

Dr. B. C. Chanyal

Department of Physics

College of Basic Sciences and Humanities (CBSH)

G. B. Pant University of Agriculture and Technology,

Pantnagar-263145



DESIGNATION:	Assistant Professor
QUALIFICATION:	B.Sc. (Physics), M.Sc. (Physics), Ph.D. (Physics)
SPECIALISATION:	Theoretical Physics (High Energy Particle Physics, Mathematical Physics, Quantum Theory, Group Theory, Quantum Electrodynamics, Quantum Chromodynamics, etc.)
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CONTACT NO.:	+91-9412969280 (M)

Academic Background and Qualifications:

- **Education Profile**

- ✓ Ph. D. (Physics) from Kumaun University, SSJ Campus Almora, Uttarakhand, India.
- ✓ M. Sc. (Physics) from Kumaun University, SSJ Campus Almora, Uttarakhand, India.
- ✓ B. Sc. (Physics, Maths & Computer Science) from Kumaun University, SSJ Campus Almora, Uttarakhand, India.

- **Academic Qualification**

- ✓ CSIR-NET (National Eligibility Test),
- ✓ JEST (Joint Entrance Screening Test),
- ✓ USET (Uttarakhand State Eligibility Test)

- **Teaching Experience**

More than Sixteen years teaching experience in U.G. and P.G. levels.

- ✓ From September 2008 to July 2015 as Assistant Professor Physics (Contractual) at Kumaun University Nainital (DSB Campus Nainital & SSJ Campus Almora) Uttarakhand, India.
- ✓ From August 2015 to December 2015 as Assistant Professor & Incharge Head Physics at Doon University Dehradun, India.
- ✓ From January 2016 onwards as Assistant Professor Physics at G.B. Pant University of Agriculture & Technology, Pantnagar, India.

- **Research Areas/ Areas of Interest**

Theoretical Physics (High Energy Particle Physics, Mathematical Physics, Quantum Theory, Group Theory, Quantum Electrodynamics, Quantum Chromodynamics, etc.)

- **Research Papers Publication**

A. Sole Author Publications

1. **B.C. Chanyal**, Dirac–Proca–Maxwell equivalence of dyonic matter with quantum corrections for the quaternionic spinor fields, Chinese Journal of Physics 88, 524 (2024)
2. **B.C. Chanyal**, On the quaternion transformation and field equations in curved space-time, Proceedings of the National Academy of Sciences, India Section A: Physical Sciences, 93, 185 (2023)
3. **B.C. Chanyal**, On octonion quark confinement condition, Modern Physics Letters A 36 (37), 2150264 (2021)
4. **B.C. Chanyal**, Quaternionic approach on the Dirac Maxwell, Bernoulli and Navier Stokes equations for dyonic fluid plasma, International Journal of Modern Physics A34, 1950202 (2019)
5. **B.C. Chanyal**, Linearised Electromagnetic and Gravito-Heavisidian chirality in split octonion space-time, International Journal of Geometric Methods in Modern Physics 15,1850109 (2018)
6. **B.C. Chanyal**, A new development in quantum field equations of dyons, Canadian Journal of Physics 96,1192 (2018)
7. **B.C. Chanyal**, Generalized Klein-Gordon field equations with octonion space-time (OST) algebra, Chinese Journal of Physics 55,432 (2017)

8. **B.C. Chanyal**, A relativistic quantum theory of dyons wave propagation, *Canadian Journal of Physics* 95,1200 (2017)
9. **B.C. Chanyal**, A Complete Set of Conservation Laws of Dyons with the Clifford-Octonion Algebra, *Ukrainian Journal of Physics* 62,539 (2017)
10. **B.C. Chanyal**, Split Octonion Reformulation for Electromagnetic Chiral Media of Massive Dyons, *Communications in Theoretical Physics* 68,701 (2017)
11. **B.C. Chanyal**, Dual octonion electrodynamics with the massive field of dyons, *Journal of Math. Physics* 57,033503 (2016)
12. **B.C. Chanyal**, Generalized Gravitational Field Equations with split octonions, *Math. Sci. International Research Journal* 5,100 (2016)
13. **B.C. Chanyal**, Classical geometrodynamics with Zorn vector-matrix algebra for gravitodyons, *Reports on Mathematical Physics* 76 (1), 1-20 (2015)
14. **B.C. Chanyal**, Split octonion reformulation of generalized linear gravitational field equations, *Journal of Mathematical Physics* 56 (5), 051702 (2015)
15. **B.C. Chanyal**, Octonion generalization of Pauli and Dirac matrices, *International Journal of Geometric Methods in Modern Physics* 12 (01), 1550007 (2015)
16. **B.C. Chanyal**, Octonionic matrix representation and electromagnetism, *Journal of the Korean Physical Society* 65 (11), 1715-1728 (2014)
17. **B.C. Chanyal**, Sedenion unified theory of gravi-electromagnetism, *Indian Journal of Physics* 88 (11), 1197-1205 (2014)
18. **B.C. Chanyal**, Octonion symmetric Dirac-Maxwell equations, *Turkish Journal of Physics* 38 (2), 174-186 (2014)
19. **B.C. Chanyal**, Role of octonion in gravity and dark matter, Clifford analysis, Clifford algebras and their Applications 3 (2), 121-129 (2014)
20. **B.C. Chanyal**, Octonion massive electrodynamics, *General Relativity and Gravitation* 46 (1), 1646 (2014)

B. First-Author or Co-Author Publications

1. A. K. Rathore and **B. C. Chanyal**, A Representation of an Octonionic Interaction of Color Quarks with the Application of Feynman Diagram. *American Journal of Modern Physics*, 14(2), 44 (2025)
2. S Marques-Bonham, R Matzner, **B.C. Chanyal**, An extension of quaternionic metrics to octonions in a non-Riemannian spacetime: Including Yang–Mills-like fields within a

division octonion algebra, *International Journal of Geometric Methods in Modern Physics* 21(14), 2450236 (2024)

3. B.C.S. Chauhan, P.K. Joshi, **B.C. Chanyal**, Z_2 Graded Lie Algebra of Quaternions and Super-conformal Algebra in $D=4$ dimensions, *Russian Journal of Mathematical Physics* 31, 162 (2024)
4. A.K. Rathore, V.K. Sharma, **B.C. Chanyal**, Complex octonion-based $SU(3)$ flavor symmetry with the concept of octet representation for quark composite particles, *The European Physical Journal Plus* 139 (3), 210 (2024)
5. G. Pathak and **B. C. Chanyal**, A possibility of Klein paradox in quaternionic $(3+1)$ frame, *International Journal of Geometric Methods in Modern Physics* 21 (05), 2450105 (2024)
6. S. Bhatt, **B.C. Chanyal**, Generalized quaternionic free rotational Dirac equation and spinor solutions in the electromagnetic field, *International Journal of Geometric Methods in Modern Physics* 19 (07), 2250103 (2022)
7. S. Marques-Bonham, **B.C. Chanyal**, R. Matzner, Yang–Mills-like field theories built on division quaternion and octonion algebras, *The European Physical Journal Plus* 135 (7), 1-34(2020)
8. **B.C. Chanyal** and Sandhya, A comparative study of quaternionic rotational Dirac equation and its interpretation, *International Journal of Geometric Methods in Modern Physics* 17, No. 02, 2050018 (2020)
9. **B.C. Chanyal** and M. Pathak, Quaternionic Approach to Dual Magneto-hydrodynamics of Dyonic cold plasma, *Advanced High Energy Physics* 2018, 1-13 (2018)
10. **B.C. Chanyal**, S. K. Chanyal, Dual number coefficient octonion algebra, field equations and conservation laws, *Analysis Math. Physics* 7,319 (2017)
11. **B.C. Chanyal**, S. K. Chanyal, Ö. Bektaş, S. Yüce, A new approach on electromagnetism with dual number coefficient octonion algebra, *International Journal of Geometric Methods in Modern Physics* 13, 1630013 (2016)
12. **B.C. Chanyal**, S K Chanyal, V. Singh, AS Rawat, Proca-Maxwell Equations for Dyons with Quaternion, *Applied Mathematics and Physics* 4,9 (2016)
13. **B.C. Chanyal**, VK Sharma, OPS Negi, Octonionic gravi-electromagnetism and dark matter, *International Journal of Theoretical Physics* 54 (10), 3516-3532 (2015)
14. **B.C. Chanyal**, PS Bisht, OPS Negi, Octonion electrodynamics in isotropic and chiral medium, *International Journal of Modern Physics A* 29 (02), 1450008 (2014)
15. **B.C. Chanyal**, PS Bisht, OPS Negi, Octonion and conservation laws for dyons, *International Journal of Modern Physics A* 28 (26), 1350125 (2013)
16. **B.C. Chanyal**, PS Bisht, OPS Negi, Octonionic non-abelian gauge theory, *International Journal of Theoretical Physics* 52 (10), 3522-3533 (2013)

17. **B.C. Chanyal**, PS Bisht, OPS Negi, Octonion model of dark matter, *Journal of Theoretical Physics* 2, 23 (2013)
 18. **B.C. Chanyal**, PS Bisht, OPS Negi, Octonion representation of the superstring theory, *International Journal of Engineering Research and Technology* 2, 1459 (2013)
 19. **B.C. Chanyal**, PS Bisht, T Li, OPS Negi, Octonion quantum chromodynamics, *International Journal of Theoretical Physics* 51 (11), 3410-3422 (2012)
 20. **B.C. Chanyal**, PS Bisht, OPS Negi, Generalized split-octonion electrodynamics, *International Journal of Theoretical Physics* 50 (6), 1919-1926 (2011)
 21. **B.C. Chanyal**, PS Bisht, OPS Negi, Generalized octonion electrodynamics, *International Journal of Theoretical Physics* 49 (6), 1333-1343 (2010)
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C. Online Preprint Publications

1. **B.C. Chanyal**, LS Karki, PK Joshi, BCS Chauhan, Exploring quaternion framework for subluminal to superluminal space transformations in particle dynamics, ArXiv preprint (arXiv:2501.16408) 2025.
 2. **B.C. Chanyal**, S Murari, On the existence of quaternion-handedness for the spinor solutions of the Dirac and Majorana neutrinos, ArXiv preprint (arXiv:2410.05337) 2024.
 3. **B.C. Chanyal**, "On the quaternion transformation and field equations in curved space-time" ArXiv preprint (arXiv:2108.05725) 2021.
 4. **B.C. Chanyal**, PS Bisht, OPS Negi, "Octonion in Superstring Theory" viXra preprint (viXra:1302.0070) 2013.
 5. **B.C. Chanyal**, "Split Octonion Electrodynamics and Energy-Momentum Conservation Laws for Dyons" viXra preprint (viXra:1302.0001) 2013.
 6. **B.C. Chanyal**, "Octonion Electrodynamics and Physics Beyond Standard Model" viXra preprint (viXra:1301.0101) 2013.
 7. **B.C. Chanyal**, "Octonion Dark Matter" viXra preprint (viXra:1302.0013) 2013.
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- **Books/ Book Chapters**

Book Published

1. **B.C. Chanyal**, O P S Negi, An Introduction to Octonion Electrodynamics: The Theory with Magnetic Monopoles, LAP Lambert Academic Publishing, Germany 2015. ISBN: 978-3-659-68051-9

A. Book Chapters Published

1. A.K. Rathore and **B. C. Chanyal**, Eightfold way for meson and baryon and its octonion representation, In *Interdisciplinary illumination: Unveiling Uncharted Research Path*, Notion Press Chennai. ISBN: 979-889498627-2
 2. **B.C. Chanyal**, *Elements of Quantum mechanics and Relativity (Four Chapters)*, Uttarakhand Open University, Haldwani, 2019, Under Process
 3. **B.C. Chanyal**, *Energy-Momentum Conservation Laws for Dual-Octonion Electromagnetism (Chapter-79)*, McGraw Hill Education (India) Private Limited (2017) p214. ISBN: 978-9352606504
 4. VK Sharma, **B.C. Chanyal**, O P S Negi, *Octonionic Generalization of Dark Matter in Gravito-Electromagnetic Space (Chapter-78)*, McGraw Hill Education (India) Private Limited (2017) p211. ISBN: 978-9352606504
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• Selected Research Publications

1. **B.C. Chanyal**, Dirac–Proca–Maxwell equivalence of dyonic matter with quantum corrections for the quaternionic spinor fields, *Chinese Journal of Physics* 88, 524 (2024)
2. **BC Chanyal**, On the quaternion transformation and field equations in curved space-time, *Proceedings of the National Academy of Sciences, India Section A: Physical Sciences* (2022) Online Published. DOI: 10.1007/s40010-022-00791-y.
3. S Bhatt, **BC Chanyal**, Generalized quaternionic free rotational Dirac equation and spinor solutions in the electromagnetic field, *International Journal of Geometric Methods in Modern Physics* 19 (07), 2250103 (2022)
4. **BC Chanyal**, On octonion quark confinement condition, *Modern Physics Letters A* 36 (37), 2150264 (2021)
5. S Marques-Bonham, **BC Chanyal**, R Matzner, Yang–Mills-like field theories built on division quaternion and octonion algebras, *The European Physical Journal Plus* 135 (7), 1-34 (2020)
6. **BC Chanyal**, K Sandhya, A comparative study of quaternionic rotational Dirac equation and its interpretation, *International Journal of Geometric Methods in Modern Physics* 17 (02), 2050018 (2020)
7. **BC Chanyal**, Quaternionic approach on the Dirac–Maxwell, Bernoulli and Navier–Stokes equations for dyonic fluid plasma, *International Journal of Modern Physics A* 34 (31), 1950202 (2019)
8. **BC Chanyal**, M Pathak, Quaternionic approach to dual Magneto-hydrodynamics of dyonic cold plasma, *Advances in High Energy Physics* 2018 (Article ID 7843730), 13 (2018)

9. **BC Chanyal**, A new development in quantum field equations of dyons, Canadian Journal of Physics 96 (11), 1192-1200 (2018)
 10. **BC Chanyal**, Linearised Electromagnetic and Gravito-Heavisidian chirality in split octonion space-time, International Journal of Geometric Methods in Modern Physics 15, 1850109 (p1-17) (2018).
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- **Awards & Recognition**

1. **Indo-Asian Best Research International Award-2020**” in Physics by RMPES Institute of Higher Education & Research, India.
 2. **“Young Scientist Award-2021”** in the International Scientist Awards on Engineering, Science and Medicine by VDGGOOD Professional Association, India.
 3. **“Devbhoomi Education Excellence Award 2025 in Higher Education”**, by MIET Kumaon and Amar Ujala, Nainital (Uttarakhand), India.
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- **Delivered Lecture as Resource Person/ Expert/Invited Speaker:**

1. Topic: “Particle Physics,” in Virtual Workshop on “Lectures and Virtual Practical Demonstration”, on 12.02.2020 organized by Department of Physics, School of Sciences, Uttarakhand Open University, Haldwani
 2. Topic: “Introduction to Particle Physics,” for the students of College of Fisheries, CBSH, and CABM on 02.01.2021 at College of Fisheries, GBPUAT Pantnagar
 3. Topic: “Current research opportunities for scholar in Physics stream (02 Lectures),” for Online Pre-Ph.D. Course Work (Research Methodology–Paper I) organized by S.V. Government P.G. College, Lohaghat (Champawat), Uttarakhand on 23.05.2022.
 4. Topic” “Step by Step approach to starting and completing a good research paper (02 Lectures),” for Online Pre-Ph.D. Course Work (Research Methodology–Paper I) organized by S.V. Government P.G. College, Lohaghat (Champawat), Uttarakhand on 23.05.2022.
 5. Topic: “Hilbert Space and the Mathematical Foundations of Quantum Mechanics,” in the two-week national workshop on “Basic Concept of Mathematics & Recent Trends in quantum Mechanics” on 20th to 31th January 2025 at Department of Mathematics and Physics, MBG PG College Haldwani.
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- **Administrative experience:**

1. Joint-Coordinator, External Examination Cell, College of Basic Sciences and Humanities (CBSH).
2. Warden, Shastri Bhawan Hostel

3. Assistant Warden, Shivalik Bhawan Hostel

- **Other Information**

- ✓ **Associate Editor**

Frontiers in Physics, Publisher: Frontiers Media. Impact factor: 3.1 (2022)

- ✓ **Editorial Board Member**

1. Hagia Sophia Journal of Geometry.
2. Engineering Sciences International Research Journal.
3. International Journal of Fluid Mechanics & Thermal Sciences.

- **Membership of Professional Societies:**

- ✓ Life Member of more than **5 Academic societies**
- ✓ Referee/Reviewer for more than **20 International** reputed journals

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- **Number of participation in National/ International Conferences/ Seminars/ Symposiums/ other Activities: 45 (Forty-Five)**
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Other Links:

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Scopus: [Click Here](#)