

Soumya Bagchi

Curriculum Vitae

Associate Professor
Department of Physics
Indian Institute of Technology (Indian School of Mines) Dhanbad
Jharkhand - 826004,
India
✉ sbagchi@iitism.ac.in, soumya.bagchi87@gmail.com

Academic Appointments

- **Associate Professor**
Department of Physics, IIT-ISM Dhanbad, India
(April 2026 – present)
- **Assistant Professor**
Department of Physics, IIT-ISM Dhanbad, India
(August 2020 – April 2026)
- **Postdoctoral Research Associate**
GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany
Astronomy and Physics Department, Saint Mary's University, Halifax, Canada &
Justus-Liebig University, Giessen, Germany &
(September 2015 – July 2020)
Adviser: Prof. Christoph Scheidenberger and Prof. Rituparna Kanungo
- **Ph.D. candidate**
University of Groningen, Groningen, The Netherlands
(November 2010 – May 2015)
- **Visiting Student**
Department of Astronomy and Astrophysics,
Tata Institute of Fundamental Research, Mumbai, India
(May 2009 – July 2009)
Adviser: Prof. J.S. Yadav

Education

Ph.D.

University of Groningen, Groningen, The Netherlands
Experimental Nuclear Physics
2010 – 2015

- Advisers:
Prof. Nasser Kalantar Nayestanaki, Prof. Muhsin N. Harakeh and Dr. Julien Gibelin
- Thesis: Study of compression modes in ^{56}Ni using an active target

Masters

Indian Institute of Technology Roorkee, Roorkee, India
2008 – 2010

- Specialization: Nuclear Physics
- Thesis: Study of Coulomb Dissociation as an Indirect Method in Nuclear Astrophysics
- Adviser: Dr. Rajdeep Chatterjee

Bachelor

University of North Bengal, Siliguri, India
2005 – 2008

- With Honours in Physics

Presentations

Invited talks

- **Title:** Collective Excitations in Rare-Earth Nuclei: Insights from Isoscalar Giant Resonances;
African Nuclear Physics Conference 2025, iThemba Lab, Cape Town, South Africa, 24 – 28 November 2025.
- **Title:** Probing Radii and Resonances;
Super-FRS EC Meeting, Walldorf, Germany, 16 – 19 September 2025.
- **Title:** Planned Gas Catcher in India;
HADO-CSC Workshop, GSI Helmholtzzentrum, Darmstadt, Germany, 03 – 04 September 2025.
- **Title:** Involvement of IIT (ISM) Dhanbad in FAIR activities;
Theme Meeting on FAIR - Science, Department of Physics, Panjab University, India, 23 – 25 April 2025.
- **Title:** Isoscalar Giant Resonances in deformed Rare-Earth Nuclei: Revealing a New Compression Mode in Quadrupole Resonance;
Frontiers in Gamma Ray Spectroscopy, Tata Institute of Fundamental Research, Mumbai, India, 9 – 12 March 2025.
- **Title:** Exotic structures unveiled from radii measurements of neutron-rich nuclei;
Cutting-edge Research in Nuclear Physics: Symmetry, Structure and Applications, Presidency University, Kolkata, India, 17 – 18 January 2024.
- **Title:** Measurements of collective excitation in nuclei and importance of transfer reactions in nuclear astrophysics;
Nuclear Reaction and Structure up to Intermediate Energy Collision (NRSIC-23), Variable Energy Cyclotron Center, India, 24 – 25 January 2023.
- **Title:** Measurements of GMR in direct and indirect kinematics;
Advances on Giant Nuclear Monopole Excitations and Applications to Multi-messenger Astrophysics, ECT*, Trento, Italy, 11 July 2022.
- **Title:** Exotic structures unveiled from radii measurements of neutron-rich nuclei;
TIFR Department of Nuclear and Atomic Physics, Annual Talk, India, 26 April 2022.
- **Title:** Journey of the humble nucleus towards exoticity;
Sarabhai Online Lecture Series, SVNIT, Surat, India, 28 August 2021.
- **Title:** Taming the Universe in the Laboratory with Nuclear Physics;
Webinar, Salesian College, Siliguri, India, 18 September 2020.
- **Title:** Quest for the heaviest Borromean two-neutron halo;
Webinar organized by the Indian Nuclear Physics community, 22 June 2020.

- **Title:** Radii measurements of exotic nuclei;
Recent Issues in Nuclear and Particle Physics, Visva-Bharati, Shantiniketan, India, 3 – 5 February 2019.
- **Title:** Proton distribution radii in neutron-rich nitrogen through charge-changing cross section measurements;
NUSTAR Annual meeting, Darmstadt, Germany, 27 February – 2 March 2017.
- **Title:** Study of compression modes in ^{56}Ni with the active target MAYA;
NUSTAR Annual meeting, Darmstadt, Germany, 3 March – 7 March 2014.
- **Title:** Highlights on ^{56}Ni ;
ENSAR Town Meeting, Warsaw, Poland, 17 – 20 June 2013.

Institute seminars

- **Title:** Measurements of the giant resonances in direct and inverse kinematics;
Tata Institute of Fundamental Research, 10th August 2022.
- **Title:** Exotic structures from radii measurements of neutron-rich nuclei;
KVI-CART, University of Groningen, The Netherlands, 13th September 2018.
- **Title:** Exotic structures from radii measurements of neutron-rich nuclei;
Tata Institute of Fundamental Research, Mumbai, India, 8th January 2018.
- **Title:** Exotic structures from radii measurements of neutron-rich nuclei;
Saha Institute of Nuclear Physics, Kolkata, India, 3rd January 2018.
- **Title:** Exotic structures from radii measurements of neutron-rich nuclei;
IIST Shibpur, Kolkata, India, 18th December 2017.
- **Title:** Study of Compression Modes in ^{56}Ni with the MAYA active-target detector;
GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany, February 2016.
- **Title:** Study of Compression Modes in ^{56}Ni with the MAYA active-target detector;
Variable Energy Cyclotron Center, Kolkata, India, August 2015.
- **Title:** Study of Compression Modes in ^{56}Ni with the MAYA active-target detector;
KVI-CART, University of Groningen, The Netherlands, 2013.

Contributed talks in Conferences and Workshops

- **Title:** Plans for Measurements of Radii and Momentum Distribution;
Super-FRS Collaboration Meeting, Mörfelden-Walldorf, Germany, 17 – 19 June 2019.
- **Title:** Proton-distribution radii of neutron-rich nitrogen isotopes;
Super-FRS Collaboration Meeting, Mörfelden-Walldorf, Germany, 17 – 19 June 2019.
- **Title:** Concept of an ionization detector for high Z-resolution measurements;
Super-FRS Collaboration Meeting, Mörfelden-Walldorf, Germany, 2 – 4 May 2018.
- **Title:** Proton radii of neutron-rich nitrogen isotopes through charge-changing cross section measurements;
61st DAE-BRNS Symposium on Nuclear Physics, Kolkata, India, 5 – 9 December 2016.
- **Title:** Proton distribution of Nitrogen isotopes through charge-changing cross section measurements;
Direct Reaction with Exotic Beams (DREB), Halifax, Canada, 11 – 15 July 2016.
- **Title:** Study of compression modes of ^{56}Ni using a TPC as an active target;
Physics@FOM, Veldhoven, The Netherlands, 21 – 22 January 2014.
- **Title:** Study of compression modes in ^{56}Ni using a TPC as an active target;
Annual Conference on Subatomic Physics, Lunteren, The Netherlands, 1 November 2013.

- **Title:** Study of the Isoscalar Giant Monopole Resonance (ISGMR) and Isoscalar Giant Dipole Resonance (ISGDR) in ^{56}Ni using active target MAYA at GANIL;
Annual Conference on Subatomic Physics, Lunteren, The Netherlands, 2 November 2012.

Posters

- **Title:** Measurement of proton-distribution radii of neutron-rich nitrogen isotopes;
Nuclear Structure and Dynamics, Venice, Italy, 13 – 17 May 2019.
- **Title:** Compression modes in ^{56}Ni with a TPC as an active target;
International conference for Science and Technology for FAIR, Worms, Germany, 13 – 17 October 2014.
- **Title:** Study of Compression Modes in ^{56}Ni with the MAYA active-target detector;
XVIIIth Colloque GANIL, Bayeux, France, 23 – 27 September 2013.
- **Title:** Study of the compression modes in ^{56}Ni with the MAYA active target detector;
Physics@FOM, Veldhoven, The Netherlands, 22 – 23 January 2013.
- **Title:** Study of Isoscalar Giant Dipole Resonance of ^{56}Ni using active target;
2nd European Nuclear Physics Conference, Bucharest, Romania, 17 – 21 September 2012.
- **Title:** Study of Isoscalar Giant Dipole Resonance in ^{56}Ni with the MAYA active target detector
Physics@FOM, Veldhoven, The Netherlands, 17 – 18 January 2012.
- **Title:** Study of Isoscalar Giant Dipole Resonance in ^{56}Ni with the MAYA active target detector;
18th Euroschool on Exotic Beams, Jyväskylä, Finland, 20 – 26 August 2011.

Schools and Workshops attended

- NUSTAR and Super-FRS collaboration annual meeting;
GSI Helmholtzzentrum, Darmstadt, Germany, 2012 – present.
- 23rd Euroschool on Exotic Beams;
GSI Helmholtzzentrum, Darmstadt, Germany, 28 August – 3 September 2016.
- 18th Euroschool on Exotic Beams;
Department of Physics, University of Jyväskylä, Finland, 20 – 26 August 2011.
- School cum Workshop on Nuclear Yrast and Near Yrast States;
Department of Physics, IIT Roorkee, Roorkee, India, 26 – 30 October 2009.
- 3rd Winter School on Astroparticle Physics;
Cosmic Ray Laboratory, TIFR, Ooty, India, 21 – 29 December 2008.
Developed a plastic scintillator cone detector for cosmic ray muon detection.

Academic Visits

- GANIL and LPC Caen, Caen, France, April 2011, September 2011, June 2012.
- RIKEN Nishina Center, Tokyo, Japan, November 2016.
- Research Center for Nuclear Physics, Osaka University, Japan, November 2018.
- GSI Helmholtzzentrum, Darmstadt, Germany, December 2022.
- IFIN-HH & ELI-NP labs, Bucharest, Romania, May-June 2025.

List of Publications

Articles in Refereed Journals

34. *Direct mass measurement of ^{93}Pd and implications for the isomer structures in ^{94}Ag : Tracing the two-proton decay branch;*
G. Kripkó-Koncz *et al.*, *Physical Review Research* **7**, L042022 (2025). [Journal Link](#);
33. *Probing isoscalar giant resonances with multipolarity $L \leq 3$ in even-A neodymium isotopes;*
M. Abdullah, K. Khokhar, S. Bagchi *et al.*, *Physical Review C* **112**, 044316 (2025). [Journal Link](#);
32. *Charge Pickup Reaction Cross Section for Neutron-Rich p-Shell Isotopes at 900A MeV;*
J. C. Zhang *et al.*, *Physical Review X* **15**, 031004 (2025). [Journal Link](#);
31. *Technical design report for the cryogenic stopping cell of the Super-FRS at FAIR;*
D. Amanbayev *et al.*, *The European Physical Journal Special Topics* **234**, 861-917 (2025). [Journal Link](#);
30. *Investigation of direct nuclear reactions in a storage ring using in-ring detection;*
J. C. Zamora, T. Aumann, S. Bagchi *et al.*, *Physical Review C* **110**, 044614 (2024). [Journal Link](#);
29. *Effect of ground-state deformation on the isoscalar giant monopole resonance and the first observation of overtones of the isoscalar giant quadrupole resonance in rare-Earth Nd isotopes;*
M. Abdullah, S. Bagchi *et al.*, *Physics Letters B* **855**, 138852 (2024). [Journal Link](#); [arXiv Link](#)
28. *Broken seniority symmetry in the semimagic proton mid-shell nucleus ^{95}Rh ;*
B. Das *et al.*, *Physical Review Research* **6**, L022038 (2024). [Journal Link](#)
27. *A new approach for deducing rms proton radii from charge-changing reactions of neutron-rich nuclei and the reaction-target dependence;*
J. Zhang *et al.*, *Science Bulletin* **69**, 1647 (2024). [Journal Link](#); [arXiv Link](#)
26. *Increasing the rate capability for the cryogenic stopping cell of the FRS Ion Catcher;*
J. W. Zhao *et al.*, *Nuclear Instruments and Methods in Physics Research Section B* **547**, 165175 (2024). [Journal Link](#); [arXiv Link](#)
25. *Accurate simultaneous lead stopping power and charge-state measurements in gases and solids: Benchmark data for basic atomic theory and nuclear applications;*
S. Ishikawa *et al.*, *Physics Letters B* **846**, 138220 (2023). [Journal Link](#)
24. *Matter radius of the doubly-magic ^{56}Ni measured in a storage ring;*
M. von Schmid *et al.*, *The European Physical Journal A* **59**(4), 83 (2023). [Journal Link](#)
23. *Studying Gamow-Teller transitions and the assignment of isomeric and ground states at $N = 50$;*
A. Mollaebrahimi *et al.*, *Physics Letters B* **839**, 127833 (2023). [Journal Link](#); [arXiv Link](#)

22. *Proton Distribution Radii of $^{16-24}\text{O}$: Signatures of New Shell Closures and Neutron Skin;*
S. Kaur et al., *Physical Review Letters* **129**, 142502 (2022). [Journal Link](#); [arXiv Link](#)
21. *Charge-changing cross sections for $^{42-51}\text{Ca}$ and effect of charged-particle evaporation induced by neutron-removal reactions;*
M. Tanaka et al., *Physical Review C* **106**, 014617 (2022). [Journal Link](#); [arXiv Link](#)
20. *First coupling of the FRS particle identification and the FRS-Ion Catcher data acquisition systems: The case of ^{109}In ;*
A. Spataru et al., *Nuclear Inst. and Methods in Physics Research B*, **522**, 32 - 37 (2022). [Journal Link](#)
19. *Experimental investigation of ground-state properties of ^7H with transfer reactions;*
M. Caamaño et al., *Physics Letters B* **829**, 137067 (2022). [Journal Link](#); [arXiv Link](#)
18. *Nature of seniority symmetry breaking in the semimagic nucleus ^{94}Ru ;*
B. Das et al., *Physical Review C* **105**, L031304 (2022). [Journal Link](#)
17. *Coulomb and nuclear excitations of ^{70}Zn and ^{68}Ni at intermediate energy;*
S. Calinescu et al., *Physical Review C* **104**, 034318 (2021). [Journal Link](#); [arXiv Link](#)
16. *Radioactive Beams for Image-Guided Particle Therapy: The BARB Experiment at GSI;*
D. Boscolo et al., *Frontiers in Oncology* **11**, 737050 (2021). [Journal Link](#)
15. *Mass measurements of As, Se, and Br nuclei, and their implication on the proton-neutron interaction strength toward the $N = Z$ line;*
I. Mardor et al., *Physical Review C* **103**, 034319 (2021). [Journal Link](#); [arXiv Link](#)
14. *Signature of a possible α -cluster state in $N = Z$ doubly-magic ^{56}Ni ;*
S. Bagchi et al., *The European Physical Journal A* **56**, 290 (2020). [Journal Link](#); [arXiv Link](#)
13. *Two-neutron halo is unveiled in ^{29}F ;*
S. Bagchi et al., *Physical Review Letters* **124**, 222504 (2020). [Journal Link](#); [arXiv Link](#)
12. *Mass and Half-Life Measurements of Neutron-Deficient Iodine Isotopes;*
S.A.S Andrés et al., *The European Physical Journal A* **56**, 143 (2020). [Journal Link](#)
11. *Swelling of Doubly Magic ^{48}Ca core in Ca isotopes beyond $N = 28$;*
M. Tanaka et al., *Physical Review Letters* **124**, 102501 (2020). [Journal Link](#); [arXiv Link](#)
10. *Isomer studies in the vicinity of the doubly-magic nucleus ^{100}Sn : Observation of a new low-lying isomeric state in ^{97}Ag ;*
C. Hornung et al., *Physics Letters B* **802**, 135200 (2020). [Journal Link](#)
9. *Compression-mode resonances in the calcium isotopes and implications for the asymmetry term in nuclear incompressibility;*

- K.B. Howard *et al.*, *Physics Letters B* **801**, 135185 (2020). [Journal Link](#); [arXiv Link](#)
8. *A Novel Method for the Measurement of Half-Lives and Decay Branching Ratios of Exotic Nuclei*;
I. Miskun *et al.*, *The European Physical Journal A* **55**, 148 (2019). [Journal Link](#); [arXiv Link](#)
 7. *High-resolution, accurate multiple-reflection time-of-flight mass spectrometry for short-lived, exotic nuclei of few events in their ground and low-lying isomeric states*;
S.A.S. Andrés *et al.*, *Physical Review C* **99**, 064313 (2019). [Journal Link](#); [arXiv Link](#)
 6. *Neutron skin and signature of the $N = 14$ shell gap found from measured proton radii of $^{17-22}\text{N}$* ;
S. Bagchi *et al.*, *Physics Letters B* **790**, 251–256 (2019). [Journal Link](#); [arXiv Link](#)
 5. *Multi-messenger investigation of the Pygmy Dipole Resonance in ^{140}Ce* ;
D. Savran *et al.*, *Physics Letters B* **786**, 16–20 (2018). [Journal Link](#)
 4. *Nuclear-matter radius studies from $^{58}\text{Ni}(\alpha, \alpha)$ experiments at the GSI Experimental Storage Ring with the EXL facility*;
J.C. Zamora *et al.*, *Physical Review C* **96**, 034617 (2017). [Journal Link](#)
 3. *First measurement of isoscalar giant resonances in a stored-beam experiment*;
J.C. Zamora *et al.*, *Physics Letters B* **763**, 16–19 (2016). [Journal Link](#)
 2. *Observation of isoscalar multipole strengths in exotic doubly-magic ^{56}Ni in inelastic α scattering in inverse kinematics*;
S. Bagchi *et al.*, *Physics Letters B* **751**, 371–375 (2015). [Journal Link](#)
 1. *A neutron spectrometer for studying giant resonances with (p,n) reactions in inverse kinematics*;
L. Stuhl *et al.*, *Nuclear Instruments and Methods in Physics Research Section A* **736**, 1–9 (2014). [Journal Link](#); [arXiv Link](#)

Conference proceedings and Book Chapters

33. *Investigating Pre-equilibrium and Equilibrium Particle Emission in $^4\text{He} + ^{92}\text{Zr}$ and ^{93}Nb reactions*;
S. Pal, S. Adhikary, P. Roy, S. Bagchi, *et al.*, *Proceedings of the DAE-BRNS Symposium on Nuclear Physics* **69**, 429 (2025).
32. *Investigation of Fission Isomers using Standalone Fastcom Tec TDC*;
K. Khokhar, J. Zhao, S. Bagchi, T. Dickel, P. G. Thirolf, *et al.*, *Proceedings of the DAE-BRNS Symposium on Nuclear Physics* **69**, 1409 (2025).
31. *Study of Isoscalar Giant Resonances in highly deformed ^{172}Yb* ;
K. Khokhar, S. Bagchi, M. N. Harakeh *et al.*, *Proceedings of the DAE-BRNS Symposium on Nuclear Physics* **69**, 143 (2025).

30. *Interaction- and charge-changing cross sections for neutron-rich $^{63-80}\text{Cu}$ isotopes toward the derivation of neutron skin thickness;*
G. Takayama *et al.*, *Nuclear Physics A* **1065**, 123261 (2026). [Proceedings Link](#)
29. *Effect of Ground-State Shape Deformation on the Collective Excitations in Even-Mass Nd isotopes;*
M. Abdullah, D. Das, S. Bagchi, M. N. Harakeh *et al.*, *Akito Arima Memorial Volume*, pp. 1-9 (2025), *World Scientific Connect*. [Book Chapter](#)
28. *First observation of MNT isotope beams at the FRS Ion Catcher;*
Ali Mollaebrahimi *et al.*, *Nuclear Physics A* **1057**, 123041 (2025). [Proceedings Link](#)
27. *Measurement of charge-changing cross section of neutron-rich nitrogen isotopes for determining their proton radii;*
A. Roy *et al.*, *Nuclear Physics A* **1054**, 122983 (2025). [Proceedings Link](#)
26. *Investigation of the proton radius of the Borromean halo nucleus ^{19}B ;*
D. Prajapati *et al.*, *Nuclear Physics A* **1053**, 122977 (2025). [Proceedings Link](#)
25. *Fission isomer studies with the FRS;*
J. W. Zhao *et al.*, *Proceedings of Science, FAIRness 2022* **419**, 063, 165175 (2023). [Proceedings Link](#)
24. *Geant4 Simulation on Gamma-Neutron Detection with CLYC: An Elpasolite Detector;*
D. Kar, S. Bagchi, *Proceedings of the DAE-BRNS Symposium on Nuclear Physics* **67**, 1297 (2023).
23. *Extraction of Optical-Model Parameters from α elastic scattering of highly-deformed ^{172}Yb ;*
K. Khokhar, S. Bagchi, M. N. Harakeh *et al.*, *Proceedings of the DAE-BRNS Symposium on Nuclear Physics* **67**, 709 (2023).
22. *Search for α -cluster state in $N = Z$ medium heavy nuclei;*
H. Akimune, *et al.*, *6th Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan* (2023). [Link](#)
21. *Effect of ground-state shape deformation on the Isoscalar Giant Monopole Resonance in Nd isotopes;*
M. Abdullah, S. Bagchi, M. N. Harakeh *et al.*, *Proceedings of the DAE-BRNS Symposium on Nuclear Physics* **66**, 94–95 (2022).
20. *Search for η' -mesic nuclei using (p,d) reaction with FRS/Super-FRS at GSI/FAIR;*
Y. Tanaka, *et al.*, *Journal of Physics: Conference Series* **1643**, 012181 (2020). [Proceedings Link](#)
19. *Structure of superheavy hydrogen ^7H ;*
M. Caamaño, *et al.*, *European Physical Journal Web of Conferences* **232**, 04002 (2020). [Proceedings Link](#)
18. *Development of a method to deduce point-proton radii from charge changing cross sections;*
A. Homma, *et al.*, *JPS Conference Proceedings* **32**, 010032 (2020). [Proceedings Link](#)

17. *Spectroscopy of η' -Mesic nuclei with WASA at GSI/FAIR;*
Y. K. Tanaka, et al., *Acta Physica Polonica B* **51**, 1 (2020). [Proceedings Link](#)
16. *A Method to Account for Hydroxide Contamination in Characterizing the Giant Monopole Resonance to Determine an Accurate K_{τ} ;*
S. Weyhmler et al., *Bulletin of the American Physical Society* **64** (2019).
15. *A Method to Account for Hydroxide Contamination in Characterizing the Giant Monopole Resonance to Determine an Accurate K_{τ} ;*
S. Weyhmler et al., *APS Division of Nuclear Physics Meeting Abstracts* **045** (2019).
14. *Investigating a possible positive value of K_{τ} , and implications for the symmetry energy;*
K. Howard et al., *APS Division of Nuclear Physics Meeting Abstracts* **007** (2019).
13. *Measurement of proton-distribution radii of neutron-rich nitrogen isotopes;*
S. Bagchi et al., *European Physical Journal Web of Conferences* **223**, 01003 (2019). [Proceedings Link](#)
12. *Search for Borromean halo structure in the Island of Inversion;*
S. Bagchi et al., *Proceedings of the DAE-BRNS Symposium on Nuclear Physics* **63**, 414–415 (2018).
11. *Study of proton distribution of neutron-rich nitrogen isotopes through charge-changing cross section measurements;*
S. Bagchi et al., *Proceedings of the DAE-BRNS Symposium on Nuclear Physics* **61**, 348–349 (2016).
10. *Nuclear reactions in the storage ring ESR with EXL;*
Th. Kröll, et al., *Journal of Physics: Conference Series* **724**, 012026 (2016). [Proceedings Link](#)
9. *Nuclear astrophysics with radioactive ions at FAIR;*
R. Reifarth, et al., *Journal of Physics: Conference Series* **665**, 012044 (2016). [Proceedings Link](#); [arXiv Link](#)
8. *Nuclear transfer reaction measurements at the ESR - for the investigation of the astrophysical $^{15}\text{O}(\alpha, \gamma)^{19}\text{Ne}$ reaction;*
D.T. Doherty, et al., *Physica Scripta* **T166**, 014007 (2015). [Proceedings Link](#)
7. *Isoscalar giant resonance studies in a stored-beam experiment within EXL;*
J.C. Zamora, et al., *Physica Scripta* **T166**, 014006 (2015). [Proceedings Link](#)
6. *Investigation of the Nuclear Matter Distribution of ^{56}Ni by Elastic Proton Scattering in Inverse Kinematics;*
M. von Schmid, et al., *Physica Scripta* **T166**, 014005 (2015). [Proceedings Link](#)
5. *First Nuclear Reaction Experiment with Stored Radioactive ^{56}Ni Beam and Internal Hydrogen and Helium Targets;*

- P. Egelhof, *et al.*, *JPS Conference Proceedings* **6**, 020049 (2015). [Proceedings Link](#)
4. *First EXL experiment with stored radioactive beam: Proton scattering on ^{56}Ni* ;
M. von Schmid, *et al.*, *European Physical Journal Web of Conferences* **66**, 03093 (2014). [Proceedings Link](#)
 3. *Alpha cluster structure in ^{56}Ni* ;
H. Akimune, *et al.*, *Journal of Physics: Conference Series* **436**, 012010 (2013). [Proceedings Link](#)
 2. *Neutron-skin thickness from the study of the anti-analog giant dipole resonance*;
A. Krasznahorkay, *et al.*, *AIP Conference Proceedings* **1491**, 190–197 (2012). [Proceedings Link](#); [arXiv Link](#)
 1. *Feasibility Studies for the EXL Project at FAIR*;
K. Yue, *et al.*, *Proceedings of Science* **STORP'11**, 014 (2011). [Proceedings Link](#)

Teaching

- Nuclear and Particle Physics (1st year M.Sc Physics), IIT-ISM Dhanbad, Winter Semesters 2024-25, 2025-26.
- Mathematical Physics (2nd year B.Tech Engineering Physics), IIT-ISM Dhanbad, Monsoon Semesters 2024-25, 2025-26.
- Mathematical Methods for Physicists (1st year M.Sc Physics), IIT-ISM Dhanbad, Monsoon Semester 2024-25.
- Physics - I (1st year B.Tech Engineering Physics) IIT-ISM Dhanbad, 2021-22, 2022-23, 2023-24.
- Introduction to Astrophysics and Astronomy (B.Tech), IIT-ISM Dhanbad, Winter Semesters 2021-22, 2022-23.
- Optical Communication (B.Tech Engineering Physics), IIT-ISM Dhanbad, Monsoon Semester 2021-22.
- Nuclear Science and Engineering (B.Tech Engineering Physics), IIT-ISM Dhanbad, Winter Semester 2020-21.
- Optoelectronics (2nd year M.Sc Physics), IIT-ISM Dhanbad, Winter Semester 2020-21.
- Lab instructor for B.Tech and M.Sc students.
- Principles of Measurement Systems, Teaching Assistant, University of Groningen, Winter 2013.
- Principles of Measurement Systems, Teaching Assistant, University of Groningen, Winter 2012.
- Statistical Methods in Experimental Physics, Teaching Assistant, University of Groningen, Spring 2012.

Supervision

Ph.D. students

- Apurbalal Bar (IIT-ISM Dhanbad, 2024 – present)
Status: Ongoing (with institute fellowship).
Topic: Low-lying E1 transitions through transfer reactions and gamma strength function.

- Shinjini Pal (IIT-ISM Dhanbad, 2023 – present)
Status: Ongoing (with institute fellowship).
Topic: Study of pre-emission equilibrium processes and transfer reactions.
- Debodyuti Kar (IIT-ISM Dhanbad, 2022 – present)
Status: Ongoing (SERB (SRG) fellowship: Apr 2022 - Feb 2024, institute fellowship: Mar 2024 - present).
Topic: Detector simulation, Upgrading Cryogenic Stopping Cell, Fission Isomer, Machine Learning.
- Kalpana Khokhar (IIT-ISM Dhanbad, 2021 – present)
Status: Ongoing (with institute fellowship).
Topic: Collective excitation in Yb nucleus, study of Fission Isomers.
- Mohammad Abdullah (IIT-ISM Dhanbad, 2020 – 2025)
Status: Completed.
Topic: Quantitative Analysis of the Effect of Ground-State Shape Deformation on the Collective Excitations in Nd isotopes.
- Pranav Subramaniam (Saint Mary's University, Halifax, Canada)
Status: Completed (partially supervised as a Postdoctorate mentor).
Topic: Charge-changing cross section in neutron-rich C isotopes.
- Satbir Kaur (Dalhousie University & Saint Mary's University, Halifax, Canada)
Status: Completed (partially supervised as a Postdoctorate mentor).
Topic: Charge-changing cross section in neutron-rich C isotopes.

B.Tech/Master and Summer students

- Tushar Kanta Sahoo (Master's student in Physics, IIT-ISM, Dhanbad, 2024 – 2025)
Topic: Unveiling Electric Dipole Transition States in ^{90}Zr through the $^{91}\text{Zr}(p,d)^{90}\text{Zr}$ Transfer Reaction.
- Sourav Gayen (Master's student in Physics, IIT-ISM, Dhanbad, 2024 – 2025)
Topic: From Nucleus to Algorithms: Predicting Neutron separation energy with Deep Neural Network (DNN).
- Aditya Kumar (Master's student in Physics, IIT-ISM, Dhanbad, 2024 – 2025)
Topic: Study of Nuclear Fission Isomers Using FastComTec TDC.
- Deveshi Singh (B.Tech student in Engineering Physics, IIT-ISM, Dhanbad, 2024 – 2025)
Topic: Verification of Bethe-Bloch Formula at Various Energies.
- Chinmaya Nayak (Master's student in Physics, IIT-ISM, Dhanbad, 2023 – 2024)
Topic: Simulation of trajectories of ionized particles in an electric field using COMSOL.
- Kumar Vaibhav (Master's student in Physics, IIT-ISM, Dhanbad, 2023 – 2024)
Topic: Characterization of CAEN DT5725s digitizer and CAER DT4800 Emulator: Tools to study CLYC.
- Akhil M Nair (B.Tech student in Engineering Physics, IIT-ISM, Dhanbad, 2023 – 2024)
Topic: Study of Pygmy Dipole Resonance through $^{91}\text{Zr}(p,d)^{90}\text{Zr}$ reaction.
- Aditya Swamy (B.Tech student in Engineering Physics, IIT-ISM, Dhanbad, 2023 – 2024)
Topic: Study of excited states in ^{31}S and its implication on ONe Novae.
- Anand Kumar S (BS-MS dual degree student in Physics, NISER Bhubaneswar, Summer 2023)
Topic: Determination of Half-lives of Fission Isomers using TDC.
- Milan John (Master's student in Physics, IIT-ISM, Dhanbad, 2022 – 2023)
Topic: Application of deep-learning and brute-force method for understanding the microstructures of a synchrotron beam.
- Saurav Mittal (Master's student in Physics, IIT-ISM, Dhanbad, 2022 – 2023)
Topic: Geant4 simulation of the response of a veto detector with various beam energies for the measurement of charge-changing cross-section of ^{12}C on a carbon target.

- Harshit Dubey (B.Tech student in Engineering Physics, IIT-ISM, Dhanbad, 2022 – 2023)
Topic: GEANT4 simulation of a CLYC detector.
- Sunny Kumar Gupta (BS-MS dual degree student in Physics, IISER Bhopal, Summer 2022)
Topic: Glauber-Model analysis of Charge-Changing Cross section to study the charge-distribution radii.
- Rajesh Pramanik (IIT-ISM, Dhanbad, 2021 – 2022)
Topic: Strength distribution of Giant Resonances using Multipole Decomposition Analysis.
- Sonali Panda (IIT-ISM, Dhanbad, 2021 – 2022)
Topic: Optimization of an ion-optical spectrometer for projectile fragmentation of ^{86}Kr to produce ^{51}K and one neutron removal reaction
- Pramod Asagodu (IIT-ISM, Dhanbad, 2021 – 2022) (Co-guide)
Topic: Quantum Optimization of Travelling Salesman Problem using Ising modelling and executing on Rydberg Atom Quantum Computer.
- Suraj Kumar Singh (SVNIT, Summer 2021)
Topic: Calibration of various detector systems installed in the magnetic spectrometer FRS at GSI.
- Debajyoti Das (IIT-ISM, Dhanbad, 2020 – 2021)
Topic: Investigation of the optical-potential parameters from elastic α -particle scattering measurements with ^{142}Nd and determination of form-factors and transition strengths in ^{142}Nd .
- Ritwika Ghosal (IIT-ISM, Dhanbad, 2020 – 2021)
Topic: Calibration of the Focal Plane of a Magnetic Spectrometer Using Inelastic Alpha Scattering and Study of Energy Straggling of the Alpha Beam within the Target Nucleus.
- Sagar Roy (IIT-ISM, Dhanbad, 2020 – 2021)
Topic: Search for the optical-potential parameters from the elastic reaction channel in the $^{172}\text{Yb} + \alpha$ -particle system.

Awards, Grants & Honours

- Indo-German (DAAD-DST) personnel exchange fellowship, Department of Science and Technology, Government of India, 2025.
- Best poster award received by my PhD student Ms. Kalpana Khokhar, DAE Symposium for Nuclear Physics 2025.
- Best proposal presentation for Superconducting Cyclotron given by my PhD student Ms. Shinjini Pal, Variable Energy Cyclotron Centre, Kolkata, 2023.
- Received a research grant (estimated amount around 33 lakhs) from Science and Engineering Research Board (SERB), Department of Science and Technology, Government of India, 2021.
- Received a start-up grant (estimated amount around 15 lakhs) from IIT-ISM Dhanbad, 2021.
- Selected as invited participant with full travel support to attend the 48th Arbeitstreffen Kernphysik in Schleching, Germany, 2017.
- Post-Doctoral fellowship: Saint Mary's University, Halifax, Canada; Justus-Liebig University, Giessen, Germany; GSI Helmholtzzentrum, Darmstadt, Germany, 2015 – 2020.
- Graduate Aptitude Test in Engineering (GATE) fellowship: Ministry of Human Resource Development, India 2010.
- Scored 97.15 Percentile in Joint Entrance Screening Test (JEST-2009).
- Junior Research Fellowship (JRF) and Lectureship eligibility: Joint Council of Scientific and Industrial Research-University Grant Commission, National Eligibility Test (CSIR-NET), India, 2009.

- Visiting Students' Research Programme fellowship: TIFR, Mumbai, India, 2009.
- IASc–INSA–NASI summer research fellowship: Indian Academy of Sciences, 2009 (not availed).
- Post-Graduate Merit Scholarship for the University Rank Holder: University Grant Commission (UGC), India, 2008 – 2010.
- University Medal in Physics: University of North Bengal, India, 2008.

Technical Skills

- Markup Languages: $\text{\LaTeX}$
- OS: Linux, Windows
- Programming Languages: C++, ROOT, GEANT4 (intermediate), FORTRAN (intermediate), Python (intermediate)
- Specialized Softwares:
 - **LISE++**: Spectrometer design and related ion-optics calculations
 - **MOCADI**: Monte Carlo simulation program for calculating the transport of beams through ion-optical systems.

Other activities

- Faculty In Charge for Departmental Stock Verification, Department of Physics, IIT (ISM) Dhanbad (May 2024 – present).
- Warden, Amber Hostel, IIT (ISM) Dhanbad (July 2024 – present).
- Engineering Physics B.Tech lab-in-charge, Department of Physics, IIT (ISM) Dhanbad (July 2022 – July 2025).
- Member of DFSC (a board which scrutinizes the faculty applications), Department of Physics, IIT (ISM) Dhanbad (January 2022 – December 2024).
- Member of DUGC (a board which oversees the undergraduate curricula), Department of Physics II, T (ISM) Dhanbad (August 2020 – present).
- Organizer of Bi-weekly Seminar/Webinar, Department of Physics, IIT (ISM) Dhanbad (August 2021 – August 2024).
- Faculty Advisor at ARKA Astronomy Club at IIT (ISM) Dhanbad (August 2021 – April 2024).
- Referee for peer-reviewed journals: Vacuum (Elsevier), Nuclear Physics A (Elsevier).
- I have given several tours of the experimental facility in GSI Helmholtzzentrum to the public and students.
- Active participation in the outreach program: One of the organizers in the Open House Day in GSI and FAIR, 7 May 2017.
- Active participation in the outreach program: One of the organizers in the Open House Day in KVI-CART, University of Groningen, the Netherlands (2011 - 2014).
- Placement representative of the Physics Association in IIT Roorkee during the session 2009 - 2010.
- Co-ordinator of the event "Spectrum" in the Physics Department during Tech-Fest "Cognizance" in IIT Roorkee (2009).