Dr Pradip Kumar Chattopadhyay

Curriculum Vitae

About me

Associate Professor, IUCAA Centre for Astronomy Research and Development (ICARD), Department of Physics, Cooch Behar Panchanan Barma University.

Personal

Astrophysicist

Areas of specialization

General Relativity • Relativistic Astrophysics • Dark Matter and Dark Energy • X-Ray Astronomy • Gravitational Wave (Theory and Observation)

Teaching Interests

General Relativity & Astrophysics, Electronics, Quantum Mechanics, Atomic Physics.

Software Skills

Fortran, Mathematica, Matlab, Windows & Linux

Languages

Bengali (Mother Tongue), English, Hindi

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Short Resumé

18.03.2019–present — **Associate Professsor**
IUCAA Centre for Astronomy Research and Development (ICARD), Department of Physics · Cooch Behar Panchanan Barma University, Cooch Behar, West Bengal, Pin-736101, India

01.11.2017–17.03.2019 — **Assistant Professor**
Department of Physics · Cooch Behar Panchanan Barma University, Cooch Behar, West Bengal, Pin-736101, India

18.03.2005–31.10.2017 — **Assistant Professor**
Department of Physics · Alipurduar College, Alipurduar, West Bengal, Pin-736121, India

Degrees

2014 — **Ph.D. (Relativistic Astrophysics)**
Department of Physics · The University of North Bengal

1999 — **M.Sc. (Physics)**
Field of specialization: Radio-Physics and Electronics · The University of Burdwan

1997 — **B.Sc. in Physics (Honours)**
Ramananda College ·

1993 — **Higher Secondary Examination**
West Bengal Council of Higher Secondary Education ·

1991 — **Secondary Examination**
West Bengal Board of Secondary Education ·

Professional Recognition

2024 — **Associate Member**
Square Kilometre Array Observatory (SKAO)-Pulsar group ·

2024 — **Life Member**
Astronomical Society of India · (L2525)

Aug, 2023–July, 2026 — **Visiting Associate**
Inter University Centre for Astronomy and Astrophysics (IUCAA) ·

05.08.2015–31.10.2017 — **Joint Coordinator of Physics (PG Courses)**
Cooch Behar Panchanan Barma University ·

2014–2015 — **Visiting Scientist**
Physical Research Laboratory, Ahmedabad ·

Professional Recognition

2011 | **Life Member**
Life member Indian Association for General Relativity and Gravitation (IAGRG) ·

Fellowship Received

June, 2000 CSIR NET Fellowship, Council of Scientific and Industrial Research, Govt. of India.

Other Qualification

2000 Graduate Aptitude Test in Engineering (GATE), Department of Higher Education, Ministry of Education (MoE), Govt. of India.

Research Activities

Projects & Grants

2010–2011 Principal investigator of Minor Research Project sponsored by University Grants Commission, Govt. of India. Status: Project Completed (PSW-089/10-11).

2011, 2012, 2014 International Astronomical Union (IAU) grants to attend international conferences abroad.

2014–2015 Principal investigator of Minor Research Project sponsored by University Grants Commission, Govt. of India. Status: Project Completed (PSW-109/2014-2015).

2017, 2018 International Astronomical Union (IAU) grants to attend international conferences abroad.

2018 Department of Science and Technology (DST), Govt. of India, grants to attend international conferences abroad.

Workshops

2009 & 2011 Attended two workshops on Analysis of Archival data sponsored jointly by IUCAA and the Department of Physics, The University of North Bengal.

Public lectures

2024 Astronomy and Astrophysics: Basic Introduction: at Sadar Government High School, Cooch Behar, West Bengal

2025 The Man Behind the Boson: A Deep Dive into the Life and Work of Satyendra Nath Bose: at Vivekananda Vidyapeeth, Cooch Behar, West Bengal

2025 National Seminar On The Role of Science in Shaping Our Future-jointly organized by Depts. of Chemistry-Mathematics-Physics, I.Q.A.C., Alipurduar University

Conference Presentation

19–21 Jan, 2011	Presented one paper in the meeting of IAGRG held at Harish Chandra Research Institute, Allahabad, India.
26–29 July, 2011	Presented one paper in the Asian Pacific Regional IAU Meeting (APRIM 2011) held in Chiang Mai, Thailand.
20–31 Aug, 2012	Presented one paper in the IAU General Assembly (IAUGA2012) held in Beijing, China.
18–22 Aug, 2014	Presented one paper in the Asian Pacific Regional IAU Meeting (APRIM 2014) held in Daejeon, South Korea.
10–15 July, 2016	Presented two papers in triennial meeting of the International Society of General Relativity and Gravitation (GR21) held in Columbia University, New York, USA.
3–7 July, 2017	Presented one paper in the Asian Pacific Regional IAU meeting (APRIM 2017) held in Taipei, Taiwan.
20–31 Aug, 2018	Presented two papers in the IAU General Assembly meeting (IAU-GA 2018) held in Vienna, Austria.
15–20 Dec, 2019	Presented one paper in the 30th Texas Symposium on Relativistic Astrophysics (TEXAS 2019) held in University of Portsmouth, Portsmouth, UK.
31 July–5 Aug, 2020	Presented one paper in the 40th International Conference (online) on High Energy Physics (ICHP 2020) held in Prague, Czech Republic.
07–11 July, 2023	Presented one paper in the Asian Pacific Regional IAU Meeting (APRIM 2023) held in Koriyama City, Fukushima, Japan.
31 Jan–04 Feb, 2024	Presented one paper in the 42 Annual Meeting of Astronomical Society of India (ASI2024) jointly organized by IISc, ISRO and JNP at IISc Bengaluru.
29–30 April, 2025	Presented one paper in the Conference on Advances in Astrophysics and Cosmology-jointly organized by Aliah University & Calcutta University.
9–11 June, 2025	Presented one paper in the International Meeting on Relativistic Astrophysics a Cosmology: Emerging Areas jointly organised by: ICARD, University of North Be gal(NBU); ICARD, Gauhati University (GU); ICARD, Cooch Behar Panchanan Barma U versity (CBPBU); ICARD, Malda College at University of North Bengal.
7–10 July, 2025	Presented one paper in the XXIV International Scientific Conference "Physical Interpret tions of Relativity Theory" (PIRT-2025) held at Bauman Moscow State Technical Universi Moscow, Russia.

Ph.D. Supervision

- **Ph.D. Awarded:** (i) Anirban Saha (Feb, 2024), (ii) Koushik Ballav Goswami (Sep, 2024)

- **Registered Research Scholars:**
  - Bishnu Das (CSIR Fellow)
  - Abdul Hakim (Swami Vivekananda Merit-Cum-Means Scholarship Fellow)
  - Debadri Bhattacharjee (DST INSPIRE Fellow)
  - Rohit Roy (Part Time Research Fellow)
  - Samir Sarkar (Part Time Research Fellow)
- **Scholars in My Research Group:**
  - Anusmita Nag (Enrolled)
  - Ishita De (Part Time Research Fellow, Enrolled)
  - Sourav Biswas
  - Sanchita Barman (Part Time Research Fellow, Enrolled)

Publications

- K. B. Goswami, A. Saha, D. Bhattacharjee & **P. K. Chattopadhyay (CA)**, Exploring density dependent B as a suitable parameter in higher dimensional approach with a non-linear equation of state (Communicated to Journal of High Energy Astrophysics).
- D. Bhattacharjee & **P. K. Chattopadhyay (CA)**, Exploring gravastar-like structures with strongly interacting quark matter shell in the framework of $f(Q)$ gravity under conformal symmetry, [arXiv:2505.17583[gr-qc]].
- D. Bhattacharjee & **P. K. Chattopadhyay (CA)**, Estimating the mass of the thin shell of gravastars in generalised cylindrically symmetric space-time within the framework of Rastall theory of gravity, [arXiv:2505.08379[gr-qc]].
- R. Roy, D. Bhattacharjee & **P. K. Chattopadhyay (CA)**, Influence of density-dependent bag function $B(n)$ on strange stars for non-zero strange quark mass ($m_s \neq 0$) in $f(R,T)$ gravity consistent with observational validation, [arXiv:2505.08379[gr-qc]].

- S. Biswas, D. Bhattacharjee & **P. K. Chattopadhyay (CA)**, Maximum mass of singularity-free anisotropic compact stars in Rastall theory of gravity [arXiv:2505.21583[gr-qc]].
- A. Saha, K. B. Goswami & **P. K. Chattopadhyay (CA)**, Density dependent B- parameter model of relativistic strange stars in the framework of $f(R,T)$ gravity (Communicated to Physics of the Dark Universe).
- S. Sarkar, D. Bhattacharjee & **P. K. Chattopadhyay (CA)**, Strange Star in Durgapal IV metric in presence of pressure anisotropy and their Maximum Mass [DOI:10.1142/S0219887825502421].
- A. Hakim, K. B. Goswami & **P. K. Chattopadhyay (CA)**, Stellar model in Tolman VII space-time with non-zero Strange quark mass ($m_s \neq 0$) and some observational aspects [https://doi.org/10.1142/S0219887825502664]].
- **P. K. Chattopadhyay (CA)** & D. Bhattacharjee, The role of finite value of strange quark mass ($m_s \neq 0$) and baryon number density (n) on the stability and maximum mass of strange stars, *Physics of the Dark Universe* **48**, 101927 (2025), [https://doi.org/10.1016/j.dark.2025.101927].
- D. Bhattacharjee, K. B. Goswami & **P. K. Chattopadhyay (CA)**, Interacting quark matter and $f(Q)$ gravity: A new paradigm in exploring the properties of quark stars, [arXiv:2412.00693[gr-qc]].
- D. Bhattacharjee & **P. K. Chattopadhyay (CA)**, Charged analogues of singularity-free anisotropic compact stars under linear $f(Q)$-action, *Chinese Journal of Physics* **94**, 650 (2025), [doi.org/10.1016/j.cjph.2025.02.008].
- A. Saha, K. B. Goswami & **P. K. Chattopadhyay (CA)**, Maximum mass and radius of higher dimensional anisotropic strange quark star in presence of charge, *International Journal of Geometric Methods in Modern Physics*, [DOI:10.1142/S0219887825501075].
- A. Nag, D. Bhattacharjee, K. B. Goswami, & **P. K. Chattopadhyay (CA)**, Effect of baryon number density (n) on the maximum mass and stability of strange stars, *Journal of High Energy Astrophysics* **45**, 231-240 (2025) [doi.org/10.1016/j.jheap.2024.12.005].
- D. Bhattacharjee & **P. K. Chattopadhyay (CA)**, Impact of non-zero strange quark mass ($m_s \neq 0$) on the properties of strange stars in $f(R,T)$ gravity admitting observational results, *Physica Scripta* **100**, 055016 (2025) [doi.org/10.1088/1402-4896/adcaf4].
- R. Roy, K. B. Goswami, D. Bhattacharjee & **P. K. Chattopadhyay (CA)**, Hybrid star with finite strange quark mass: favouring some recent observational results, [arXiv:2410.19029[gr-qc]].
- R. Roy, K. B. Goswami, **P. K. Chattopadhyay (CA)** & A. Saha, Effect of QCD coupling parameter (α_c) and nonzero strange quark mass ($m_s \neq 0$) on stellar structure admitting observational results, [arXiv:2411.02155[gr-qc]].
- D. Bhattacharjee & **P. K. Chattopadhyay (CA)**, Singularity-free dark energy star in Rastall gravity, *Chinese Journal of Physics* **93**, 183–201 (2025) doi.org/10.1016/j.cjph.2024.11.035.
- K. B. Goswami, D. Bhattacharjee, **P. K. Chattopadhyay (CA)** & A. Saha, Self bound compact stars in $f(R,T)$ gravity admitting CFL equation of state in presence of non-minimal QCD correction factor, *Physics of the Dark Universe* **47**, 101752 (2025), doi.org/10.1016/j.dark.2024.101752.
- D. Bhattacharjee & **P. K. Chattopadhyay (CA)**, Charged gravastar model in Rastall theory of gravity, *Journal of High Energy Astrophysics* **43**, 248-257 (2024), doi.org/10.1142/S0219887824501792.
- R. Roy, K. B. Goswami, A. Saha & **P. K. Chattopadhyay (CA)**, Relativistic stellar model with non-zero strange quark mass and Mak-Harko density profile, *European Physical Journal C* **84**, 570 (2024), doi.org/10.1140/epjc/s10052-024-12947-8.
- A. Hakim, K. B. Goswami & **P. K. Chattopadhyay (CA)**, Strange star model in higher dimensions ($D \geq 4$) with density dependent B in pseudo-spheroidal geometry, *International Journal of Geometric Methods in Modern Physics* **22**, 2450282 (2025), doi.org/10.1142/S0219887824501792.
- B. Das, K. B. Goswami & **P. K. Chattopadhyay (CA)**, A comparative study on the maximum mass and radius of compact stars from Heintzmann geometry and the TOV approach, *International Journal of Geometric Methods in Modern Physics*, doi.org/10.1142/S0219887824501792.
- S. Sarkar, D. Bhattacharjee, K. B. Goswami & **P. K. Chattopadhyay (CA)**, New class of anisotropic charged strange quark star in Durgapal IV metric and its maximum mass, *Astro-Physics & Space Science* **369**, 19 (2024), doi.org/10.1007/s10509-024-04283-w.
- D. Bhattacharjee & **P. K. Chattopadhyay (CA)**, Maximum mass of an anisotropic compact object admitting the modified Chaplygin equation of state in Buchdahl-I metric, *European Physical Journal C* **84**, 77 (2024), doi.org/10.1140/epjc/s10052-024-12449-7.
- D. Bhattacharjee, **P. K. Chattopadhyay (CA)** & B. C. Paul, New gravastar model in generalized cylindrically symmetric space-time and prediction of mass limit, *Physics of the Dark Universe* **43**, 101411 (2024), doi.org/10.1016/j.dark.2023.101411.

- B. Das, K. B. Goswami, A. Saha & **P. K. Chattopadhyay (CA)**, Anisotropic strange stars and its maximum mass in Finch-Skea geometry in dimensions $D \geq 4$, *Physica Scripta* **98**, 125004 (2023), doi.org/10.1088/1402-4896/ad06f6.
- K. B. Goswami, A. Saha, **P. K. Chattopadhyay (CA)** & S. Karmakar, New mass limit of a strange star admitting a colour flavor locked equation of state, *European Physical Journal C* **83**, 1038 (2023), doi.org/10.1140/epjc/s10052-023-12207-1.
- A. Saha, K. B. Goswami, R. Roy & **P. K. Chattopadhyay (CA)**, Maximum mass of charged strange quark star in presence of Strange Quark Mass (m_s), *Physica Scripta* **98**, 105012 (2023), doi.org/10.1088/1402-4896/acf1d7.
- D. Bhattacharjee & **P. K. Chattopadhyay (CA)**, Stable charged gravastar model in cylindrically symmetric space-time, *Physica Scripta* **98**, 085013 (2023), doi.org/10.1088/1402-4896/ace483.
- A. Hakim, K. B. Goswami & **P. K. Chattopadhyay (CA)**, Strange Quark Mass (m_s) dependent model of anisotropic Strange Quark Star, *Chinese Physics C* **47**(9), 095103 (2023), doi.org/10.1088/1674-1137/acddd6.
- B. Das, K. B. Goswami, A. Saha & **P. K. Chattopadhyay (CA)**, Anisotropic Strange Quark Star (SQS) in Finch-Skea geometry and its maximum mass for non-zero strange quark mass $(ms \neq 0)$, *Chinese Physics C* **47**(5), 055101 (2023), doi.org/10.1088/1674-1137/acb90f.
- A. Saha, K. B. Goswami, B. Das & **P. K. Chattopadhyay (CA)**, Maximum mass of anisotropic charged strange quark stars in a higher dimensional approach $(D \geq 4)$, *Chinese Physics C* **47**(1), 015105 (2023), doi.org/10.1088/1674-1137/ac9aaa.
- B. Das, K. B. Goswami, **P. K. Chattopadhyay (CA)** & R. Sharma, Core-envelop model of an anisotropic strange star with density-dependent Bag (B) parameter, *Indian Journal of Physics* **97**(8), 2273-2287 (2023), doi.org/10.1007/s12648-023-02586-2.
- A. Saha, K. B. Goswami, B. Das & **P. K. Chattopadhyay (CA)**, Effect of charge on the maximum mass of anisotropic strange quark star, *PRAMANA Journal of Physics* **97**, 10 (2022), doi.org/10.1007/s12043-022-02477-x.
- K. B. Goswami, R. Roy, A. Saha & **P. K. Chattopadhyay (CA)**, Strange Quark Star (SQS) in Tolman IV potential with density dependent B- parameter and charge, *European Physical Journal C* **82**, 1042 (2022), doi.org/10.1140/epjc/s10052-022-11009-1.
- K. B. Goswami, A. Saha & **P. K. Chattopadhyay (CA)**, Dependence of maximum mass of strange star on finite strange quark mass $(ms \neq 0)$, *Classical & Quantum Gravity* **39**, 175006 (2022), doi.org/10.1088/1361-6382/ac7f78.
- K. B. Goswami, A. Saha & **P. K. Chattopadhyay (CA)**, Anisotropic compact star in modified Vaidya-Tikekar model admitting new solutions and maximum mass, *PRAMANA Journal of Physics*, **96** 127 (2022), doi.org/10.1007/s12043-022-02355-6.
- A. Saha, K. B. Goswami & **P. K. Chattopadhyay (CA)**, Anisotropic star in Vaidya-Tikekar model admitting MIT bag model equation of state in pseudo-spheroidal geometry, *Astro-Physics & Space Science*, **366** 98 (2021), doi.org/10.1007/s10509-021-04005-6.
- K. B. Goswami, A. Saha & **P. K. Chattopadhyay (CA)**, New class of relativistic anisotropic strange star in Vaidya-Tikekar model, *Astro-Physics & Space Science* **365**, 141 (2020), doi.org/10.1007/s10509-020-03856-9.
- R. K. Dey, S. Dam, S. Ray, A. Basak & **P. K. Chattopadhyay**, Determination of the mass and energy of primary cosmic rays above 100 TeV, *Indian J. Phys* **92**(11), 1357-1365 (2018), doi.org/10.1007/s1264-018-1241-1.
- **P. K. Chattopadhyay** & B. C. Paul, Density dependent B parameter of relativistic strange stars with anisotropy, *Astro-Physics & Space Science* **361**(4), 01-11 (2016), doi.org/10.1007/s10509-016-2733-0.
- B. C. Paul, **P. K. Chattopadhyay** & S. Karmakar, Relativistic Anisotropic Star and its Maximum Mass in Higher Dimensions, *Astro-Physics & Space Science* **365**(2), 327-337 (2015), doi.org/10.1007/s10509-014-2221-3.
- **P. K. Chattopadhyay**, R. Deb & B. C. Paul, Relativistic Charged Compact Stars with Spheroidal Space-Time, *International Journal of Theoretical Physics* **53**(5), 1666-1684 (2013), doi.org/10.1007/s10773-013-1965-9.
- **P. K. Chattopadhyay**, R. Deb & B. C. Paul, Relativistic Solution for a class of static compact charged star in Pseudo-Spheroidal Space-time, *International Journal of Modern Physics D* **21**(8), 1250071 (2012), doi.org/10.1142/S021827181250071X.
- B. C. Paul, **P. K. Chattopadhyay**, S. Karmakar & R. Tikekar, Relativistic Strange Stars with anisotropy, *Modern Physics Letters A* **26**(8), 1-13 (2011), doi.org/10.1142/S0217732311034943.
- **P. K. Chattopadhyay** & B. C. Paul, Relativistic star solutions in higher dimensional Pseudo-Spheroidal space-time, *PRAMANA Journal of Physics* **74**(4), 513-523 (2010), doi.org/10.1007/s12043-010-0046-3.

❖ Walk-off compensated uv generation in lithium tetraborate crystals, U. Chatterjee, S. Gangopadhyay, C. Ghosh, **P. K. Chattopadhyay** & G. C. Bhar, Japanese journal of applied physics **43**(7R), 4190 (2004).

CA → Corresponding author.

Book Chapters

❖ **P. K. Chattopadhyay** & B. C. Paul, Relativistic strange stars with anisotropy and B-parameter in pseudo spheroidal space-time, Proceedings of IAUS 291 ISBN 978-1-107 03380-1, Pages 362-364, (Cambridge University Press), 2012.

❖ B. C. Paul & **P. K. Chattopadhyay**, Relativistic anisotropic strange stars in pseudo spheroidal space- time, NARIT Conference Series Vol. 2012 (ISBN 978-616-12-02859) Pages 258-264, 2011.

Other Notable Activities:

❖ Reviewer of Journal: International Journal of Modern Physics A (World Scientific)