HAMMAD NAZAR

PhD(Mathematics)

Visiting Lecturer

Department of Mathematics
The Islamia University of Bahawalpur
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Education

Ph. D. (Mathematics) 2020	The Islamia University of Bahawalpur, Pakistan Title: Some Aspects of Gravitating Systems in *f*(R) Theories of Gravity **CGPA: 3.90/4.00**
M. Phil. (Mathematics) 2015	National College of Business Administration & Economics, Lahore, Pakistan Title: Proper homothetic vector fields in Godel-Friedmann static spacetime **CGPA: 3.90/4.00**
Master (Mathematics) 2009	The Islamia University of Bahawalpur, Pakistan Secured 77.42% marks, **CGPA: 3.32/4.00**
Bachelor in Science 2005	The Islamia University of Bahawalpur, Pakistan Secured 57.13% marks, **2nd Division**
Intermediate (HSSC) 2003	BISE, Bahawalpur, Pakistan Secured 57.36% marks, **2nd Division**
Matriculation (SSC) 2001	BISE, Bahawalpur, Pakistan Secured 75.76% marks, **1st Division**
Bachelor of Education (Science) 2006	University of Education, Lahore, Pakistan Secured 81.83% marks, **1st Division**

Experience

- I have a teaching experience more than 12 years as subject specialist in mathematics and physics since April 2, 2012, at the School Institution, Bahawalpur, Punjab, Pakistan.
- As a visiting lecturer, I have taught various courses in mathematics to BS and MSc classes at the Islamia University of Bahawalpur.
- I have served as a resource person for Allama Iqbal Open University, Islamabad, to teach several online MA courses.

Achievements

- Certified by the Election Commission of Pakistan for participant as well as performing various duties as an Assistant Presiding Officer and Presiding Officer in the General Elections of Pakistan in 2013, 2018 and 2024, respectively.
- Certified by the Directorate of Staff Development Punjab, Pakistan for participating in the 4 days inclusive training of the school institution held in May 6-9, 2017.
- Received a HEC Prime Minister Laptop during the PhD work in 2018.

Courses Taught

- Calculus
- ODE,s and PDE,s
- Mechanics
- Vector Tensor Analysis
- Complex Analysis
- Integral Equation & Boundary Value Problems
- Theory of Relativity
- Advanced General Relativity
- Advanced Analytic Dynamics

Memberships/Responsibilities

- Reviewer of Mathematical Reviews, Advances in Astronomy.
- Reviewer of Universe Journal from MDPI.
- Reviewer of Frontiers in Astronomy and Space Sciences.
- Reviewer of International Journal of Emerging Multidisciplinary: Biomedical and Clinical Research
- Responsibility as a member of Discipline committee in School Institution.
- Responsibility of new student's enrollment for secondary school classes.

Computer Skills

- Mathematical Tools: Latex, Maple, Mathematica
- Office Automation: Microsoft Office

National/International Conferences

- Presented a paper entitled "Some New Dark Energy Star Models in Rastall Gravity via Tolman-Kuchowicz Potentials" in the International Conference on Gravitation and Cosmology organized by The Department of Mathematics and Statics held on January 29-31, 2024 at the University of Lahore, Pakistan.
- Presented a paper entitled "Stellar Shear-Free Gravitational Collapse with Karmarkar Condition in f(R) Gravity" in the 4th PU International Conference on Gravitation and Cosmology organized by The Group of Gravitation and Cosmology held on November 22-25, 2021 at the Department of Mathematics, University of the Punjab, Lahore, Pakistan.
- Attended "International Conference on Impact of Mathematics in Modern Era," held on April 8, 2021, at the Baghdad-ul-Jaded campus, the Islamia University of Bahawalpur.
- Presented a paper entitled "Complexity factor for anisotropic source in non-minimal coupling metric f(R) gravity in the "2nd International Conference on Recent Advances in Applied Mathematics held on February 20-22, 2019 at Comsats

University Islamabad, Lahore campus.

- Presented a paper entitled "Complexity factor for anisotropic source in non-minimal coupling metric f(R) gravity" in the 1st PU International Conference on Gravitation and Cosmology organized by The Group of Gravitation and Cosmology held on January 27-31, 2019 at the Department of Mathematics, University of the Punjab, Lahore, Pakistan.
- Attended the 2nd Algebra Conference of Mathematics held on November 10-11, 2018 at the Islamia University of Bahawalpur.
- Attended as a participant of the 18th International Pure Mathematics Conference 2017, organized by the Islamia University of Bahawalpur, Preston University, and the Pakistan Mathematical Society, Islamabad, from August 5-07, 2017.

Research Interests

My research field is inter-disciplinary in applied mathematics, general relativity, and modified theories of gravitation (curvature-based), like f(R) theories of gravity, f(R,T) theory,energy-momentum squared gravity, f(R,G) formalism, f(G) gravity, the 4D Einstein- Gauss-Bonnet theory, and the Rastall theory of gravity. I want to investigate the impacts of dark matter and dark energy on the accelerating evolution of the universe by using the various models of these gravitational theories. I wish to discuss the different constraints of such theories and models by analyzing the energy and stability conditions. I also want to continue my work by inspecting the various physical implications of astrophysical as well as cosmological events through studying their variety of problems, like dynamical evolutionary structures, self-gravitating dense models, gravitational collapsing objects, extended gravitational decoupled star models, models of compact stars, stability and instability of wormhole structures, modeling of Gravastars through black hole solutions, etc. Moreover, I wish to investigate various physical properties of black holes (BHs), like accretion onto a BH, circular orbits of BH, Bondi-type accretion onto a BH, thermodynamics and phase transitions of BH,the Joule Thomson effect of Ads/ds BH, thermal fluctuation, quasinormal modes, and the shadow of a BH. I am willing to work in different areas of mathematics to solve research problems.

Research Activities

A) Articles (Published /Accepted/ Submitted)

I have been published the following research papers in the well reputed International journals**...**

1. Abdul Majeed, Ghulam Abbas, Aisha Siddiqa, Asifa Ashraf, and **Hammad Nazar**, Hybrid star model with Tolman-Buchdahl metric potentials in non-conservative theory of gravity, Phys. Dark Uni. 2024, (Revision Submitted)
2. **Hammad Nazar**, Ghulam Abbas, Athar Abbas, Shahid Qaisar, Collapsing Shear-Free Anisotropic Embedding Star Model in $f(R)$ Gravity, **Fortschr. Phys. (2024) 2300250 (I. F=5.6)**
3. **H. Nazar**, M. Azam, G. Abbas, Riaz Ahmed and R. Naeem, Relativistic Polytropic Models of Charged Anisotropic Compact Object, **Chin. Phys. C (2023) 47:035109 (I. F=3.6).**
4. Abdul Majeed, **H. Nazar** and G. Abbas, Some New Dark Energy Star Models in Rastall Gravity via Tolman-Kuchowicz Potentials,**Chin. J. Phys. (2023) 86:530 (I. F=4.6)**
5. G. Abbas and **H. Nazar,** Complexity factor for static anisotropic self-gravitating source in *f (R)* gravity, **Eur. Phys. J. C (2018) 78:510 (I. F=4.843)**
6. G. Abbas and **H. Nazar,** Complexity factor for anisotropic source in non-minimal coupling metric *f (R)* gravity, **Eur. Phys. J. C (2018) 78:957 (I. F=4.843)**
7. G. Abbas and **H. Nazar,** Hybrid star model with quark matter and baryonic matter in minimally coupled *f*(R) gravity, **Ann. Phys. (2021) 424:168336 (I. F=3.036)**
8. G. Abbas and **H. Nazar,** Dynamics of dissipative viscous cylindrical collapse with full causal approach in *f (R)* gravity, **Advances in High Energy**

Physics (2018) 2018:9250786 (I. F=1.953)

9. **H. Nazar** and G. Abbas, Charged anisotropic collapsing stars with heat flux in *f*(R) gravity, **Chin. J. Phys. (2020) 63:436 (I. F=3.237)**
10. **H. Nazar** and G. Abbas, Study of Gravitational Collapse for Anisotropic Karmarkar Star in Minimally Coupled f(R) Gravity, **Chin. J. Phys. (2022) 79:124 (I. F=5)**
11. **H. Nazar,** A. H. Alkhaldi, G. Abbas and M. R. Shahzad, Complexity Factor for Anisotropic Self-Gravitating Sphere in Rastall Gravity**, Int. J. Mod. Phys. A (2021) 36:2150233 (I. F=1.475)**
12. **H. Nazar** and G. Abbas, Gravitational collapse in f(R) theories of gravity with non-minimal coupling, **Mod. Phys. Lett. A (2019) 34:1950025 (I. F=1.391)**
13. **H. Nazar and** G. Abbas, Complexity factor for dynamical spherically symmetric fluid distributions in f(R) gravity, **Int. J. Geom. Meth. Mod. Phys. (2019) 16:1950170 (I. F=1.287)**
14. **H. Nazar** and G. Abbas, Model of charged anisotropic strange stars in minimally coupled f(R) **gravity, Advances in Astronomy (2021) 2021:6698208 (I. F=1.093)**
15. G. Abbas and **H. Nazar,** Stellar shear-free gravitational collapse with Karmarkar condition in f(R) gravity**, Int. J. Mod. Phys A (2019) 34:1950220 (I. F=1.486)**
16. G. Abbas and **H. Nazar,** Dynamics of dissipative gravitational collapse with full causal approach in f(R) gravity, **Can. J. Phys. (2020) 98:613 (I. F=1.240)**
17. G. Abbas and **H. Nazar,** Complexity factors for static anisotropic axially symmetric fluid distributions in f(R) gravity**, Int. J. Geom. Meth. Mod. Phys. (2020) 17:2050043 (I. F=1.874)**
18. G. Abbas and **H. Nazar,** Shear-free radiating collapse model via Karmarkar condition in f(R) gravity**, Int. J. Geom. Meth. Mod. Phys. (2021) 18:2150045 (I. F=1.873)**
19. G. Abbas, **H. Nazar,** Shahid Qaiser and Ertan Gudekli, Anisotropic Stellar Compact Spheres in *f*(R) Gravity via Karmarkar Approach, **Int. J. Geom. Meth. Mod. Phys. (2021) 18:2150133 (I. F=1.873)**

20. R. Naeem, M. Azam, G. Abbas and **H. Nazar**, Generalized Polytropic Models in Finch-Skea Spacetime, **New Astronomy (2021) 89:101651 (I. F=2.096)**

21. Riaz Ahmed, G. Abbas, **H. Nazar** and K, Iqbal, Existence of Traversable Wormholes with Varied Shape Functions in f(R^2, T) Gravity, **Int. J. Geom. Meth. Mod. Phys. (2022) 19:2250170 (I. F=1.8)**

22. Ertan Gudekli, **H. Nazar**, G. Abbas and M. Saddique, Wormholes Models in f(R) Gravity Inspired by Non-Compact Source, **Int. J. Geom. Meth. Mod. Phys. (2022) 19:2250227 (I. F=1.8)**

B) Reviewed Research Articles

I have reviewed the following articles…

1. Jian Liang Yang paper "The light speed invariant solution and its enlightenmentof field equation of general relativity" **—2020**
2. M. Zubair, Saira Waheed and Hina Javaid paper "A Generic Embedding Class-I Model Via Karmarkar Condition in $f(R;$ T) Gravity" **—2021**
3. Jian Liang Yang paper "Modification of gravitational field equation due to invariance of light speed and new system of universe evolution" **—2021**
4. M. Sharif and Saba Naz "Stable Gravastars with Krori-Barua Metric in f(R,T^2) Gravity" **—2023**Aylin Caliskan, Rana Muhammad Zulqarnain, Ertan Gudekli, Imran Siddique, Hijaz Ahmad and Sameh Askar "Structural properties of a new class of stellarstructures in modified teleparallel gravity" **—2023**
5. Khaleel Ahmad, Umar Ishtiaq, Farhan Ali and Usman Ali "Fixed Point Results for Generalized Contraction with Application of Biomedical Sciences" **—2023**

C) Total Impact Factor, H-index and Citations of Research Articles

- **56**
- **9**
- **300**

D) Detail of Published Papers in Q1 and Q2 Journals

- **8 in Q1 Journals**
- **13 in Q2 Journals**

E) Google Scholar Profile Link

- **https://scholar.google.com/citations?user=43qBYJUAAAAJ&hl=en**

F) ResearchGate Profile Link

- **https://www.researchgate.net/profile/Hammad-Nazar-2**

G) ORCID

- **https://orcid.org/0000-0001-6570-7953**

Supervisor

Dr. Ghulam Abbas, Associate Professor, Department of Mathematics, TheIslamia University of Bahawalpur (ghulamabbas@iub.edu.pk & abbasg91@yahoo.com) Contact No. +923027862183

References

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ii. Dr. Muhammad Azam, Professor of Mathematics, Division of Science and Technology University of Education, Township Campus Lahore (azammath@gmail.com) Contact No.+923334187559

iii. Dr. Muhammad Zubair, Associate Professor, Department of Mathematics, COMSATS University Islamabad, Lahore Campus, Pakistan (drmzubair@cuilahore.edu.pk) Contact No. +923215778250