

Kangkan Goswami

Prime Minister's Research Fellow

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Education

- **Ph.D. in Experimental High-Energy Physics** 2022 – Present
 - Indian Institute of Technology Indore
- **M.Sc. in Physics** 2019 – 2021
 - Indian Institute of Technology Indore
- **B.Sc. in Physics (Hons)** 2016 – 2019
 - Keshav Mahavidyalaya, University of Delhi

Research Publications

1. Development of next-generation light-weight ternary Mg–Al–Li alloys for beampipe applications in particle accelerators
K. Singh, **K. Goswami**, and R. Sahoo
Preprint (2026) arXiv
2. Soret and Dufour effects in hot and dense QCD matter
K. Singh, **K. Goswami**, and R. Sahoo
Phys. Rev. D 113, 014040 (2026) DOI
3. Machine learning driven identification of heavy flavor decay leptons in proton-proton collisions at the Large Hadron Collider
R. Sahoo, **K. Goswami**, and S. Prasad
Preprint (2025) arXiv
4. Partial pressure and susceptibilities of charmed sector in the van der Waals hadron resonance gas model
K. Goswami, K.K. Pradhan, D. Sahu, and R. Sahoo
Phys. Rev. D 113, 014042 (2026) DOI
5. Shear viscosity and electrical conductivity of rotating quark matter in Nambu–Jona-Lasinio Model
A. Dwibedi, D. Sahu, J. Dey, **K. Goswami**, S. Ghosh, R. Sahoo
Preprint (2025) arXiv
6. Design and development of advanced Al–Ti–V alloys for beampipe applications in particle accelerators
K. Singh, **K. Goswami**, R. Sahoo, S. Samal
Phys. Rev. Accel. Beams 28, 043101 (2025) DOI

7. Can charm fluctuation be a better probe to study the QCD critical point?
K. Goswami, K. K. Pradhan, D. Sahu, J. Dey, R. Sahoo
Phys. Rev. D 111, 014029 (2025) [DOI](#)
8. Machine learning-based study of open-charm hadrons in proton-proton collisions at the Large Hadron Collider
K. Goswami, S. Prasad, N. Mallick, R. Sahoo, G. B. Mohanty
Phys. Rev. D 110, 034017 (2024) [DOI](#)
9. Anisotropy of magnetized quark matter
K. Goswami, D. Sahu, J. Dey, R. Sahoo, R. Stock
Phys. Rev. D 109, 074012 (2024) [DOI](#)
10. Diffusion and fluctuations of open charmed hadrons in an interacting hadronic medium
K. Goswami, K. K. Pradhan, D. Sahu, R. Sahoo
Phys. Rev. D 108, 074011 (2023) [DOI](#)
11. Understanding the QCD medium by the diffusion of charm quarks using a color string percolation model
K. Goswami, D. Sahu, R. Sahoo
Phys. Rev. D 107, 014003 (2023) [DOI](#)

Conference Proceedings

1. Diffusion Matrix Related to Charmed State and a New Probe for QCD Critical Point,
K. Goswami, K. K. Pradhan, D. Sahu, and R. Sahoo,
Springer Proc. Phys. 432, 831-834 (2026). [Link](#)
Contribution to: 26th DAE-BRNS High Energy Physics Symposium
2. Prompt and Non-prompt Production of Open and Hidden Charm Hadrons at the Large Hadron Collider Using Machine Learning,
S. Prasad, R. Sahoo, **K. Goswami**, N. Mallick, and G. B. Mohanty,
Springer Proc. Phys. 432, 827-830 (2026). [Link](#)
Contribution to: 26th DAE-BRNS High Energy Physics Symposium
3. A novel machine learning method to identify heavy-flavor decay leptons,
R. Sahoo, **K. Goswami**, and S. Prasad,
DAE Symp.Nucl.Phys. 69 (2023) 1207-1208. [Link](#)
Contribution to: 69th DAE Symposium on Nuclear Physics
4. Partial pressure of charmed hadrons in an interacting hadronic medium,
K. Goswami, K. K. Pradhan, D. Sahu, and R. Sahoo,
DAE Symp.Nucl.Phys. 69 (2023) 1119-1120. [Link](#)
Contribution to: 69th DAE Symposium on Nuclear Physics
5. Exploring the QCD medium by studying the diffusion of charm quarks,
K. Goswami, D. Sahu, and R. Sahoo,
J.Subatomic Part.Cosmol. 4 (2025) 100157. [Link](#)
Contribution to: ICPAQGP 2023
6. Possibility of charm diffusion in an interacting hadronic matter,
K. Goswami, K. K. Pradhan, D. Sahu, and R. Sahoo,
J.Subatomic Part.Cosmol. 4 (2025) 100151. [Link](#)

Contribution to: ATHIC 2025

7. Prompt and non-prompt production of charm hadrons in proton–proton collisions at the Large Hadron Collider using machine learning,
R. Sahoo, S. Prasad, N. Mallick, **K. Goswami**, and G. B. Mohanty,
J.Subatomic Part.Cosmol. 4 (2025) 100085.
Contribution to: ATHIC 2025 [Link](#)
8. Exploring the melting of heavy-flavor hadrons and diffusion of charm quarks,
K. Goswami, K. K. Pradhan, D. Sahu, and R. Sahoo,
PoS QNP2024 (2025) 115.
Contribution to: QNP 2024 [Link](#)
9. A study of open-charmed hadrons in p-p collisions using machine learning methods,
K. Goswami, S. Prasad, N. Mallick, R. Sahoo, and G. B. Mohanty,
DAE Symp.Nucl.Phys. 68 (2023) 945-946.
Contribution to: 68th DAE Symposium on Nuclear Physics [Link](#)
10. Drag and Diffusion Coefficients of Charm Quarks in a Hot QCD Medium,
K. Goswami, D. Sahu, and R. Sahoo,
Springer Proc.Phys. 304 (2024) 1055-1057.
Contribution to: 25th DAE-BRNS High Energy Physics Symposium [Link](#)
11. Dynamics of charmed hadron in an interacting hadron gas,
K. Goswami, K. K. Pradhan, D. Sahu, and R. Sahoo,
DAE Symp.Nucl.Phys. 67 (2024) 883-884.
Contribution to: 67th DAE Symposium on Nuclear Physics [Link](#)
12. Studying the diffusion of charm quarks in a deconfined medium using Color String Percolation approach,
K. Goswami, D. Sahu, and R. Sahoo,
DAE Symp.Nucl.Phys. 66 (2023) 936-937.
Contribution to: 66th DAE Symposium on Nuclear Physics [Link](#)

Talks and Poster Presentations

1. **Poster:** A novel machine learning method to identify heavy-flavor decay leptons
69th DAE-BRNS Symposium on Nuclear Physics, NIT Jalandhar, Punjab, India **(December 2025)**
2. **Poster:** Partial pressure of charmed hadrons in an interacting hadronic medium
69th DAE-BRNS Symposium on Nuclear Physics, NIT Jalandhar, Punjab, India **(December 2025)**
3. **Poster:** Diffusion of Charm Quarks and the Search of QCD Critical Point
Initial Stages 2025, Taipei, Taiwan **(September 2025)**
4. **Poster:** Diffusion coefficient matrix related to charm sector in an interacting hadronic medium and a possible probe for QCD critical point
Quark Matter 2025, Goethe University Frankfurt, Germany **(April 2025)**
5. **Talk:** Possibility of charm diffusion in an interacting hadronic matter
10th Asian Triangle Heavy-Ion Conference (ATHIC 2025), IISER Berhampur, Odisha, India **(January 2025)**

6. **Talk:** Diffusion matrix related to charmed state and a new probe for QCD critical point
XXVI DAE-BRNS High Energy Physics Symposium, Banaras Hindu University, Uttar Pradesh, India (December 2024)
7. **Talk:** A study of open-charmed hadrons in p-p collisions using machine learning methods
68th DAE-BRNS Symposium on Nuclear Physics, IIT Roorkee, Uttarakhand, India (December 2024)
8. **Talk:** Exploring the melting of heavy-flavor hadrons and diffusion of charm quarks
10th Quarks and Nuclear Physics, Universitat de Barcelona, Spain (July 2024)
9. **Poster:** Understanding the diffusion and melting of heavy flavor hadrons
21st SQM Conference, Université de Strasbourg / Palais de la Musique et des Congrès, Strasbourg, France (June 2024)
10. **Talk:** Dynamics of charmed hadrons in an interacting hadron gas
67th DAE-BRNS Symposium on Nuclear Physics, IIT Indore, Madhya Pradesh, India (December 2023)
11. **Poster:** Diffusion of charm quarks in a deconfined medium
4th Heavy Flavour Meet, IIT Goa, Goa, India (November 2023)
12. **Poster:** Exploring the QCD medium by studying the diffusion of charm quarks
International Conference on Physics and Astrophysics of Quark Gluon Plasma, Puri, Odisha, India (February 2023)
13. **Poster:** Studying the diffusion of charm quarks in a deconfined medium using Color String Percolation approach
66th DAE-BRNS Symposium on Nuclear Physics, Cotton University, Guwahati, Assam, India (December 2022)
14. **Poster:** Drag and diffusion coefficients of charm quarks in a hot QCD medium
XXV DAE-BRNS High Energy Physics Symposium, IISER Mohali, Mohali, India (December 2022)

Achievements

- Prime Minister's Research Fellow 2022 – Present
- Graduate Aptitude Test in Engineering (GATE) — AIR:27 2022
- CSIR-UGC National Eligibility Test (NET) — AIR:134 2021
- Joint Entrance Screening Test (JEST) — AIR:296 (2019), 249 (2021) 2019, 2021
- Joint Admission Test for M.Sc. (JAM) — AIR:304 2019

Skills

- **Languages:** English, Hindi, Assamese
- **Programming:** CERN-ROOT, ALICE O2, Python, C++
- **Data Science:** Machine Learning, Deep Learning