

Soroush Zare

Curriculum Vitae

Summary

My personal data is:

- Full name: Soroush Zare (he/him)
- Title: PhD
- Email: soroushzrg@gmail.com, szare@uva.es
- [Google Scholar](#)
- [Inspire HEP](#)
- [ResearchGate](#)
- [Scopus](#)
- [ORCID](#)

Education

- **Ph.D. in Theoretical Physics** **Sept. 2018 – July 2022**
Faculty of Physics
Shahrood University of Technology (Iran)
Top Student Researcher Honors
Thesis: *Investigation of bosons and fermions in spaces with topological defects*
- **Master of Science** **Sept. 2013 – Sept. 2016**
Department of Basic Sciences
Islamic Azad University, North Tehran Branch (Iran)
- **Bachelor in Physics** **Feb. 2009 – Sept. 2013**
Department of Physics
The University of Damghan (Iran)

Postdoctoral Research Experience

- **Department of Physics, University of Hradec Králové (Czech Republic)**
- **Departamento de Física Teórica, Universidad de Valladolid (Spain)**

Academic Interests

- General Relativity,
- Quantum Gravity,
- Modified Gravity Theories,
- Geodesics Observables
- Gravitational Lensing,
- Cosmology, Dark matter,
- Mathematical Physics,
- Quasinormal Modes,
- Observational Appearances of Compact Objects from Accretion Disks,

- Physical Characteristics of Thin Accretion Disks,
- Periodic Orbits and Gravitational Wave Radiation.

Honors and Awards

- **Top researcher– Physics** **2017**
Islamic Azad University, North Tehran Branch (Iran)
- **Achieving elite student award** **2019**
Elite Foundation of Semnan province (Iran)
- **Top student researcher – Physics** **2020**
Shahrood University of Technology (Iran)
- **Top student researcher – Physics** **2021**
Shahrood University of Technology (Iran)
- **Top student researcher – Physics** **2022**
Shahrood University of Technology (Iran)
- **Top student researcher – Physics** **2022**
In Semnan province (Iran)

Teaching Activities

From Sept. 2016 to Feb. 2020, as a Teaching Assistant in the Physics Department at Shahrood University of Technology, I supported undergraduate and graduate students studying in the departments of Engineering and Physics. During my time as an MSc and Ph.D. student, I was actively involved in leading tutorial sessions and providing one-on-one support to students in the following courses:

- *Fundamental Physics: Mechanics*
- *Quantum Mechanics*
- *Fundamental Physics: Electromagnetism*
- *Classical Electrodynamics*
- *Mathematical Physics*

From Sept. 2019 to July 2022, I served as a Lecturer in the Physics Department at Shahrood University of Technology while also pursuing my Ph.D. degree. As a part-time faculty member, I taught undergraduate students from the departments of Engineering. This experience provided me with the opportunity to further develop my teaching skills and gain valuable experience working with students from diverse backgrounds. It also demonstrated my ability to balance multiple responsibilities and work effectively as a member of a team.

Courses taught:

- *Fundamental Physics: Mechanics*
- *Fundamental Physics: Electromagnetism*
- *Laboratory of Fundamental Physics: Mechanics*
- *Laboratory of Fundamental Physics: Electromagnetism*

Conferences Attended

- **The Third and Fourth International Conference Techno-Science** (online)
2020 & 2021 (Turkey)
- **Hradec Králové International Physics Days 2023** (online)
2023 (Czech Republic)
- **Black Holes Inside and Out**
September 26–30, 2024 (The Niels Bohr Institute, Copenhagen, Denmark)
- **XI International Workshop “New Challenges in Quantum Mechanics: Graphene, Supersymmetry and Mathematical Physics”** (invited speaker)
January 15th to 17th, 2025 (University of Valladolid, Valladolid, Spain)
- **Black Holes & Cosmology**
August 5–9, 2025 (University of Iceland, Reykjavik, Iceland)

Languages

Persian: Native

English: Fluent

Spanish: Basic

Journals Refereed

- | | |
|-----------------------------------|--|
| ○ Classical and Quantum Gravity | ○ Annals of Physics |
| ○ The European Physical Journal C | ○ Proceedings of the Royal Society A |
| ○ Annalen der Physik | ○ International Journal of Theoretical Physics |
| ○ Scientific Reports | ○ International Journal of Modern Physics A |
| ○ Results in Physics | ○ Universe |
| ○ Canadian Journal of Physics | ○ Nuclear Physics, Section B |
| ○ Modern Physics Letters A | ○ Physics of the Dark Universe |
| ○ Physica B: Condensed Matter | ○ Few-Body Systems |
| ○ Physica Scripta | |

Publications 2016-2024:

1. Accretion Disk Luminosity and Topological Characteristics for a Schwarzschild Black Hole Surrounded by a Hernquist Dark Matter Halo
L. M. Nieto, F. Hosseinifar, K. Boshkayev, **S. Zare** and H. Hassanabadi,
Physics of the Dark Universe, 50 (2025) 102151.
2. Modified Kerr black holes surrounded by dark matter spike
S. Capozziello, **S. Zare**, L.M. Nieto and H. Hassanabadi
Physics of the Dark Universe, 50 (2025) 102065.
3. Universal thermodynamic topological classes of static black holes in Conformal Killing Gravity

- H. Chen, D. Wu, M.-Y. Zhang, **S. Zare**, H. Hassanabadi, B. C. Lütüoğlu, Z.-W. Long
Eur. Phys. J. C, 85 (2025) 828.
4. Black holes immersed in polytropic scalar field gas
Y. Sekhmani, **S. Zare**, L.M. Nieto, H. Hassanabadi, and K. Boshkayev
Journal of High Energy Astrophysics, 47 (2025) 100389.
 5. Two Types of q-Gaussian Distributions Used to Study the Diffusion in a Finite Region
W.S. Chung, L.M. Nieto, **S. Zare**, and H. Hassanabadi
Mathematical Methods in the Applied Sciences, 48 (2025) 13192.
 6. Influences of modified Chaplygin dark fluid around a black hole
S. Zare, L. M. Nieto, F. Hosseinifar, X. H. Feng and H. Hassanabadi
Phys. Lett. B ., 859 (2024) 139125.
 7. Shadows, rings and optical appearance of a magnetically charged regular black hole illuminated by various accretion disks
S. Zare and L. M. Nieto, X.-H. Feng, S.-H. Dong and H. Hassanabadi
Journal of Cosmology and Astroparticle Physics, 08 (2024) 041.
 8. Gup-corrected black holes: thermodynamic properties, evaporation time and shadow constraint from EHT observations of M87* and Sgr A
H. Chen, S.-H. Dong, E. Maghsoodi, S. Hassanabadi, J. Kříž, **S. Zare** and H Hassanabadi
Eur. Phys. J. Plus, 139 (2024) 759.
 9. Accelerating AdS black holes in gravity's rainbow
B. Eslam Panah, **S. Zare** and H. Hassanabadi
Eur. Phys. J. C, 84 (2024) 259.
 10. Gravitational traces of bumblebee gravity in metric–affine formalism
A. A. Araújo Filho, H. Hassanabadi, N. Heidari, J. Kříž and **S. Zare**
Class. Quantum Gravity, 41 (2024) 055003.
 11. Gravitational signatures of a non–commutative stable black hole
N. Heidari, H. Hassanabadi, A. A. Araújo Filho, J. Kříž, **S. Zare** and P. J. Porfírio
Physics of the Dark Universe , 43 (2024) 101382.
 12. Dark matter spike around bumblebee black holes
S. Capozziello, **S. Zare**, D. F.Mota and H. Hassanabadi
Journal of Cosmology and Astroparticle Physics , 05 (2023) 027.
 13. Thermodynamics and evaporation of modified Schwarzschild black hole in a non–commutative gauge theory

- A. A. Araújo Filho, **S. Zare**, P. J. Porfírio, J. Kříž and H. Hassanabadi
Phys. Lett. B., 838 (2023) 137744.
14. On a neutral Dirac particle interacting with a magnetic field in a topological defect space-time and its hidden supersymmetry
S. Zare, H. Hassanabadi and G. Junker
European Physical Journal Plus, 138 (2023) 354.
 15. Thermal properties of the Q-deformed spin-one DKP oscillator
A. Boumali, A. Bouzenada, **S. Zare** and H. Hassanabadi
Physica A, 628 (2023) 129134.
 16. Exact solution for a fermion-antifermion system with Cornell type nonminimal coupling in the topological defect-generated spacetime
A. Guvendi, **S. Zare** and H. Hassanabadi
Physics of the Dark Universe , 38 (2022) 101133.
 17. Relativistic Landau quantization for a composite system in the spiral dislocation spacetime
S. Zare, H. Hassanabadi and A. Guvendi,
European Physical Journal Plus, 137 (2022) 589.
 18. Influences of Lorentz symmetry violation on charged Dirac fermions in cosmic dislocation space-time
S. Zare, H. Hassanabadi and G. Junker
General Relativity and Gravitation, 54 (2022) 69.
 19. Relativistic Landau-Aharonov-Casher quantization of a Duffin-Kemmer-Petiau spinless boson with Lorentz violation
S. Zare, H. Hassanabadi and M. de Montigny
International Journal of Modern Physics A, 37. (2022) 2250099.
 20. Influences of the Lorentz symmetry violation on the interaction of the relativistic spin-zero particle with the Cornell-type non-minimal coupling
S. Zare, H. Hassanabadi and G. Junker
Modern Physics Letters A, 37 (2022) 2250113.
 21. The influence of Aharonov–Casher effect on the generalized Dirac oscillator in the cosmic string space-time
H. Chen, Z.-W. Long, C.-Y. Long, **S. Zare** and H. Hassanabadi
International Journal of Geometric Methods in Modern Physics, 19 (2022) 2250133.
 22. On the interaction of a Cornell-type nonminimal coupling with the scalar field under the background of topological defects

- S. Zare**, H. Hassanabadi, A. Guvendi and W. S. Chung
International Journal of Modern Physics A, 37 (2022) 2250033.
23. Quantum description of the moving magnetic quadrupole moment interacting with electric field configurations under the rotating background with the screw dislocation
 H. Chen, **S. Zare**, H. Hassanabadi and Z. -W. Long
Indian Journal of Physics, 96 (2022) 4219.
 24. Klein-Gordon oscillator in a global monopole space-time with rainbow gravity
 M. de Montigny, J. Pinfold, **S. Zare** and H. Hassanabadi
European Physical Journal Plus, 137 (2022) 54.
 25. Spin symmetry in the presence of a Killingbeck potential for a relativistic Λ -hypernuclei
 F. Moradi, H. Hassanabadi, **S. Zare**, H. Sobhani
Indian Journal of Physics, 95 (2021) 2431.
 26. Exact solutions of the generalized Klein–Gordon oscillator in a global monopole space-time
 M. Montigny, H. Hassanabadi, J. Pinfold and **S. Zare**
European Physical Journal Plus, 136 (2021) 788.
 27. Duffin-Kemmer-Petiau particles in the presence of the spiral dislocation
 S. Hassanabadi, **S. Zare**, B. C. Lütfüoğlu, J. Kříž and H. Hassanabadi
International Journal of Modern Physics A, 36 (2021) 2150100.
 28. Vector boson oscillator in the spiral dislocation spacetime
 A. Guvendi, **S. Zare** and H. Hassanabadi
European Physical Journal A, 57 (2021) 192.
 29. Relativistic free fermions in spiral dislocation space-time with a distortion of a radial line into a spiral
S. Zare, H. Hassanabadi and G. Junker
International Journal of Modern Physics A, 36 (2021) 2150215.
 30. Interaction of the magnetic quadrupole moment of a non-relativistic particle with an electric field in the background of screw dislocations with a rotating frame
 B.C. Lütfüoğlu, J. Kříž, **S. Zare** and H. Hassanabadi
Physica Scripta, 96 (2021) 015005.
 31. Electric quadrupole moment of a neutral non-relativistic particle in the presence of screw dislocation
 H. Hassanabadi, **S. Zare**, J. Kříž and B.C. Lütfüoğlu
EPL, 132 (2020) 60005.

32. Duffin-Kemmer-Petiau oscillator in the presence of a cosmic screw dislocation
S. Zare, H. Hassanabadi and M. De Montigny
International Journal of Modern Physics A, 35 (2020) 2050195.
33. Spin and pseudospin symmetries of a relativistic fermion in an elastic medium with spiral dislocations
S. Zare, H. Hassanabadi, G. J. Rampho and A. N. Ikot
European Physical Journal Plus, 135 (2020) 748.
34. The effect of fractional calculus on the formation of quantum-mechanical operators
W.S. Chung, **S. Zare**, H. Hassanabadi and E. Maghsoodi
Mathematical Methods in the Applied Sciences, 43 (2020) 6950.
35. Nonrelativistic particles in the presence of a Cariñena-Perelomov-Rañada-Santander oscillator and a disclination
S. Zare, H. Hassanabadi and M. De Montigny
International Journal of Modern Physics A, 35 (2020) 2050071.
36. Non-inertial effects on a generalized DKP oscillator in a cosmic string space-time
S. Zare, H. Hassanabadi and M. de Montigny
General Relativity and Gravitation, 52 (2020) 25.
37. The investigation of a classical particle in the presence of fractional calculus
W.S. Chung, **S. Zare**, H. Hassanabadi, J. Kříž and E. Maghsoodi
Revista Mexicana de Física, 66 (2020) 840.
38. Relativistic free fermions in an elastic medium with screw dislocations
S. Zare, H. Hassanabadi and M. de Montigny
European Physical Journal Plus, 135 (2020) 122.
39. Study of bosons for Three Special Limits of Gödel-Type Spacetimes
H. Hassanabadi, M. Hosseini, **S. Zare** and M. Hosseinpour
Few-Body Systems, 60 (2019) 12.
40. Relativistic spin-zero bosons in a Som-Raychaudhuri space-time
H. Hassanabadi, **S. Zare** and M. de Montigny
General Relativity and Gravitation, 50 (2018) 104.
41. Fermi field and Dirac oscillator in a Som-Raychaudhuri space-time
M. de Montigny, **S. Zare** and H. Hassanabadi
General Relativity and Gravitation, 50 (2018) 47.
42. Investigation of DKP equation for spin-zero system in the presence of Gödel-type back-

- ground space-time
H. Hassanabadi, W. S. Chung, **S. Zare** and H. Sobhani
European Physical Journal C, 78 (2018) 83.
43. Investigation of the information entropy for the $X(3)$ model
H. Hassanabadi, **S. Zare** and M. Alimohammadi
European Physical Journal Plus, 132 (2017) 498.
44. γ -rigid version of Bohr Hamiltonian with the modified Davidson potential in the position-dependent mass formalism
H. Hassanabadi, M. Alimohammadi, and **S. Zare**,
Modern Physics Letters A, 32 (2017) 1750085.
45. Investigation of Bohr-Mottelson Hamiltonian in γ -rigid version with position dependent mass
M. Alimohammadi, H. Hassanabadi, and **S. Zare**
Nuclear Physics A, 960 (2017) 78.
46. Scattering of position-dependent mass Schrödinger equation with delta potential
H. Hassanabadi, W.S. Chung, **S. Zare**, and M. Alimohammadi
European Physical Journal Plus, 132 (2017) 135.
47. Investigation of Conformable Fractional Schrödinger Equation in Presence of Killingbeck and Hyperbolic Potentials
W.S. Chung, **S. Zare** and H. Hassanabadi
Communications in Theoretical Physics, 67 (2017) 250.
48. Scattering study of a modified cusp potential in conformable fractional formalism
W.S. Chung, S. Zarrinkamar, **S. Zare** and H. Hassanabadi
Journal of the Korean Physical Society, 70 (2017) 348.
49. Q -Deformed Morse and Oscillator Potential
H. Hassanabadi, W.S. Chung, **S. Zare** and S.B. Bhardwaj
Advances in High Energy Physics, 2017, (2017), 1730834.
50. Investigation of the non-relativistic fermi-gas model by considering the position-dependent mass
Zare, S., de Montigny, M., Hassanabadi, H.
Journal of the Korean Physical Society, 70 (2017) 122.
51. Investigation of quasi-Morse potential in position-dependent mass formalism
H. Hassanabadi and **S. Zare**
European Physical Journal Plus, 132 (2017) 49.

52. Scattering states of the Schrödinger equation with a position-dependent-mass and a non-central potential
M. Chabab, A. El Batoul, M. Oulne, H. Hassanabadi, **S. Zare**
Journal of the Korean Physical Society, 69 (2016) (11) 1619.
53. Klein-Gordon equation particles in exponential-type molecule potentials and their thermodynamic properties in D dimensions
A.N. Ikot, B.C. Lutfuloglu, M.I. Ngwueke, M. E. Udoh, **S. Zare** and H. Hassanabadi
European Physical Journal Plus, 131 (2016) 419.
54. Relativistic Dirac-attractive radial problem with Yukawa-like tensor interaction via SUSYQM
A.N. Ikot, S. Zarrinkamar, **S. Zare** and H. Hassanabadi
Chinese Journal of Physics, 54 (2016) 968.
55. Scattering states of Dirac particle equation with position-dependent mass under the cusp potential
M. Chabab, A. El Batoul, H. Hassanabadi, M. Oulne and **S. Zare**
European Physical Journal Plus, 131 (2016) 387.
56. Scattering and Bound States of Klein-Gordon Particle with Hylleraas Potential Within Effective Mass Formalism
M.C. Onyeaju, A.N. Ikot, E.O. Chukwuocha, H. P. Obong, **S. Zare** and H. Hassanabadi
Few-Body Systems, 57 (2016) 823.
57. Bound and Scattering State of Position Dependent Mass Klein-Gordon Equation with Hulthen Plus Deformed-Type Hyperbolic Potential
A.N. Ikot, H.P. Obong, T.M. Abbey, **S. Zare**, M. Ghafourian and H. Hassanabadi
Few-Body Systems, 57 (2016) 807.
58. Properties of Quasi-Oscillator in Position-Dependent Mass Formalism
S. Zare and H. Hassanabadi
Advances in High Energy Physics, 2016 (2016) 4717012.