paper/PHS 404A).

**Publications in Journal / Book / Book Chapter****Papers**

Title of the Paper	Journal Name with ISSN, Vol. etc.	Year of Publication
<b>Nitrogen vacancy and hydrogen substitution mediated tunable optoelectronic properties of g-C<sub>3</sub>N<sub>4</sub> 2D layered structures: Applications towards blue LED to broad-band photodetection</b>	<b>Applied Surface Science, 556, 149773 (2021). ISSN: 0169-4332</b>	<b>2021</b>
<b>γ-GeSe: A New Hexagonal Polymorph from Group IV–VI Monochalcogenides</b>	<b>Nano Letters, 21(10), 4305–4313 (2021). ISSN: 1530-6984 (print); 1530-6992 (web)</b>	<b>2021</b>
<b>Low operating voltage organic field-effect transistors with gelatin as a moisture-induced ionic dielectric layer: the issues of high carrier mobility</b>	<b>ACS Appl. Mater. Interfaces, 12(17), 19727-19736 (2020). ISSN: 1944-8244 (print); 1944-8252 (web)</b>	<b>2020</b>
<b>The Hybrids of Core-Shell Chain-like Nanostructure of Au@ Porous Pd with Graphene for Energy Conversion Application</b>	<b>Chemistry Select, 5(20), 6048-6053 (2020). ISSN: 2365-6549 (online)</b>	<b>2020</b>
<b>P-type β-MoO<sub>2</sub> Nanostructures on n-Si by Hydrogenation Process: Synthesis and Application towards Self-Biased UV-Visible Photodetection</b>	<b>Nanotechnology 30, 035204 (2019) ISSN :0957-4484 (print); 1361-6528 (web)</b>	<b>2019</b>
<b>Plasmonics in Atomically-Thin Crystalline Silver Films</b>	<b>ACS Nano 13(7), 7771-7779 (2019). ISSN: 1936-0851 (print); 1936-086X (web)</b>	<b>2019</b>
<b>Organic Field-Effect Transistor-Based Ultrafast, Flexible, Physiological-Temperature</b>	<b>ACS Appl. Mater. Interfaces 11(4), 4193-4202 (2019).</b>	<b>2019</b>

<b>Sensors with Hexagonal Barium Titanate Nanocrystals in Amorphous Matrix as Sensing Material.</b>	<b>ISSN: 1944-8244 (print); 1944-8252 (web)</b>	
<b>Graphene Schottky Varactor Diodes for High-Performance Photodetection</b>	<b>ACS Photonics 6(8), 1910-1915 (2019). ISSN: 2330-4022 (web)</b>	<b>2019</b>
<b>MoS<sub>2</sub> Quantum Dots as Efficient Catalyst Materials for the Oxygen Evolution Reaction</b>	<b>ACS Catal. 8, 1683–1689 (2018). ISSN: 2155-5435 (web)</b>	<b>2018</b>
<b>Highly ordered 1D NiCo<sub>2</sub>O<sub>4</sub> nanorods on graphene: An efficient dual-functional hybrid materials for electrochemical energy conversion and storage applications</b>	<b>Electrochimica Acta 263, 147-157 (2018). ISSN: 0013-4686 (web)</b>	<b>2018</b>
<b>In-situ Synchrotron X-ray Diffraction Study of Coherently Embedded Silver Nanostructures Growth in Silicon</b>	<b>CrystEngComm. 19, 6811-6820 (2017). ISSN: 1466-8033 (web)</b>	<b>2017</b>
<b>Ag nanoparticles decorated molybdenum oxide structures: Growth, characterizations, DFT studies and their application for enhanced field emission</b>	<b>Nanotechnology 28, 415602 (2017). ISSN :0957-4484 (print); 1361-6528 (web)</b>	<b>2017</b>
<b>Effect of Au thickness on Au-Ag bimetallic growth on reconstructed Si(5 5 12) Surfaces.</b>	<b>Appl. Phys. A 123, 174 (2017). ISSN: 0947-8396 (print); 1432-0630 (web)</b>	<b>2017</b>
<b>Filled-carbon nanotubes: 1 D nanomagnets possessing uniaxial magnetization axis controlled by magnetic field gradient</b>	<b>Carbon 119, 464-475 (2017). ISSN: 0008-6223 (web)</b>	<b>2017</b>
<b>Covalently Connected Carbon Nanotubes as Electrocatalysts for Hydrogen Evolution Reaction through Band Engineering</b>	<b>ACS Catal. 7, 2676–2684 (2017). ISSN: 2155-5435 (web)</b>	<b>2017</b>
<b>Highly Active 2D Layered MoS<sub>2</sub>-rGO Hybrids for Energy Conversion and Storage Applications</b>	<b>Sci. Rep. 7, 8378 (2017). ISSN: 2045-2322 (web)</b>	<b>2017</b>

<b>Effect of dry air on interface smoothening in reactive sputter deposited Co/Ti Multilayer</b>	<b>Appl. surf. Sci. 416, 168-177 (2017). ISSN: 0169-4332 (web)</b>	<b>2017</b>
<b>Growth of Au capped GeO<sub>2</sub> nanowires for visible-light photodetection</b>	<b>Appl. Phys. Lett. 109, 123105 (2016). ISSN: 0003-6951 (print); 1077-3118 (web)</b>	<b>2016</b>
<b>Tuning Work Function of Randomly Oriented ZnO nanostructures by capping with Faceted Au nanostructure and Oxygen defects: Enhanced Field Emission Experiments and DFT studies</b>	<b>Nanotechnology 27, 125701 (2016). ISSN :0957-4484 (print); 1361-6528 (web)</b>	<b>2016</b>
<b>Tunable optoelectronic properties of pulsed dc sputter-deposited ZnO:Al thin films: Role of growth angle</b>	<b>J. Appl. Phys. 120, 015302 (2016). ISSN: 0021-8979 (print); 1089-7550 (web)</b>	<b>2016</b>
<b>Electron irradiation induced buckling, morphological transformation, and inverse Ostwald ripening in nanorod filled inside carbon nanotube</b>	<b>Appl. surf. Sci. 360, 1003-1008 (2016). ISSN: 0169-4332 (web)</b>	<b>2016</b>
<b>Growth of Ag nanostructures on high index Si (5 5 12) surfaces under UHV conditions: Effect of prior surface treatment before deposition</b>	<b>Appl. Phys. A 122, 356 (2016). ISSN: 0947-8396 (print); 1432-0630 (web)</b>	<b>2016</b>
<b>Polysaccharide-capped silver nanoparticles inhibit biofilm formation and eliminate multi-drug-resistant bacteria by disrupting bacterial cytoskeleton with reduced cytotoxicity towards mammalian cells</b>	<b>Sci. Rep. 6, 24929 (2016). ISSN: 2045-2322 (web)</b>	<b>2016</b>
<b>Highly Porous Pd Nanostructures and Reduced Graphene Hybrids: Excellent Electrocatalytic Activity towards Hydrogen Peroxide</b>	<b>New J. Chem. 40, 1096-1099 (2016). ISSN: 1144-0546 (print); 1369-9261 (web)</b>	<b>2016</b>
<b>Simple Growth of Faceted Au–ZnO Hetero-nanostructures on Silicon Substrates (Nanowires and Triangular Nanoflakes): A Shape and Defect Driven Enhanced</b>	<b>ACS Appl. Mater. Interfaces 7 (18), 9486–9496 (2015). ISSN: 1944-8244 (print); 1944-8252 (web)</b>	<b>2015</b>

<b>Photocatalytic Performance under Visible Light</b>		
<b>Study of Faceted Au nanoparticle capped ZnO nanowires: Antireflection, Surface Enhanced Raman Spectroscopy and Photoluminescence aspects</b>	<b>J. Phys. D: Appl. Phys. 48, 055303 (2015). ISSN: 0022-3727 (print); 1361-6463 (web)</b>	<b>2015</b>
<b>Sandwiched Graphene with Nitrogen, Sulphur co-doped CQDs: Efficient Metal Free Material for Energy Storage and Conversion Application</b>	<b>J. Mater. Chem. A 3, 16961-16970 (2015). ISSN: 2050-7488 (web)</b>	<b>2015</b>
<b>Multilayer Ge Nanocrystals embedded within Al<sub>2</sub>O<sub>3</sub> matrix for high performance floating gate memory devices</b>	<b>Appl. Phys. Lett. 107, 093102 (2015). ISSN: 0003-6951 (print); 1077-3118 (web)</b>	<b>2015</b>
<b>Silver Endotaxy in Silicon under Various Ambient Conditions and their use as Surface Enhanced Raman Spectroscopy Substrates</b>	<b>Thin Solid Films 586, 88–94 (2015). ISSN: 0040-6090 (web)</b>	<b>2015</b>
<b>Facile synthesis of single crystalline n- / p- type ZnO nanorods by lithium substitution and their photoluminescence, electrochemical and photocatalytic properties</b>	<b>New J. Chem. 39, 2612-2619 (2015). ISSN: 1144-0546 (print); 1369-9261 (web)</b>	<b>2015</b>
<b>Photoluminescence study on irradiated yttria stabilized zirconia</b>	<b>Journal of Nuclear Materials 456, 359-368 (2015). ISSN: 0022-3115 (web)</b>	<b>2015</b>
<b>Coherently Embedded Ag Nanostructures in Si: 3D Imaging and their application to SERS</b>	<b>Sci. Rep. 4, 4663 (2014). ISSN: 2045-2322 (web)</b>	<b>2014</b>
<b>Study of initial stages of growth of Au-assisted epitaxial Ge nanowires on clean Ge(100) Surface</b>	<b>CrystEngComm. 16, 2486-2490 (2014). ISSN: 1466-8033 (web)</b>	<b>2014</b>
<b>A Bioinspired Approach for Shaping Au Nanostructures: The Role of Biomolecule Structures in Shape Evolution</b>	<b>Chem. Eur. J. 19, 8220-8226 (2013). ISSN: 0947-6539 (print); 1521-3765 (web)</b>	<b>2013</b>

Substrate symmetry driven endotaxial silver nanostructures by chemical vapor deposition	J. Phys. Chem. C 117 (25), 13247-13251 (2013). ISSN: 1932-7447 (print); 1932-7455 (web)	2013
Polarity selective etching: A self-assisted route for fabricating high density of c-axis oriented tapered GaN nanopillars	J. Appl. Phys. 110, 033528 (2011). ISSN: 0021-8979 (print); 1089-7550 (web)	2011

Book/Book Chapter: NA

Conference /Seminar/Workshop Attended/Organised

Event	International level	National level	State level
Attended Seminars/ Workshops	<ol style="list-style-type: none"> <li>1) Attended the Two-day International e-conference on “Coping with COVID-19: Sustainable Living in the Era of Pandemic”, jointly organized by the IQAC, Belda College, WB, India and Bangladesh Open University, Bangladesh on 15<sup>th</sup> and 16<sup>th</sup> June, 2020.</li> <li>2) Participated in the International webinar on “Frontiers in Materials for Technological Applications (FIMTA-2020)” held on 4<sup>th</sup> to 6<sup>th</sup> August 2020, organized by CSIR-Institute of Mineral and Materials Technology, Bhubaneswar.</li> <li>3) Attended Special Public Lecture (Webinar) on the "Molecular Magic of the Primary Steps of Photosynthesis" held on 20th August, 2020, organized by Deen Dayal Upadhyaya College, University of Delhi, New Delhi.</li> </ol>	<ol style="list-style-type: none"> <li>1) Attended the Webinar on "Advanced Materials (AdMs) - Study &amp; Application" held on 19<sup>th</sup> August, 2020, organized by College of Engineering and Management, Kolaghat.</li> <li>2) Participated in the One Day National Level Webinar on “Electronic Properties of Two Dimensional Crystals” organized by the Department of Physics in collaboration with the IQAC, Vidyasagar College, on 8th August, 2020.</li> <li>3) Participated in the National Webinar on “NAAC Assessment and Accreditation of HEIs during and post Covid19 Pandemic” organised by NAAC, Bangalore in collaboration with IQAC, Fakir Mohan University, Balasore, Odisha on 12th August 2020.</li> <li>4) Participated in the National level webinar series lecture workshop-I on “How we think project/low cost</li> </ol>	<ol style="list-style-type: none"> <li>1) Participated in WEBINAR 3.0 entitled “An Overview of Experimental Physics and its Applications' held on September 12, 2020, jointly organized by Jhargram Raj College Physics Alumni Association (JRCPAA), and Department of Physics, Jhargram Raj College, West Bengal, INDIA.</li> <li>2) actively participated in the Online Workshop on ‘Career Advancement Scheme (CAS)’ organized by the Teachers’ Council in collaboration with the Internal Quality</li> </ol>

- 4) Participated in the “Special Techniques in Electron Microscopy for Material Science Applications STEM-2020” online seminar held on 6<sup>th</sup>-7<sup>th</sup> November, 2020, jointly organized by CSIR-IMMT, Bhubaneswar; IIT-Bhubaneswar & EMSI, East Zone, Kolkata.
- 5) Participated in the International Webinar on “Engineered Materials in Electromagnetic Interference Shielding for Electronic Applications” (EMEIS - 2021) organized by PG and Research Department of Physics, Sacred Heart College (Autonomous), Tirupattur, Tirupattur District, Tamil Nadu, India on 2nd September 2021.
- 6) Participated in the International Virtual Conference on Frontiers in Materials for Technological Applications (FIMTA-2021) organised by CSIR Institute of Minerals and Materials Technology, Bhubaneswar, India during August 04-06, 2021.
- 7) Participated in the international webinar on “Advances in Electronic, Optoelectronic and Photonic Materials and Devices” organized by Department of Physics, Indian Institute of

experimental setup in an ordinary laboratory” organized by Bhattar College in collaboration with Egra S. S. B. College, held on 15<sup>th</sup>, 16<sup>th</sup>, 19<sup>th</sup> and 20<sup>th</sup> July 2020.

- 5) Actively participated in the One-day National Webinar on “NAAC related quality enhancement strategies for HEI’s and preparation of NAAC documents” organized by IQAC, Belda College on 11<sup>th</sup> February, 2021.
- 6) Participated in the National Level Webinar on "New Assessment and Accreditation Process of NAAC with special focus on the Challenges faced by Rural Colleges" held on 27<sup>th</sup> January, 2021 organized by Raidighi College.
- 7) Attended the National level webinar on “Yoga and its relevance in present scenario 2020 and celebration of 6<sup>th</sup> International Yoga day” organized by the department of physical education and NCC unit, Belda College, held on 21<sup>st</sup> July 2020.
- 8) Attended the Seven-day International Webinar Series on Addressing multiple jeopardies in the Era of Pandemic, 2020 Lecture Session IV, V and IX, held on 26<sup>th</sup> and 30<sup>th</sup> June, 2020 organized by Department of Physics, IQAC & Psychology cell, Basundhara ECO club & Geography Department of Belda College respectively.

Assurance Cell (IQAC), Santal Bidroha Sardha Satabarshiki Mahavidyalaya, Goaltore, Paschim Medinipur, West Bengal on July 03, 2021

**Engineering Science and Technology, Shibpur, Kolkata – 711103, West Bengal during 17th to 19th March, 2021.**

- 8) Actively Participated in the INTERNATIONAL WEB CONFERENCE ON MATERIALS SCIENCE AND ITS TECHNOLOGICAL ADVANCEMENTS held on 22 September, 2021 Organized by the Department of Physics, Voorhees College, Vellore.**

- 9) Attended the National Webinars held during the Science Academies Online Lecture Workshop on Frontiers in Science & Engineering - Opportunities for Graduates, held on 14<sup>th</sup> September, 2020 organized by Deen Dayal Upadhyaya College, University of Delhi, New Delhi.**

- 10) Participated in a one-day National Webinar titled “Recent Research and Opportunities in the Field of Renewable Energy Sources” on 26<sup>th</sup> September, 2020, organized by Department of Physics in collaboration with IQAC, Ramsaday College.**

- 11) Participated in the WEBINAR 6.0 entitled "Environmental Sustainability Through Green Technologies: Present & Future" held on October 17<sup>th</sup> 2020, jointly organized by Jhargram Raj College Physics Alumni Association (JRCPAA), and Department of Physics, Jhargram Raj College West Bengal, INDIA.**

- 12) Participated in the 2-day National Webinar on "Online Education in the Changing Times: Problems and Prospects" held on 7th - 8th July, 2020 and organized by Vidyasagar University Teachers' Association (VUTA), Vidyasagar University, WB, India.**

**Invited Lectures: NA**