Hadi Sobhani · Ph. D. of Theoretical Nuclear Physics · Shahrood, Iran · hadisobhani8637@gmail.com · +98 936 507 8637

Hadi Sobhani | Resume

Personal Information

- *Name:* Hadi.
- *Last Name:* Sobhani.
- *Nationality:* Iranian.
- *Birth Day:* January 4, 1991.
- *Marriage Status:* Not married.
- *Religion:* Islam.
- *Birth Place:* Shahrood.
- *Current Place:* Shahrood.
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Education

- *Bachelor of Science:* Theoretical Physics; Shahrood University, Iran. (2010-2014)
- *Master of Science:* Nuclear Physics; Shahrood University of Technology, Iran. (2014-2016)
- *Ph. D.:* Nuclear Physics; Shahrood University of Technology, Iran. (start: 16 Sep. 2017, end: 19 Sep. 2020).

Research visit

Department of Physics, Liaoning Normal University, Dalian 116029, PR China (Duration: Sep. 2019 – Jan. 2020)

Languages

- Persian, English.

Computer Skills

- *Operating Systems:* Windows, Linux.
- *Softwares:* Mathematica, MatLab.
- *Text Editors:* Latex, Word.

Teaching Experiences

- Mechanics, 1st year course, Shahrood University of Technology, (2018).
- Electromagnetism, 1st year course, Shahrood University of Technology, (2018) and (2021)
- Electromagnetism laboratory, 1st year course, Shahrood University of Technology, (2020)

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Research Interests

- Collective Models: Bohr Hamiltonian (E(5) ,Z(5), Z(4), X(3)), energy rates of isotopes, B(E2) transition rates.
- Nilsson model.
- Semi-empirical formulae.
- Nuclear decays and transitions.
- Deformation and other formalism of Quantum Mechanics.
- Numerical analysis (Solving of differential equation, Fitting data,...).
- Analytical Solution of quantum differential equation (Schrödinger, Dirac, Duffin-Kemmer-Petiau (Spin-0 and Spin-1), Klein-Gordon, Salpeter equations) in presence of different interactions.
- Mathematical physics (applications of special functions and polynomials in quantum mechanics such as Airy, Bessel, Hermite, Laguerre, Jacobi, Hypergeometric, Heun and ...).
- Time-dependent systems.
- Scattering in Quantum mechanics.
- Commutative and Non-Commutative phase space formalisms in quantum mechanics.
- Minimal length effects in quantum mechanics.

Refereeing of scientific journals

- Modern Physics Letter A
- Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences
- Indian Journal of Physics
- Advances in High Energy Physics
- Physica Scripta
- Current journal of applied science and technology

Publications

- Books:
  1. Angular momentum in quantum mechanics, translated to Persian (2022) (Accepted for publishing in IUP)
- Articles:
  1. Hadi Sobhani, Hassan Hasanabadi, Dennis Bonatsos, Feng Pan, Jerry Draayer, The quasi-exactly solvable decatic model description of nuclei near the $X(5)$ critical point (*Commun. Theor. Phys.* **74** 015301 (2021)).
  2. Hadi Sobhani, Hassan Hassanabadi, Dennis Bonatsos, Lembit Sihver, An analytical description of the parity doublet structure in an odd-A nucleus , (*Nucl. Phys. A*, **1013** 122224 (2021)).
  3. Hadi Sobhani, Hassan Hassanabadi, Dennis Bonatsos, Resolution of the spin paradox in the Nilsson model, (*Eur. Phys. J. Plus* **136** 398 (2021)).
  4. Dennis Bonatsos, Hadi Sobhani, Hassan Hassanabadi, Shell model structure of proxy-SU(3) pairs of orbitals, (*Eur. Phys. J. Plus* **135** (9) 710 (2020)).
  5. Hadi Sobhani, Hassan Hassanabadi, Dennis Bonatsos, Feng Pan, Jerry P. Draayer, γ-unstable Bohr Hamiltonian with sextic potential for odd-A nuclei, (*Nucl. Phys. A*, **1002** 121956 (2020)).
  6. M. Moradi, H. Hassanabadi, S. Zare, H. Sobhani, Spin symmetry in the presence of a Killingbeck potential for a relativistic Λ-hypernuclei, *Indian J. Phys.* https://doi.org/10.1007/s12648-020-01882-5
  7. S. Rahmania, H. Hassanabadi, H. Sobhani Mass and decay properties of double heavy baryons with a phenomenological potential model (*Eur. Phys. J. C 80* **80** 312 (2020)).

8. Hadi Sobhani, Hassan Hassanabadi, W. S. Chung Study of Spin-1 Particles Scattering and Bound States in the q-Deformed Quantum Mechanics (*Few-Body Syst.*, **61** 7 (2020)).
9. Hadi Sobhani, Hassan Hassanabadi, Won Sang Chung Investigation of fractional harmonic oscillator canonical ensemble in the q-deformed super-statistic (*Int. J. Geom. Methods. M* **16**, 1950163 , (2018))
10. Hadi Sobhani, Hassan Hassanabadi, Dennis Bonatsos, Feng Pan, Sai Cui, Ziwei Feng, Jerry P. Draayer Analytical study of the γ-unstable Bohr Hamiltonian with quasi-exactly solvable decatic potential (*Eur. Phys. J. A*, **56** 29 (2020)).
11. Hadi Sobhani, Hassan Hassanabadi, CSP-Z$\left(\frac{5}{2J+1}\right)$: Application of the controlled single particle concept for the prolate to oblate nuclear shape phase transition in odd-A nuclei (*Nucl. Phys. A*, **992** 121 (2019)).
12. Hadi Sobhani, Hassan Hassanabadi, Application of the controlled single particle concept in the γ-rigid Bohr Hamiltonian for $\gamma = 30^{\circ}$ (*Nucl. Phys. A*, **989** 135 (2019)).
13. H Sobhani, H Hassanabadi, and WS Chung, Effects of non-commutative phase-space on prolate nuclei in the presence of Coulomb interaction (*Mod. Phys. Lett. A* **34** 1950279 (2019))
14. H Sobhani and H Hassanabadi, Exact Solutions for Time-Dependent Schrödinger Equation in Presence of The Pöschl-Teller Double-Ring Shaped Harmonic Potential (*Acta Physica Polonica, A.* **136** 17 (2019)).
15. H Sobhani and H Hassanabadi, The controlled single particle: A new concept in odd-mass nuclei (*Nucl. Phys. A*, **986** 223 (2019))
16. H Sobhani and H Hassanabadi, Non-degenerate γ-unstable Bohr Hamiltonian considering Killingbeck potential (*Nucl. Phys. A*, **983** 229 (2019))
17. H Sobhani and H Hassanabadi, Study of non-degenerate γ-unstable Bohr Hamiltonian considering deformation-dependent mass and Davidson potential (*Eur. Phys. J. Plus* **133** 482 (2018))
18. H Sobhani and H Hassanabadi, Behavioral Differences of a Time-Dependent Harmonic Oscillator in Commutative Space and Non-Commutative Phase Space (*Phys. Part. Nuclei Lett.* **15** 469 (2018))
19. H Sobhani and H Hassanabadi, Observation of ultra-fine structures in energy levels of prolate nuclei (*Can. J. Phys.*, **96** (9) 1059 (2018))
20. H Hassanabadi, H Sobhani, Elimination of degeneracy in the γ-unstable Bohr Hamiltonian in the presence of an extended sextic potential (*Phys. Rev. C* **98**, 014312 , (2018))
21. FS Mozaffari, H Hassanabadi, H Sobhani, and WS Chung, On the Conformable Fractional Quantum Mechanics (*J. Korean Phys. Soc.* **72**, 980 , (2018))
22. FS Mozaffari, H Hassanabadi, H Sobhani, and WS Chung, Investigation of the Dirac Equation by Using the Conformable Fractional Derivative (*J. Korean Phys. Soc.* **72**, 987 , (2018))
23. H Sobhani, H Hassanabadi, and WS Chung, Investigation of Bohr Hamiltonian in presence of Killingbeck potential using bi-confluent Heun functions (*Nucl. Phys. A* **973**, 33 , (2018))
24. H Sobhani, WS Chung, and H Hassanabadi, Investigation of spin-zero bosons in q-deformed relativistic quantum mechanics (*Indian J. Phys.* **92**, 529 , (2018))
25. Hadi Sobhani, Hassan Hassanabadi, and Won Sang Chung, A survey on the Klein–Gordon equation in the Gödel-type space-times (*Int. J. Geom. Methods. M* **15**, 1850037 , (2018))
26. H Sobhani, H Hassanabadi, and WS Chung, Effects of cosmic-string framework on the thermodynamical properties of anharmonic oscillator using the ordinary statistics and the q-deformed superstatistics approaches (*Eur. Phys. J. C* **78**, 106 , (2018))
27. H Hassanabadi, H Sobhani, and WS Chung, Scattering Study of Fermions due to Double Dirac Delta Potential in Quaternionic Relativistic Quantum Mechanics (*Adv. High Energy Phys.* **2018**, 8124073 , (2018))
28. H Hassanabadi, WS Chung, S Zare, and H Sobhani, Investigation of DKP equation for spin-zero system in the presence of Gödel-type background space-time (*Eur. Phys. J. C* **78**, 83 , (2018))
29. SS Hosseini, H Hassanabadi, and H Sobhani, Estimation of the alpha decay of Platinum isotopes using different versions of theoretical formula (*Int. J. Mod. Phys. E* **26**, 1750069 , (2017))
30. H Hassanabadi, H Sobhani, and AN Ikot, Investigation of energy and B(E2) transition rates for Bohr Hamiltonian with generalized Davidson potential (*Nucl. Phys. A* **966**, 82 , (2017))
31. H Sobhani and H Hassanabadi, New face of Ramsauer–Townsend effect by using a Quaternionic double Dirac potential (*Indian J Phys* **91**, 1205 , (2017))
32. WS Chung, H Sobhani, and H Hassanabadi, Investigation of the Ramsauer-Townsend effect in q-deformed quantum mechanics and simulation by double Dirac delta potential (*Eur. Phys. J. Plus* **132**, 398 , (2017))
33. H Hassanabadi, H Sobhani, and A Banerjee Relativistic scattering of fermions in quaternionic quantum mechanics (*Eur. Phys. J. C* **77**, 581 , (2017))

34. H Sobhani and H Hassanabadi, Davydov-Chaban Hamiltonian for $\gamma = 30°$ and time-dependent interaction (*Eur. Phys. J. Plus* **132**, 351 , (2017))
35. H Sobhani and H Hassanabadi Quantum many-body system in presence of time-dependent potential and electric field (*U. Korean Phys. Soc.* **71**, 8 , (2017))
36. AN Ikot, H Sobhani, and H Hassanabadi, Study of energy and B(E2) transition rates for Davydov–Chaban Hamiltonian with generalized Davidson potential (*Nucl. Phys. A* **963**, 1 , (2017))
37. H Sobhani, H Hassanabadi, and WS Chung, Observations of the Ramsauer–Townsend effect in quaternionic quantum mechanics (*Eur. Phys. J. C* **77**, 425 , (2017))
38. H Sobhani, AN Ikot, and H Hassanabadi, Analytical solution of Bohr Hamiltonian and extended form of sextic potential using bi-confluent Heun functions (*Eur. Phys. J. Plus* **132**, 240 , (2017))
39. H Sobhani and H Hassanabadi, Investigation of Relativistic Bosons in the Presence of Two-Dimensional Time-Dependent Harmonic Interaction (*Physics of Particles and Nuclei Letters* **14** (1) 83 (2017))
40. H Sobhani, WS Chung, and H Hassanabadi, q-Deformed Relativistic Fermion Scattering ,(*Advances in High Energy Physics*, **2017**, 9530874 (2017))
41. H Sobhani and H Hassanabadi, Investigation of a Time-Dependent Two-Body System via the Lewis-Riesenfeld Dynamical Invariant Method, (*Journal of the Korean Physical Society* **69** 1509 (2016))
42. M Alimohammadi, H Hassanabadi, and H Sobhani, Effects of Coulomb-like potential on γ-rigid prolate nuclei considering minimal length formalism (*Mod. Phys. Lett. A*, **31**, 1650193 (2016))
43. H Sobhani and H Hassanabadi, Davydov–Chaban Hamiltonian in presence of time-dependent potential (*Phys. Lett. B*, **760**, 1 (2016))
44. H Sobhani and H Hassanabadi, Study of Davydov-Chaban approach considering shifted Killingbeck potential for any l-state (*Mod. Phys. Lett. A*, **31**, 1650152 (2016))
45. H Sobhani and H Hassanabadi, Electric quadrupole transitions for some isotopes of Xenon; considering rigidity for $\gamma = 30°$ collective parameter (*Nucl. Phys. A*, **957** 177 (2016))
46. H Sobhani and H Hassanabadi, Investigation of Bohr Hamiltonian in the presence of time-dependent Manning–Rosen, harmonic oscillator and double ring shaped potential (*Int. J. Mod. Phys. E*, **25**, 1650073 (2016))
47. H Sobhani and H Hassanabadi, Rashba Effect in Presence of Time-Dependent Interaction (*Commun. Theor. Phys.* **65** 543 (2016))
48. H Sobhani and H Hassanabadi, Study of Time Evolution for Approximation of Two-Body Spinless Salpeter Equation in Presence of Time-Dependent Interaction (*Advances in High Energy Physics* **2016**, 3647392, (2016))
49. L Naderi, H Hassanabadi, and H Sobhani, Bohr Hamiltonian with time-dependent potential (*Int. J. Mod. Phys. E*, **25**, 1650029 (2016))
50. Hadi Sobhani and Hassan Hassanabadi Investigation of a time-dependent two-body system via the Lewis-Riesenfeld dynamical invariant method (*Journal of the Korean Physical Society* **69**, 1509-1512 (2016))
51. H Sobhani and H Hassanabadi, Scattering in quantum mechanics under quaternionic Dirac delta potential (*Can. J. Phys.*, **94** (3) 262 (2016))
52. H Sobhani and H Hassanabadi, Two-Dimensional Linear Dependencies on the Coordinate Time-Dependent Interaction in Relativistic Non-Commutative Phase Space (*Commun. Theor. Phys.* **64** 263 (2016))

Honors and Activities

- Top student in Bachelor degree.
- Secretary of the Physics students' scientific association.
- Achieving elite student quota in Bachelor degree.
- Top student in Master degree.
- Achieving elite student quota in Master degree.
- Top researcher of Physics department of Shahrood University of Technology (2016).
- Top researcher of Physics department of Shahrood University of Technology (2017).
- Top student researcher of Semnan State of Iran (2017).

- Top researcher of Physics department of Shahrood University of Technology (2018).
- Assistant Laboratory of Fundamental Physics Part I (mechanics) and Fundamental Physics part II (electromagnetic) courses.
- Holding of exercise and problem sessions of some courses such as
  - Fundamental Physics Part I (mechanics),
  - Fundamental Physics part II (electromagnetic),
  - Classical Mechanics,
  - Mathematical Physics,
  - Quantum Mechanics,
  - Classical Electrodynamics.