

Curriculum vitae



Name Contact

Dr. Jagadish Chandra Mahato
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Information

Department of Physics, Siksha Bhavana, Visva-Bharati, Santiniketan-731235, India

Personal Information

Born: January 23, 1986
Citizenship: Indian

Teaching Experience

Assistant Professor in the **Department of Physics** at the **Visva-Bharati University**,
Santiniketan-731235, Bolpur, West Bengal, India
2022- Till date

Assistant Professor in Physics at **Ramakrishna Mission Residential College**, Narendrapur,
Kolkata-700103, India
2015- 2022

Professional Experience

Postdoc in Prof. Andreas Hangleiter' Research Group at the **Institute of Applied**
Physics in the Technical University of Braunschweig, Germany

Topic: Epitaxial growth of III-V (GaN , $\text{Al}_x\text{Ga}_{1-x}\text{N}$, $\text{In}_{1-x}\text{Ga}_x\text{N}$) nitrides on high lattice mismatch substrate and investigation of the optoelectronic properties

Education

PhD in experimental condensed matter physics (Surface science)

Indian Association for the Cultivation of Science, Kolkata, India

Degree awarded by the University of Calcutta

Dissertation title: **Self-Organized Nanostructures at Semiconductor Surfaces**

Advisor: **Prof. Dr. Bhupendra Nath Dev**

2009- 2015

M. Sc. in Physics

University of North Bengal, Darjeeling, India

Project title: **Deposition of Al thin film and measurement of its thickness and its resistivity**

Advisor: **Prof. Dr. Dhruba Dasgupta & Prof. Dr. Biswanath Bhattacharyya**

2006- 2008

B. Sc. in Physics (Honours)

Malda College affiliated to the University of North Bengal, Darjeeling, India

2003- 2006

Professional Training

i) Advanced school on high resolution transmission electron microscopy-2013 at
Institute of Physics, Bhubaneswar, India, **March 04-08, 2013**

ii) **INUP Hands-on Training Workshop on Fabrication & Characterization of GaN LED** at
IIT Bombay, Bombay, India, **September 24-28, 2018**

iii) **MSc College and University teachers training programme** at IISc, Talent Development
Centre, hands on training on **Density Functional Theory (Quantum Espresso)**, in
Challakere, India, **June 16- July 06, 2019**

Research interest

Experimental condensed matter physics, more specifically surface science & nanoscience-
epitaxial growth of nanodots, nanowires, nanoislands investigation by the MBE & scanning
tunnelling microscopy & spectroscopy (STM & STS), hetero-epitaxial growth of

III-V Nitrides using PA-MBE and investigation of their structural and optoelectronic properties, ion-beam modification, metal-semiconductor interface, Density Functional Theory (DFT) using VASP code, Quantum Espresso (QE) etc..

Professional Supervision

Guided eight B.Sc. and five MSc dissertations

Membership

Indian Association for the Cultivation of Science (since 2016)
Electron Microscopy Society of India (EMSI) (since 2019)

Honours Awards

- 2008** **National Eligibility Test (NET), CSIR-JRF** in category in June, 2008
- 2011** **Best poster presentation award** in 2nd International Conference on Advanced Nanomaterials and Nanotechnology, 2011, IIT Guwahati, India
- 2021** **Best paper presentation award** in “International Virtual Conference on Energy Conversion and Storage (ICECS-2K21)”, Organized by Department of Physics, PPG College of Arts and Science, in Collaboration with Indian Association For Crystal Growth, April 20-21, 2021, India.

Research project

1. UGC DAE CSR Kolkata, India CRS collaborative project, 2019-2022
2. UGC DAE CSR Indore, India CRS collaborative project, 2023-2026

Publication

Google scholar: <https://scholar.google.com/citations?user=aiCRNJAAAAAJ&hl=en>

ORCID IDs: <https://orcid.org/0000-0001-5929-8970>

ResearcherID: L-2159-2015 <https://visvabharati.irins.org/profile/261899>

Scopus Author ID: 37100149300

• *Peer reviewed book chapters (in reverse chronological order)*

18. Ferromagnetism in Mn and Fe Doped LuN: A Potential Candidate for Spintronic Application
R. Sharma, J. A. Abraham, **J. C. Mahato**, S. A. Dar and V. Srivastava
Book chapter in Density Functional Theory - Recent Advances, New Perspectives and Applications (2022)
[DOI: 10.5772/intechopen.99774](https://doi.org/10.5772/intechopen.99774)

17. Wire-to-dot shape transition in FeSi₂/Si system
D. Das and **J. C. Mahato**
Book Chapter in Basic and Applied Sciences into Next Frontiers: The Aspects of Bio & Physical Sciences (2021)
[ISBN: 978-81-948993-0-3](https://doi.org/10.1007/978-81-948993-0-3)

• *Peer reviewed journals (in reverse chronological order)*

16. Effect of dopants in the HTL layer on photovoltaic properties in hybrid perovskite solar cells
RH Sardar, A Bera, S Chattopadhyay, **J C Mahato**, S Sarraf, AK Basu
Journal of Materials Science: Materials in Electronics **34 (32), 2138 (2023)** [IF 2.779, CITED 0]

15. Growth of self-organized epitaxial FeSi₂ and CoSi₂ nanostructures on Si(111)-7×7 surfaces
J. C. Mahato, D. Das, A. Pal, P. Pal, and B. N. Dev
Applied Surface Science **47, 1617-1620 (2022)** [IF 6.707, CITED 1]
<https://doi.org/10.1016/j.apsusc.2021.151397>

14. Silicon Nanodots Via Sputtering of Si(111)-7×7 Surfaces and Post-Annealing
J. C. Mahato, D. Das, R. Batabyal, A. Roy, and B. N. Dev
Material Today: Proceedings **47, 1617-1620 (2021)** [IF XXX, CITED 0]
<https://doi.org/10.1016/j.matpr.2021.04.319>

13. Tuning the length/width aspect ratio of epitaxial unidirectional silicide nanowires on Si (110)-16×2 surfaces
J. C. Mahato, D Das, P Das, TK Chini, B. N. Dev
Nano Express **1 (2), 020045 (2020)** [IF XXX, CITED 1]
<https://doi.org/10.1088/2632-959X/abb922>

12. Unidirectional endotaxial cobalt di-silicide nanowires on Si (110) substrates
J. C. Mahato, D. Das, N. Banu, B. Satpati, B. N. Dev
Nanotechnology **28**, 425603 (2017) [IF 3.446, CITED 8]
<https://doi.org/10.1088/1361-6528/aa7f31>
11. Real time investigation of the effect of thermal expansion coefficient mismatch on film-substrate strain partitioning in Ag/Si systems
D. Das, N. Banu, B. Bisi, **J. C. Mahato**, V. Srihari, R. Halder, B. N. Dev
Journal of Applied Physics **120**, 135301 (2016) [IF 2.068, CITED 2]
<https://doi.org/10.1063/1.4963872>
10. Ag-induced $\sqrt{3}$ reconstruction on Si(111)/Ge-(5×5) and the surfactant behaviour of Ag in further growth of Ge
J. C. Mahato, D. Das, B. Bisi, A. Pal and B. N. Dev
Applied Surface Science, **356**, 249-258 (2015) [IF 6.707, CITED 2]
<https://doi.org/10.1016/j.apsusc.2015.07.203>
09. Self-organized patterns along sidewalls of iron silicide nanowires on Si(110) and their origin
D. Das, **J. C. Mahato**, Bhaskar Bisi, B. Satpati, and B. N. Dev
Applied Physics Letters **105**, 191606 (2014) [IF 3.515, CITED 21]
<https://doi.org/10.1063/1.4901815>
08. Self-organized trench-island structures in epitaxial cobalt silicide growth on Si(111)
J. C. Mahato, D. Das, R. Batabyal, Anupam Roy and B. N. Dev
Surface Science **620**, 23–29 (2014) [IF 1.876, CITED 9]
<https://doi.org/10.1016/j.susc.2013.10.006>
07. Roughening in Electronic Growth of Ag on Si(111)-(7×7) Surfaces
A. Pal, **J. C. Mahato**, B.N. Dev and D. K. Goswami
ACS Applied Materials & Interfaces **5**, 9517–9521 (2013) [IF 7.500, CITED 3]
<https://doi.org/10.1021/am402258q>
06. Self-organized one-atom thick fractal nanoclusters via field-induced atomic transport
R. Batabyal, **J. C. Mahato**, D. Das, A. Roy, B. N. Dev
Journal of Applied Physics **114**, 064304 (2013) [IF 2.185, CITED 13]
<https://doi.org/10.1063/1.4817520>
05. Uniformity of epitaxial nanostructures of CoSi₂ via defect control of the Si (111) surface
J. C. Mahato, D. Das, A. Roy, R. Batabyal, R. R. Juluri, P. V. Satyam and B. N. Dev
Thin Solid Films **534**, 296–300 (2013) [IF 1.867, CITED 10]
<https://doi.org/10.1016/j.tsf.2013.01.092>
04. First principles electronic structure of coincidence site epitaxial Ag/Si(111) interface
A.H.M. Abdul Wasey, R. Batabyal, **J.C. Mahato**, B.N. Dev, Y. Kawazoe and G.P. Das
Physica Status Solid B **250**, 13313-1319 (2013) [IF 1.605, CITED 18]
<https://doi.org/10.1002/pssb.201248542>
03. Negative differential resistance at the atomic-scale in ultrathin Ag films on Si (111)
R. Batabyal, A. H. M. Abdul Wasey, **J. C. Mahato**, D. Das, A. Roy, G. P. Das and B. N. Dev
Journal of Applied Physics **113**, 034308 (2013) [IF 2.185, CITED 9]
<https://doi.org/10.1063/1.4775816>
02. Nanodot to nanowire: A strain-driven shape transition in self-organized endotaxial CoSi₂ on Si (100)
J. C. Mahato, D. Das, R. Batabyal, A. Roy, R. R. Juluri, P. V. Satyam and B. N. Dev
Applied Physics Letters **100**, 263117 (2012) [IF 3.515, CITED 26]
<https://doi.org/10.1063/1.4731777>
01. Lateral straggling and its influence on lateral diffusion in implantation with a focused ion beam
R. Batabyal, **J. C. Mahato**, A. Roy, S. Roy, L. Bischoff and B. N. Dev
Nuclear Instruments and Method in Physics Research B **269**, 856 (2011) [IF 1.186, CITED 3]
<https://doi.org/10.1016/j.nimb.2010.11.039>

- **Conferences proceedings (in reverse chronological order)**

07. Simultaneous growth of sub-nanometer deep vacancy island and epitaxial silicide islands on Si (111)

J. C. Mahato, Debolina Das, R. Batabyal and B. N. Dev

AIP Conf. Proc. **1512**, 748-749 (2013)

[IF 0.400, CITED 0]

Solid State Physics, Proceedings of the 57th DAE Solid State Physics Symposium 2012

<https://doi.org/10.1063/1.4791254>

06. Early stage fractal growth in thin films below the percolation limit

R. Batabyal, **J. C. Mahato**, Debolina Das and B. N. Dev

AIP Conf. Proc. **1512**, 740-741 (2013)

[IF 0.400, CITED 1]

Solid State Physics, Proceedings of the 57th DAE Solid State Physics Symposium 2012

<https://doi.org/10.1063/1.4791250>

05. Growth of a-few atom wide nanowires with different surface reconstructions via desorption of Au on Si (111) surfaces

Debolina Das, **J. C. Mahato**, R. Batabyal, Nasrin Banu, Bhaskar Bisi and B. N. Dev

AIP Conf. Proc. **1536**, 377-378 (2013)

[IF 0.400, CITED 0]

Proceeding of International Conference on Recent Trends in Applied Physics and Material Science

<https://doi.org/10.1063/1.4810258>

04. Self-organized growth of cobalt nanostructures on Ag/Si (111)-7×7 surfaces

R. Batabyal, **J. C. Mahato**, A. Roy and B. N. Dev

AIP Conf. Proc. **1349**, 741-742 (2011)

[IF 0.400, CITED 0]

Solid State Physics, Proceedings of the 55th DAE Solid State Physics Symposium 2010

<https://doi.org/10.1063/1.3606071>

03. Desorption of Ag from grain boundaries in Ag film on brand H-passivated Si (111) surfaces

A. Roy, B. Sundaravel, R. Batabyal, **J. C. Mahato** and B. N. Dev

AIP Conf. Proc. **1349**, 691-692 (2011)

[IF 0.400, CITED 2]

Solid State Physics, Proceedings of the 55th DAE Solid State Physics Symposium 2010

<https://doi.org/10.1063/1.3606046>

02. Tip-voltage induced modifications and real-time growth observation of adlayer on ultrathin Ag nanoislands on Si (111)-7×7 surfaces

R. Batabyal, **J. C. Mahato**, D. Das, A. Roy, A. S. Bhattacharyya and B. N. Dev

8th International Symposium on Atomic Level Characterizations for New Materials and Devices '11 (ALC'2011),

May 22 (Sun) – 27 (Fri), 2011, Seoul, Republic of Korea

01. Quantum size effects in electronic and magnetic behaviour in epitaxial nanostructures

B. N. Dev, R. Batabyal, A. Roy, **J. C. Mahato**, T. Yasue and T. Koshikawa

8th International Symposium on Atomic Level Characterizations for New Materials and Devices '11(ALC'2011), May

22 (Sun) – 27 (Fri), 2011, Seoul, Republic of Korea