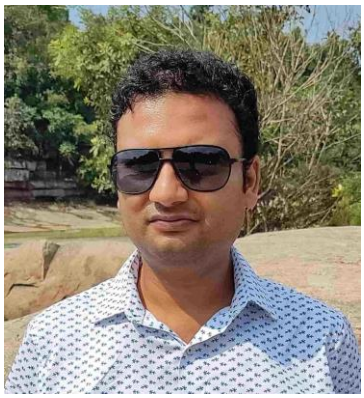
FACULTY MEMBERS' ACADEMIC PROFILE

Name of the Faculty member: Dr. SUBHADIP NATH



1. **Designation:** Assistant Professor in Physics (W.B.E.S.)
2. **Qualification:** M.Sc. (University of Kalyani);
   Ph.D. (University of Kalyani)
3. **Specialization:** Condensed Matter Physics
4. **E-mail address:** subha.31connect@gmail.com
5. **Date of Joining in W.B.E.S.:** 26.02.2015
6. **Date of Joining in this College:** 26.02.2015
7. **Total Teaching experience in College level:** 10+ years
8. **Research interests:** High Temperature Superconductivity, Electron-Phonon Interactions, Density Functional Theory, Graphene and its Allotropes, Nanomaterials
9. **Title of thesis (Ph.D.) with year:** "A Study on some aspects of High temperature Superconductivity using Hubbard Model and it's variants" (Awarded in March, 2017)
   a) **Research guidance:** Registered as Co-supervisor at University of Calcutta, Ph.D student: Krishnansu Basak, University of Calcutta
10. **Research Projects (Completed and ongoing):** Nil
11. **List of publications:**

Google Scholar Id: Click here

Orcid Id : 0000-0001-9404-0182

A) Published papers in Journals:

1. "Finite Temperature Properties of the 2D Hubbard Model extended by Next-Nearest-Neighbor Hopping Interaction", **S. Nath** and N. K. Ghosh, *Indian Journal of Physics*, **2012**, 86(5), 351-356 [ISSN 0973-1458; **IF: 1.242**] .
2. "On-site and Inter-site Electron–Phonon Interaction in 2D Hubbard Model", **S. Nath**, N. S. Mondal and N. K. Ghosh, *Physica B*, **2013**, 412, 83-86 [ISSN 0921-4526; **IF: 1.874**].
3. "Thermodynamics of the Frustrated 2D Hubbard Model", **S. Nath*** and N.K. Ghosh, *Journal of Superconductivity and Novel Magnetism*, **2014**, 27, 1347-1352 [ISSN 1557-1939; **IF: 1.7**].
4. "Ground-State Properties of the Frustrated 2D Quarter-Filled Hubbard Model", **S. Nath*** and N. K. Ghosh, *Journal of Superconductivity and Novel Magnetism*, **2014**, 27, 2871-2877 [ISSN 1557-1939; **IF: 1.7**].
5. "Interplay between Electron-Phonon Interaction and Hubbard Repulsion: An Exact Approach", **S. Nath***, N. S. Mondal and N. K. Ghosh, *Journal of Superconductivity and Novel Magnetism*, June, **2015**, 28, 1687-1692 [ISSN 1557-1939; **IF: 1.7**].

6. "Phonon-Mediated Electron-Phonon Interaction in Hubbard-Holstein Model", **S. Nath*** and N. K. Ghosh, *Journal of Low Temperature Physics*, January, **2016**, 182, 1-12 [ISSN 0022-2291; **IF: 1.491**].
7. "Electron-Phonon Interaction in the presence of Strong Coulomb Repulsion", **S. Nath***, N. S. Mondal and N. K. Ghosh, *Journal of Superconductivity and Novel Magnetism*, January, **2018**, 31, 29-35 [ISSN 1557-1939; **IF: 1.7**].
8. "Relevance of inter-site Coulomb repulsion on high-Tc superconductivity within t-J-V model", P. Pal, K. Roy, **S. Nath*** and N. K. Ghosh, *Chinese Journal of Physics*, March, **2018**, 56, 958-964 [ISSN 0577-9073; **IF: 2.544**].
9. "Hole pairing and ground state properties of high-Tc superconductivity within the t-t′-J-V model", K. Roy, P. Pal, **S. Nath***, N. K. Ghosh, *The European Physical Journal B*, April, **2018**, 91, 64-1-64-9 [ISSN 1434-6028; **IF: 1.44**].
10. "Hole-polarons and bipolarons in the Holstein t-J model: Relevance of hole-phonon interaction" K. Roy, **S. Nath*** and N.K. Ghosh, *Physics Letters A*, April, **2019**, 383, 1510-1515 [ISSN 0375-9601; **IF: 2.087**].
11. "Specific Heat, Entropy and Magnetic Properties of High Tc Superconductivity within the planar *t-t'-J-V* model" K. Roy, S. Ghosh, **S. Nath*** and N.K. Ghosh, *The European Physical Journal B*, December, **2019**, 92,270 [ISSN 1434-6028; **IF: 1.44**].
12. "Mobile inter-site bipolarons in presence of long-range interactions" N.S. Mondal and **S. Nath***, *Physica B*, February, **2020**, 578, 411881 [ISSN 0921-4526; **IF: 1.874**].
13. "The topology and robustness of two Dirac cones in S-graphene: A tight binding approach" A. Bandopadhyay, S. Dutta, D. Jana, **S. Nath** and M. Mohi Uddin, *Scientific Reports,* February, **2020**, 10, 2502 [ISSN 2045-2322; **IF: 4.122**].
14. **Subhadip Nath,** Arka Bandyopadhyay Sujoy Datta, Md. Mohi Uddin, Debnarayan Jana, "*Electronic and optical properties of non-hexagonal Dirac material S-graphene sheet and nanoribbons*" Physica E, June, **2020**, 120, 114087 [ISSN 1386-9477; **IF: 3.382**].
15. Niladri Sekhar Mondal , **Subhadip Nath,** Debnarayan Jana and Nanda Kumar Ghosh, "*Band engineering of non-hexagonal 2D tetragonal-silicene sheet and nanoribbons: A theoretical approach"* Journal of Physics and Chemistry of Solids, March, **2021**, 150, 109801[ISSN 0022-3697; **IF: 3.995**].
16. **Subhadip Nath**, Arka Bandyopadhyay, Sabyasachi Sen, Debnarayan Jana "*First principles investigation of structural, electronic and optical properties of synthesized radiaannulene oligomers for 6,6,12-graphyne*" Journal of Physics and Chemistry of Solids, June, **2021**, 153, 109990 [ISSN 0022-3697; **IF: 3.995**]
17. Niladri Sekhar Mondal , **Subhadip Nath,** Debnarayan Jana and Nanda Kumar Ghosh, '*First-principles study of the optical and thermoelectric properties of tetragonal-silicene*' Physical Chemistry Chemical Physics, May, **2021,** 23 (20), 11863 – 11875 [ISSN 1463-9076 ; **IF: 3.676**].

18. **Subhadip Nath** 'Thermoelectric and optical properties of 2D hexagonal Dirac material Be3X2 (X = C, Si, Ge, Sn): A density functional theory study' Journal of Applied Physics, August, **2021**, 130, 055106 [ISSN 0021-8979; **IF: 2.546**].
19. Supriya Ghosal**,** **Subhadip Nath**, Arka Bandyopadhyay, Sabyasachi Sen, and Debnarayan Jana '*Tetragonal Silicene and Germanene Quantum Dots: Candidates for Enhanced Nonlinear Optical and Photocatalytic Activity'* Journal of Physical Chemistry C October, **2021,** 125 , 21718−21728[ISSN 1932-7447; **IF: 4.126**].
20. Niladri Sekhar Mondal**,** **Subhadip Nath**, Suman Chowdhury and Debnarayan Jana '*Electric field-induced electronic-thermoelectric-optical properties of typical isoelectronic HNC6 monolayers: a theoretical study*' Applied Surface Science, April, **2022,** 581,152094[ISSN 0169-4332; **IF: 6.707**].
21. Medha Rakshit, Subhadip **Nath**, Suman Chowdhury, Rajkumar Mondal , Dipali Banerjee and Debnarayan Jana '*A study of anisotropic thermoelectric properties of bulk Germanium Sulfide in its Pnma phase: a combined first-principles and machine-learning approach*' Phys. Scr., October, **2022**, 97 125804 [ISSN 0031-8949; **IF: 2.6**].
22. Mainak Ghosh, **Subhadip Nath** , Sabyasachi Sen and Debnarayan Jana, *'Nonlinear optical response and characteristic Raman spectra of phagraphene quantum dots*' Phys. Scr., March, **2023**, 98 045109K [ISSN 0031-8949; **IF: 2.6]**
23. Krishnanshu Basak, **Subhadip Nath**, Rajkumar Mondal, and Debnarayan Jana, '*Electric Field-Induced Phase Transition on HPX6 (X = C, Si, Ge, Sn) Monolayers*' Phys. Status Solidi B, June, **2023,** 260, 2300112 [ISSN 0370-1972; **IF: 1.6]**
24. **Subhadip Nath** , Niladri Sekhar Mondal , Arka Bandyopadhyay, Rajkumar Mondal and Debnarayan Jana 'Non-equivalent nature of acetylenic bonds in typical square graphynes and intricate negative differential resistance characteristics' J. Phys.: Condens. Matter, May, **2023**, 35, 325501. [ISSN 0953-8984; **IF: 2.3]**
25. Chumki Tarafdar , Nanda Kumar Ghosh, **Subhadip Nath**∗ *'Role of inter-site Coulomb interaction on the thermodynamic and ground state properties within the t-J-U-V model*' Physica C: Superconductivity and its applications, November, **2023**, 615 1354393 [ISSN 1873-2143; **IF: 1.3]**
26. Niladri Sekhar Mondal, Rajkumar Mondal, N Bedamani Singh, and **Subhadip Nath***, and Debnarayan Jana, '*Electric field modulated electronic, thermoelectric and transport properties of 2D tetragonal silicene and its nanoribbons*' J. Phys.: Condens. Matter, June ,**2024**, 36 385301. [ISSN 0953-8984; **IF: 2.3]**
27. Krishnansu Basak**,** Supriyo Ghosal, **Subhadip Nath**, Susmita Jana**,** Debnarayan Jana, '*Effect of AFM ordering on thermoelectric responses of Mg_3X_2 (X: C, Si, Ge) monolayers: a DFT insight'* Journal of Physics: Condensed Matter **37** (1), 015701 (2024) [ISSN 1557-1939; **IF: 2.3**].

28. Srijani Ghosh**,** Krishanu Roy**,** Nanda Kumar Ghosh**,** **Subhadip Nath***, *'Hole-Polarons and Bipolarons in the Extended t–J–V Holstein Model'* Journal of Superconductivity and Novel Magnetism **38** (1), 72 (2025) [ISSN 1557-1939; **IF: 1.7**]
29. Srijani Ghosh**,** Nanda Kumar Ghosh**,** **Subhadip Nath*,** *'Hole-Phonon Interaction in the Fröhlich Model: A Theoretical Perspective'*Journal of Superconductivity and Novel Magnetism **38** (4), 1–11 (2025) [ISSN 1557-1939; **IF: 1.7**]

B) Conference Proceedings:

1. "Electron phonon interaction in high-Tc superconductors", **S. Nath**, N.S. Mondal, S.K. Bhowmick, and N.K. Ghosh, *Proceedings of the 'International Conference on Recent Trends in Applied Physics and Material* Science', AIP Conf. Proc., **2013**, 1536, 325-326.
2. "Bipolaron by inter-site electron-phonon interaction", N.S. Mondal, **S. Nath,** S. Bose, and M. Paul, *Proceedings of the '57th DAE Solid State Physics Symposium 2012'*, AIP Conf. Proc., **2013**, 1512, 810-811.
3. "Electron phonon interaction in Hubbard model", **S. Nath**, N.S. Mondal, N.K. Ghosh, and S.K. Bhowmick, *Proceedings of the '57th DAE Solid State Physics Symposium 2012'*, AIP Conf. Proc., **2013**, 1512, 1084-1085.
4. "Ground state properties of the frustrated Hubbard model", **S. Nath**, N.K. Ghosh, S.K. Bhowmick, and N.S. Mondal, *Proceedings of the 'International Conference on Recent Trends in Applied Physics and Material Science'*, AIP Conf. Proc., **2013**, 1536, 1093-1094.
5. "Interplay between Electron-Phonon Interaction and Hubbard Repulsion: Bipolaron Formation", **S. Nath**, N.S. Mondal, and N.K. Ghosh, *Proceedings of the '59th DAE Solid State Physics Symposium 2014'*, AIP Conf. Proc., **2015**, 1665, 090022-1-090022-3.
6. "Superlight Bipolarons in High T_c Superconductors", **S. Nath**, N.S. Mondal, K. Roy and N.K. Ghosh, *Proceedings of the '59th DAE Solid State Physics Symposium 2014'*, AIP Conf. Proc., **2015**, 1665,130031-1-130031-3.
7. "Small Superlight Bipolarons within *t-*J_p model", K. Roy, **S. Nath** and N.K. Ghosh, *Proceedings of the 'International Conference on Condensed Matter and Applied Physics (ICC 2015)',* AIP Conf. Proc., **2016**, 1728, 020019-1-020019-4.
8. "Interplay between on-site electron-phonon interaction and inter-site Coulomb repulsion", **S. Nath**, N.S. Mondal, K. Roy and N.K. Ghosh, *Proceedings of the '*60*th DAE Solid State Physics Symposium 2015'*, AIP Conf. Proc., **2016**, 1731, 090032-1-090032-3.
9. "High-T_c Superconductivity: The t-J-V Model and its Applications", K. Roy, P. Pal, **S. Nath** and N.K. Ghosh, *Proceedings of the '*60*th DAE Solid State Physics Symposium 2015'*, AIP Conf. Proc., **2016**, 1832, 130024-1-130024-3.

10. "Hole Pairing and Thermodynamic Properties of the Two Dimensional Frustrated t-J model", K. Roy, P. Pal, **S. Nath** and N.K. Ghosh, *Proceedings of the '62nd DAE Solid State Physics Symposium 2017'*, AIP Conf. Proc., **2018**, 1942, 130012-1-130012-3.
11. "On some ground state characteristics of the t-J-V model", P. Pal, K. Roy, **S. Nath** and N.K. Ghosh, *Proceedings of '2nd International Conference on Condensed Matter and Applied Physics (ICC 2017)'*, AIP Conference Proceedings, **2018**, 1953, 120003-1-120003-4.

C) TEXT Books:

1. Partha Pratim Roy, Santoshkumar Ghoroi, Partha Ghosh, **Subhadip Nath** 'Dwadash Padarthabidya' TB No. text book of Class XII, Semester 3, Published by Parul Prakashani, Kolkata

12. Membership of Learned Societies/ Editorial Boards, etc.: Reviewer of Scientific Reports, New Journal of Physics, Applied Physics letter, Applied Physics A, Journal of Superconductivity and Novel magnetism etc,

13. Patents: Nil

14. Awards: CSIR-NET (December 2008, June 2009, December 2008)
Gate 2009

15. Other notable activities:

16. A) Participation in Seminars/Symposia/Conferences/Workshops:

1. **Presented a paper** entitled "*Numerical studies on High Temperature Superconductors using Hubbard Model*" in the **National Conference** '*Condensed Matter Days 2010*', organized by Department of Physics, University of Kalyani from **25th-27th August, 2010**.
2. **Presented a paper** entitled "*Thermodynamic properties of the 2D extended Hubbard model*" in the **National Conference** '*Condensed Matter Days 2011*', organized by Department of Physics, Gauhati University from **24th-26th August, 2011**.
3. **Participated** in the **International level** '*56th DAE- Solid State Physics Symposium*', organized by SRM University, Kattankulathur, Tamil Nadu on 19th-23rd December, 2011.
4. **Presented a paper** entitled "*Pairing Susceptibility and Hole dynamics in the extended 2D Hubbard model*" in the UGC sponsored Second **National Seminar** on '*Recent Trends in Condensed Matter Physics including Laser Applications (SNSCMPLA-2012)*', organized by Department of Physics, University of Burdwan on **22-23rd March, 2012**.
5. **Presented a paper** entitled "*Electron phonon interaction in Hubbard model*" in the **International level** '*57th DAE- Solid State Physics Symposium*', organized by Indian Institute of Technology, Bombay, Mumbai on 3rd-7th December, 2012.

6. **Presented a paper** entitled "*Ground state properties of the frustrated Hubbard model*" in the '*International Conference on Recent Trends In Applied Physics and Material Science RAM-2013 '*, organized by Govt. College of Engineering and Technology, Bikaner on 1st-2nd February, 2013
7. **Presented a paper** entitled "*Interplay between Electron-Phonon Interaction and Hubbard Repulsion: Bipolaron Formation*" in the **International level** '*59th DAE- Solid State Physics Symposium*', organized by VIT University, Vellore on 16th -20th December, 2014.
8. **Presented a paper** entitled "*High-T_c Superconductivity: The t-J-V Model and its Applications*" in the **International level** '*60th DAE- Solid State Physics Symposium*', organized AMITY University UP, Noida on 21st-25th December, 2015.
9. **Presented a paper (Oral presentation)** entitled "*Electron-Phonon Interaction in Presence of Inter-site Coulomb Repulsion*" in the **National Conference** on '*Emerging Trends in Condensed Matter Physics and Material Science*', organized by Department of Physics, University of Kalyani on **18-19th March, 2016**.
10. **Presented a paper** entitled "*Interplay Between Inter-site Electron-Phonon Interaction and Inter-site Coulomb Repulsion*" in the **National Seminar** on '*Recent Trends in Condensed Matter Physics including Laser Applications (NSCMPLA-2017)*', organized by Department of Physics, University of Burdwan on **8-9th March, 2017**.
11. **Presented a paper** entitled "*Electronic Structure of S-Graphene sheet and Nanoribbon*" in the **National Seminar** '*Condensed Matter Days 2018 (CMDAYS-2018)*' organized by Department of Physics, University of Burdwan on **29th to 31st August, 2018**
12. **Presented a paper** entitled "*Electronic and Optical Properties of S-Graphene Sheet and Nanoribbon*" in the **National Seminar** '*National Conference on Recent Developments in nanoscience and Nanotechnology (NCRDNN)*' organized by School of materials Science and Nanotechnology, Jadavpur University on **29th to 31st January, 2019**
13. **Presented a paper (Oral presentation)** entitled "*Ab initio study of the electronic, optical and thermal properties of non-hexagonal Dirac material S-Graphene sheet*" in the **National Seminar** '*Condensed Matter Days 2019 (CMDAYS-2019)*' organized by Department of Physics, Vidyasagar University, Midnapore on **29th to 31st August, 2019**

B) Participation in OP/RC:

- Participated in the UGC sponsored **Orientation Programme** (OP-119) organized by the UGC-HRDC, University of Calcutta from **17th July to 12th August, 2017**.
- Participated in the UGC sponsored **3rd Refresher course on Nano-science and Nano-technology** organized by the UGC-HRDC, University of Burdwan from **14th September to 4th October, 2018**

- Participated in the UGC sponsored **Refresher course on Physics** organized by the UGC-HRDC, University of Calcutta from **15th February-28th February, 2022**