



MORTEZA
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WHO AM I?

I am a professor of the University of Mohaghegh Ardabili, Ardabil, Iran. My main scientific focus are complex systems and quantum chains.

LANGUAGES

Persian - native **English** - proficient

SCIENTIFIC STATISTICS

H-INDEX: 17
CITATIONS: 823
I10-INDEX: 31
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MY PAGES

Scholar:
<https://scholar.google.com/citations?user=kCAR85oAAAAJ&hl=en&oi=ao>
Sharif University:
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Researchgate:
<https://www.researchgate.net/profile/M-Najafi-2>

SOCIAL MEDIA

Positions and Education

Sep 2023 – Present	Professor of Theoretical Physics	Physics dep., UMA, Ardabil, Iran.
Aug 2022 – Sep 2023	Visiting Research Scholar	Mechanical Engineering dep., University of Akron, Akron, Ohio, US
Feb 2021 – Present	Professor of Theoretical Physics	Physics dep., UMA, Ardabil, Iran.
Feb 2019 – Feb 2021	Associate Professor	Physics dep., UMA, Ardabil, Iran.
2018 – 2019	Visiting Research Scholar	Computer sciences dep., ETH, Zurich, Switzerland.
2017 – 2018	Associate Professor	Physics dep., UMA, Ardabil, Iran.
2013 – 2017	Assistant Professor	Physics dep., UMA, Ardabil, Iran.
2007 – 2012	PhD Student in Physics (Statistical Field Theory)	Physics dep., Sharif university of technology, Tehran, Iran. Thesis: Off-critical sandpile model and percolation, Supervisor: Prof. Shahin Rouhani.
2005 – 2007	MSc. Student in Condensed Matter Physics	Physics dep., Sharif university of technology, Tehran, Iran. Thesis: Study on Dynamical Mean Field Theory and its applications, Supervisor: Prof. Nasser Nafari.
2001 – 2005	BSc Student in Solid State Physics	Zanjan university, Zanjan, Iran.

Scholar Visits

2018	Federal University of Fluminense, Niterói, RJ, Brazil.
2018 – 2019	IfB, ETH Zurich, Zurich, Switzerland.
2022-2023	University of Akron, Akron, USA.
2026	Upcoming: University of Mainz, Mainz, Germany.

Foreign Conferences

- 2011 **Bonn, Germany: Conference on the *Stochastic Analysis and its Applications Process*.**
- 2012 **Florence, Italy: Conference and School on *New Quantum States of Matter in and out of equilibrium*.**

SKILLS & INTERESTS

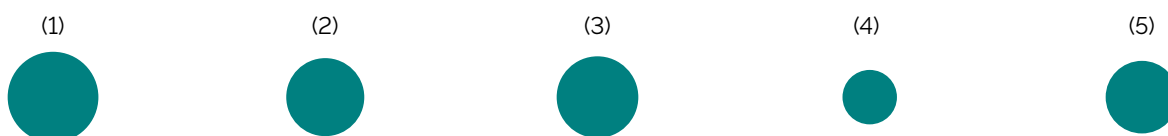
(1) STATISTICAL & COMPUTATIONAL PHYSICS (2) CRITICAL & NON EQUILIBRIUM PHENOMENA

(3) STOCHASTIC PROCESS, NON-LINEAR FOKKER-PLANCK EQ. & STOCK MARKETS

(4) INTEGRABLE MODELS & QUANTUM CHAINS

(5) LOW-DIMENSIONAL CONDENSED MATTER SYSTEMS

Rate of Activities and Focus:



Honors & Awards

- Principal member of the **computational physics branch** of physics society of Iran (PSI) (2020-now).
- Distinguished researcher in province of Ardabil, Ardabil, Iran (2019).
- Distinguished researcher in science group, University of Mohaghegh Ardabili, Ardabil, Iran (2018).
- Distinguished researcher in 20*20 research scheme in the science group, University of Mohaghegh Ardabili, Ardabil, Iran (2013).

TEACHING EXPERIENCE

I have been teaching the physics courses in university of Mohaghegh Ardabil, Ardabil Iran since 2012. Before that, during my PhD career, I was teaching in Azad university, Saveh, Iran, as well as Payamnour university, Hasan-Abad, Tehran, Iran. The SELECTED courses that I taught are classified to undergraduate and graduate courses:

- **Undergraduate courses:**
Foundations of classical electromagnetism, Part 1, 2, and 3 (2009, 2014-2015, 2017-2019), Foundations of Physics (2011-2015), Thermodynamics (2012, 2013), Modern Physics (2012), Fluid Mechanics (2013, 2015), Quantum Mechanics (2009, 2010, 2014), Solid State Physics (2012), Classical Mechanics (2013, 2021), Thermodynamics and classical Mechanics (2014), Computer Programming (2015,2017,2021), Astronomy (2019, 2020, 2023), Stochastic Process (2024).
- **Graduate courses in condensed matter physics:**
Special Topics in Condensed Matter Physics (2013), Advanced Solid State Physics, part 1 and 2 (2014,2020), Quantum Many body systems (2019), Special Topics in Condensed Matter Physics (2015), Electronics (2014), Thin films (2016), Mathematical Physics (2017), Magnetic properties of solids (2021), Superconductivity (2025).
- **Graduate courses in theoretical physics:**
Quantum Field Theory (2013), Advanced quantum mechanics (2015), The special relativity (2014), Relativistic quantum mechanics (2013), Elementary particles (2019), Conformal field theory (2019), Astronomy and astrophysics (2019, 2020, 2021), Cosmology (2019).
- **Graduate courses in statistical mechanics:**
Advanced statistical mechanics (2013,2015,2019), Computational Physics (2015, 2016, 2017,2018,2019), Complex systems (2019).

Publications

- **BOOKS**
 1. **M. N. Najafi**, "Computational Physics" (Farsi) (2019) Ardabil University Press, Ardabil, ISBN: 978-600-8569-92-3.
- **PUBLISHED PAPERS**
 1. A. Shoja-Daliklidash, **M. N. Najafi*** (2025): Sandpiles with finite-range interactions, Submitted to *Chaos; Fractal and Fractional*, Arxiv:250913500.

2. M. Pirgholi, **M. N. Najafi**^{*}, V. Adami, (2025): A Self-Organized Model for the Flicker Noise in Interacting Two-Dimensional Electron Gas, Submitted to *Physical Review E*, Arxiv:250913090.
3. NE Saghavaz, H Mohammadzadeh^{*}, Z Ebadi, **M. N. Najafi** (2025): Thermodynamic geometry of two coupled spins via various Ising Hamiltonians, *The European Physical Journal Plus* 140 (8), 749.
4. J. Cheraghalizadeh, N. Arghand, **M. N. Najafi**^{*} (2025): Vibrating sandpiles: An example of systems with directionality transition, *Physical review E* 111, 064111.
5. **M. N. Najafi**^{*}, F. Foroughirad, (2025): Fractional Nonlinear Schrodinger Equation Revisited, Submitted to *Physical review A*, Preprint: arXiv:2505.19202.
6. V Adami, H Masoomy, **M. N. Najafi**^{*}, (2025): Topological data analysis of the visibility graphs of the BTW avalanche-size sequences, *Journal of Physics A: Mathematical and Theoretical* 58 (20), 205002.
7. F Alonso-Marroquin^{*}, Y. Tang, F Gharari, **M. N. Najafi**, (2025): Salpeter equation with complex Hamiltonian, *Physical review E* 111 (5), 054121.
8. N Einali, H Mohammadzadeh, V Adami, **M. N. Najafi**^{*}, Quantum Geometry of Finite XY Chains: A Comparison of Neveu-Schwarz and Ramond Sectors, Submitted to *Journal of Statistical Mechanics*, Preprint arXiv:2504.13346.
9. J Cheraghalizadeh, HJ Herrmann, **M. N. Najafi**^{*}, (2025): Forest fire as a temperature-pattern-driven depinning problem, *Physical review E* 111, 054115.
10. A Makani, **M. N. Najafi**^{*}, (2025): Emergent Dynamical Ising Transition in Diffusive Sandpiles, Submitted to *Physical review Letters*, preprint Arxiv 250216893.
11. A. Shoja-Daliklidash, **M. N. Najafi**^{*}, N. Sepehri-Javan (2025): Mapping Sandpiles to Complex Networks, Submitted to *Physical review E*, Preprint: arXiv:2501.15845.
12. H. Esmaili, H. Mohammadzadeh, M. Biderang, **M. N. Najafi**^{*}, (2024): Quantum Many-Body Theory for kq-Deformed Particles, *Physical Review A* 111, 022223, Preprint: arXiv:2412.05822.
13. V. Adami, S. Emdadi-Mahdimahalleh, H. J. Herrmann, **M. N. Najafi**^{*}, (2024): Centrality and Universality in Scale-Free Networks, Submitted to *Physical review Letters*, Preprint: arXiv:241210406.
14. N. Dashti, **M. N. Najafi**, D. J. Searles^{*}, (2024): Pheromone-Guided Navigation of Potential Mates: A Distinct Exploration Strategy, Submitted to *Physical review X life*, preprint: arXiv:2411.09092.
15. J. Cheraghalizadeh, N. Valizadeh, S. Tizdast, **M. N. Najafi**^{*}, (2024): Fractional Brownian motion as a rough surface, *Physica A: Statistical Mechanics and its Applications* p.129907.
16. H. Esmaili^{*}, H. Mohammadzadeh, M. Biderang, **M. N. Najafi**, (2024): Thermodynamic geometry of a system with unified quantum statistics., *Physical Review E*. 109(4):044104.
17. **M. N. Najafi**^{*}, A. Ramezanzpour, MA. Rajabpour, (2024): A field theory representation of sum of powers of principal minors and physical applications, *Scipost Physics*, preprint: arXiv: 2403.09874.
18. Y. Tang, F. Gharari, K. Arias-Calluari, F. Alonso-Marroquin, **M. N. Najafi**^{*}, (2024): Variable-order porous media equations: Application on modeling the S & P500 and Bitcoin price return, *Physical Review E*. 2024;109(2):024310.
19. J. Cheraghalizadeh, M. Luković, **M. N. Najafi**^{*}, (2024): Simulating cumulus clouds based on self-organized criticality, *Physica A: Statistical Mechanics and its Applications*, 636:129553.
20. V. Adami, Z. Ebadi, **M. N. Najafi**^{*}, (2024): A dandelion structure of eigenvector preferential attachment networks, *Scientific Reports* 14, 6994, Preprint: arXiv:2404.09238.
21. H. Masoomi, V. Adami, **M. N. Najafi**^{*}, (2023): Relation between the degree and betweenness centrality distribution in complex networks, *Physical Review E* 107 (4), 044303.
22. **M. N. Najafi**^{*}, Mohammad Nabil, Rafsun Hossain Mridha and S A Nabavizadeh, (2023): Anomalous Self-Organization in Active Piles, *Entropy* 25(6), 861.
23. **M. N. Najafi**^{*}, Rafe Zayed and S A Nabavizadeh, (2023): Swarming Transition in Super-Diffusive Self-Propelled Particles, *Entropy* 25(5), 817.
24. M. Maleki, H. Mohammadzadeh^{*}, **M. N. Najafi**, Z. Ebadi, (2023): Beyond the Planck temperature. *Physica Scripta* 98 (4), 045008.
25. J. Cheraghalizadeh, M.A. MirJafarlou, and **M. N. Najafi**^{*}, (2023): Sandpiles Subjected to Sinusoidal Drive. *Physical Review E* 107 (6), 064132.
26. N. Valizadeh, M. Samadpour, H. Hamzehpour, **M. N. Najafi**^{*}, (2023): Edwards-Wilkinson depinning transition in fractional Brownian motion background, *Scientific Reports* 13(1), 12300.
27. M. Rahimi-Majd, J. G Restrepo and **M. N. Najafi**^{*} (2022) Stochastic and deterministic dynamics in networks with excitable nodes, *Chaos* 33, 023134.
28. H. Moayeri^{*}, **M. N. Najafi** (2022): The intermediate fermionic species created by SO(3) rotation in the representation of the Dirac equation, *U.P.B. Sci. Bull., Series A*, Vol. 72, Iss. 1.
29. J. Cheraghalizadeh, M. Lukovic, and **M. N. Najafi**^{*}, (2022): Simulating Cumulus Clouds based on Self-Organized Criticality. *arXiv preprint arXiv:2212.02580*.
30. J. Cheraghalizadeh, S. Tizdast, S. Doostdari, and **M. N. Najafi** (2022): Statistical analysis of the drying pattern of coffee. *arXiv preprint arXiv:2211.12132* (2022).

31. B. Tarighi, R. Khasseh, **M.N. Najafi**, and M.A. Rajabpour, (2022): Universal logarithmic correction to Rényi (Shannon) entropy in generic systems of critical quadratic fermions. *Physical Review B*, 105(24), p.245109.
32. K. Arias-Calluari*, **M. N. Najafi**, M.S. Harre, F. Alonso-Marroquin (2022): Testing stationarity of the detrended price return in stock markets, *Physica A Statistical Mechanics and its Applications* 587, 126487.
33. M Maleki*, H Mohammadzadeh, Z Ebadi, **M. N. Najafi** (2022): Description of the properties of dark matter by deformed statistics, *Journal of Statistical Mechanics: Theory and Experiment* 2022 (1), 013104.
34. M. Rahimi-Majd, T. Shirzad, and **M.N. Najafi**, (2022): A self-organized critical model and multifractal analysis for earthquakes in Central Alborz, Iran. *Scientific Reports*, 12(1), pp.1-15.
35. M. Maleki, H. Mohammadzadeh, Z. Ebadi, and **M. N. Najafi**, (2022): Mass bounds on the deformed bosons as dark matter particles. *International Journal of Modern Physics A*, 37(11n12), p.2250059.
36. J. Cheraghalizadeh, S. Tizdast, H. Mohammadzade, and M. N. Najafi, (2022): Mapping cumulus clouds to scale invariant rough surfaces, *arXiv preprint arXiv:2204.13783*.
37. S.Tizdast, Z. Ebadi, J. Cheraghalizadeh, **M. N. Najafi***, Jose S. Andrade, Hans J Herrmann (2022): Self-similar but not conformally invariant traces obtained by modified Loewner forces, *Physical Review E* 105, 024103.
38. H. Dashti*, **M. N. Najafi**, H. Park (2021): Self-Repelling Bi-Exploration Process *Physical Review E* 104, 054135.
39. **M. N. Najafi***, J. Cheraghalizadeh, H. J. Herrmann (2021), Self-organized criticality in cumulus clouds, *Physical Review E* 103, 052106.
40. **M. N. Najafi***, S.Tizdast, Z. Moghaddam, M. Samadpour (2021), Flicker noise in two-dimensional electron gas, *Physica Scripta*. 2021 Nov 30;96(12):125259..
41. **M. N. Najafi***, S.Tizdast, J. Cheraghalizadeh, H. Dashti-Nasserabadi (2021), Invasion percolation in short-range and long-range disordered background, *Physical Review E* 104, 064119.
42. N. Valizadeh, M. Samadpour, H. Hamzehpour, **M. N. Najafi***, (2021), Edwards-Wilkinson depinning transition in the background of coulomb random potential, *Physical Review E* 104, 064140.
43. **M. N. Najafi***, S Tizdast, J. Cheraghalizadeh (2021): Some Properties of Sandpile Models as a Prototype of Self-Organized Critical Systems, *Physica Scripta* 96, 112001.
44. K. Arias-Calluari*, F. Allonso-Marroquin, **M. N. Najafi**, M. Harre, (2021): Methods for forecasting the effect of exogenous risks on stock markets, *Physica A: Statistical Mechanics and its Applications* 568, 125587.
45. M. Rahimi, M. A. Seifi-Mirjafarlou, Lucilla de Arcangelis*, **M. N. Najafi**, (2021) On the role of anaxonic local neurons in the crossover to continuously varying exponents for avalanche activity, *Physical Review E*, 103, 042402.
46. J. Cheraghalizadeh*, M. Seifi, Z. Ebadi, H. Mohammadzadeh, **M. N. Najafi**, (2021): Superstatistical two-temperature Ising model, *Physical Review E* 103(3), 032104.
47. J. Cheraghalizadeh, **M. N. Najafi***, A. Saber, (2021) cumulus clouds from the rough surface perspective, *Journal of the Earth and Space Physics* 47, 11. DOI: 10.22059/jesphys.2021.311393.1007254.
48. H. Massomi, B. Askari, **M. N. Najafi***, S. M. S. Movahed, (2021) Persistent homology of weighted visibility graph from fractional Gaussian noise, *Physical Review E* 104, 034116.
49. H. Mohamadzade*, M. Rastkar, **M. N. Najafi** , (2021):Thermodynamic geometry of normal (exotic) BTZ black hole regarding the fluctuation of cosmological constant, *International Journal of Geometric Methods in Modern Physics*, 18, 2150023.
50. S Tizdast, N Ahadpour, **M. N. Najafi***, Z Ebadi, H Mohamadzadeh (2020): Dynamical Crossover in Invasion Percolation, *Physica Scripta* 95, 115212.
51. F. Gharari, K. Arias-Calluari, F. Alonso-Marroquin, **M. N. Najafi*** (2020), Local and Non-local Fractional Porous Media Equations, *Physical Review E* 104 (5), 054140.
52. M Samadpour*, M Dehghani, P Parand, **M. N. Najafi**, E. Parvazian (2020): Photovoltaic performance and electrochemical impedance spectroscopy analysis of CdS/CdSe sensitized solar cell based on surfactant modified ZnS treatment, *Applied Physics A* 461, 126.
53. **M. N. Najafi***, M. Rahimi-Majd, T. Shirzad (2020): Avalanches on the complex network of Rigan Earthquake, Virtual Seismometer Technique, Criticality and Seismic Cycle, *Europhysics Letters* 130 (2), 20001.
54. **M. N. Najafi***, M.A. Rajabpour (2020): Formation probabilities and statistics of observables as defect problems in the free fermions and the quantum spin chains, *Physical Review B* 101, 165415.
55. **M. N. Najafi***, J. Cheraghalizadeh, M. Lukovic, H.J. Herrmann (2020): Geometry-induced non-equilibrium phase transition in sandpiles, *Physical Review E* 101, 032116.
56. **M. N. Najafi***, Z. Moghaddam, M. Samadpour, N.A.M. Araujo (2020): Invasion sandpile model, *Journal of Statistical Mechanics: Theory and Experiment*, 2020(7), p.073205.
57. M. Maleki*, H. Mohammadzadeh, Z. Ebadi, **M. N. Najafi** (2019): Deformed Boson condensate as a model of Dark Matter, Preprint: Arxiv: 191204656.
58. **M. N. Najafi***, J. Cheraghalizadeh, H.J. Herrmann (2019): Elastic backbone phase transition in the Ising model, *Physical Review E* 100, 042132.

59. F. Alonso-Marroquin*, K. Arias-Calluari, M. Harre, **M. N. Najafi**, H. J. Herrmann (2019): Q-Gaussian diffusion in stock markets, *Physical Review E* 99, 062313.
60. Mahmoud Samadpour*, Hieng Kiat Jun, Parisa Parand, **M. N. Najafi** (2019): CdS quantum dots pre-deposition for efficiency enhancement of quantum dot-sensitized solar cells, *Solar Energy* 188, 825-830.
61. **M. N. Najafi*** (2019): An electronic avalanche model for metal-insulator transition in two dimensional electron gas, *The European Physical Journal B* 92, 172.
62. N. Sepehri-Javan*, M. Hosseinpour Azad, **M. N. Najafi** (2019): Semi-Analytical Solution for Solitary Waves in a Dissipative Suspension of Metallic Nanoparticles, *Plasmonics* 14, 579-593.
63. F. Adli*, H. Mohammadzadeh, Z. Ebadi, **M. N. Najafi** (2019): Nonperturbative thermodynamic geometry of nonextensive statistics, *International Journal of Geometric Methods in Modern Physics*. 16 1950069.
64. **M. N. Najafi***, S. Tizdast, J. Cheraghalizadeh (2019): Schramm-Loewner Evolution in the background of attractive and repulsive points in the stochastic Henon-percolation lattice, *Acta Physica Polonica B* 50, 929.
65. **M. N. Najafi***, M. Rahimi (2019): The effect of retardation in neuronal activity in the random networks, *Physica Scripta* 94, 4896.
66. **M. N. Najafi***, Z. Moghaddam (2019): Local smoothing in sandpiles: spanning avalanches, bifurcation and temporal oscillations, *Physical Review E* 99, 042120.
67. F. Adli*, H. Mohammadzadeh, **M. N. Najafi**, Z. Ebadi (2019): Condensation of non-extensive ideal Bose gas and critical exponents, *Physica A: statistical mechanics and its applications* 521, 773-780.
68. J. Cheraghalizadeh, **M. N. Najafi*** (2019): Correlation effects in the diluteness pattern in non-integral dimensional systems on super diffusion process, *Physica Scripta* 94, 095204.
69. **M. N. Najafi*** (2018): Percolation transition in two dimensional electron gas: A quantum cellular automaton model, *Solid State Communications* 284, 84-87.
70. **M. N. Najafi***, J. Cheraghalizadeh (2018): Ising ferromagnets in disordered correlated square lattice, an example of Ising-Ising coupling, *Physical Review E* 98, 052136.
71. Z. Moghaddam, **M. N. Najafi***, A. Saber, Z. Ebadi (2018): Power spectrum of rare events in two-dimensional BTW model, *Physica Scripta* 93, 105203.
72. J. Cheraghalizadeh, **M. N. Najafi***, H. Mohammadzadeh (2018): Gaussian free field in the iso-height random islands tuned by percolation theory, *Journal of Statistical Mechanics, Theory and Experiment* 083301, DOI:10.1088/1742-5468/aad6c9.
73. J. Cheraghalizadeh, **M. N. Najafi***, H. Mohammadzadeh, A. Saber (2018): Self-Avoiding Walk on the square site-diluted Ising-correlated lattice, *Physical Review E* 97 (4), 042128.
74. **M. N. Najafi***, Nasim Ahadpour, Jafar Cheraghalizadeh, H. Dashti-Naserabadi (2018): Scaling properties of mono-layer graphene away from the Dirac point, *Physical Review E* 98, 012111.
75. M. N. Najafi* (2018): Coupling of $c=-2$ and $c=1/2$ and $c=0$ conformal field theories: The geometrical point of view, *Journal of Physics A: Mathematical and Theoretical* 51, 175001.
76. **M. N. Najafi***, H. Dashti-Naseabadi (2018): Statistical investigation of avalanches of three-dimensional small-world networks and their boundary and bulk cross-sections, *Physical Review E* 97, 032108.
77. J. Cheraghalizadeh, **M. N. Najafi***, H. Mohammadzadeh (2018): Gaussian Free Field in the background of metallic correlated disorders, *European Physical Journal B* 91 (5), 81:91.
78. N. Sepehri-Javan*, M. Hosseinpour Azad, **M. N. Najafi** (2018): Artificial Kerr effect on the self-focusing of laser in a dissipative suspension of metallic nanoparticles, *Physics of Plasmas* 25, 082310.
79. **M. N. Najafi*** (2019): Interaction-disorder-driven characteristic momentum in graphene, approach of multi-body distribution functions, *Scientific Reports* 9, 3624.
80. **M. N. Najafi***, H. Dashti-Naseabadi (2018): Sandpile on uncorrelated site-diluted percolation lattice; From three to two dimensions, *Journal of statistical mechanics, theory and experiment* 23211.
81. J. Cheraghalizadeh, **M. N. Najafi***, H. Dashti-Naserabadi, H. Mohammadzadeh (2017): Mapping of the Bak, Tang, and Wiesenfeld sandpile model on a two-dimensional Ising-correlated percolation lattice to the two-dimensional self-avoiding random walk, *Physical Review E* 96, 052127.
82. H. Dashti-Naseabadi, **M. N. Najafi*** (2017): Bak-Tang-Wiesenfeld model in the upper critical dimension: Induced criticality in lower-dimensional subsystems, *Physical Review E* 96, 04215.
83. **M. N. Najafi***, M. GhaseminezhadHaghighi (2017): Scale-invariant puddles in Graphene: Geometric properties of electron-hole distribution at the Dirac point, *Physical Review E* 95, 032112.
84. N. Sepehri Javan*, F. Rouhi Erdi, **M. N. Najafi** (2017): Magnetic field effect on the self-focusing of an intense laser pulse interacting with a bulk medium of graphite nanoparticles, *Physics of Plasmas* 24 052301.
85. **M. N. Najafi***, A. Tavana (2016): Universality class of the structural phase transition in the normal phase of cuprate superconductors, *Physical Review E* 94, 022110.
86. **M. N. Najafi*** (2016): Bak-Tang-Weisenfeld Model on the Square Percolation Lattice, *Journal of Physics A: Mathematical and Theoretical* 49, 335003.

87. **M. N. Najafi***, M. Ghaedi (2016): Water Propagation in the Porous Media, Self-Organized Criticality and Ising Model, *Physica A: Statistical Mechanics and its Applications* 445, 102–111.
88. **M. N. Najafi*** (2016): Monte Carlo study of the Ising ferromagnet on the site-diluted triangular lattice, *Physics Letters A* 380, 370–376.
89. **M. N. Najafi*** (2015): Renormalization group analysis of Blume–Capel ferromagnet on two-dimensional triangular lattice, *Physica Scripta* 90, 085206 (7pp).
90. **M. N. Najafi***, M. Ghaedi (2015): Geometrical clusters of Darcy's reservoir model and Ising universality class, *Physica A: Statistical Mechanics and its Applications* 427, 82–91.
91. H. Dashti-Naserabadi, **M. N. Najafi*** (2015): Statistical investigation of the cross-sections of wave clusters in the three-dimensional Bak-Tang-Weisenfeld model, *Physical Review E* 91, 052145.
92. **M. N. Najafi*** (2015): Observation of Schramm-Loewner evolution on the geometrical clusters of the Ising model, *Journal of Statistical Mechanics, Theory and Experiment* P05009 doi:10.1088/1742-5468/2015/05/P05009.
93. H. Asasi*, S. Moghimi-Araghia, **M. N. Najafi** (2015): Continuous transforming the BTW to the Manna model, *Physica A: Statistical Mechanics and its Applications* 419, 196–202.
94. **M. N. Najafi***, H. Mohammadzadeh (2015): Statistical study of two-dimensional electron gas within Thomas-Fermi approximation, *Journal of Research on Many-Body Systems*, If= 0.09.
95. **M. N. Najafi*** (2015): Fokker-Planck Equation of Schramm-Loewner Evolution, *Physical Review E* 92, 022113.
96. **M. N. Najafi*** (2014): Bak-Tang-Wiesenfeld model in the finite range random link lattice, *Physics Letters A*, 378, 2008–2015.
97. **M. N. Najafi*** (2013): Numerical determination of the boundary condition changing operators, *Physica A: Statistical Mechanics and its Applications* 392, Issue 20, 5179–5185.
98. **M. N. Najafi*** (2013): Left passage probability of Schramm-Loewner Evolution, *Physical Review E* 87, 062105.
99. **M. N. Najafi***, S. Moghimi-Aragh, S. Rouhani (2012): Observation of SLE(κ, r) on the critical statistical models, *Journal of Physics A: Mathematical and Theoretical* 45, 095001 (12pp).
100. **M. N. Najafi***, S. Moghimi-Aragh, S. Rouhani (2012): *Avalanche frontiers in the dissipative Abelian sandpile model and off-critical Schramm-Loewner evolution*, *Physical Review E* 85, 051104.

• IN WRITING PROCESS

1. **M. N. Najafi***, L. Majidi, R. Asgari, *on the magnetoresistance of graphene on transition metal dichalcogenides*.
2. M. Biderang, **M. N. Najafi***, *singlet and triplet superconducting states in Rashba-Hubbard model for Sr_2IrO_4* .
3. H. Masoomi, M. Lukovic, **M. N. Najafi***, (2021) Topological phase transition in Barabasi-Albert networks.
4. A. Shoja, **M. N. Najafi***, Complex network description of Schramm-Loewner Evolution.
5. A. Shoja, **M. N. Najafi***, Visibility Graph corresponding to Schramm-Loewner Evolution.
6. N. Arghand, **M. N. Najafi***, Information spread in complex networks.
7. V. Adami, Dibakar Gosh, **M. N. Najafi***, Higher order (m, p)-centrality driven attachment model.
8. A. Shoja, **M. N. Najafi***, Long-Range interaction Bak-Tang-Weisenfeld model.

CONFERENCES & PRESENTATIONS

• ORAL PRESENTATION

1. **M. N. Najafi***, The distribution function of single-particles in graphene, with white- noise disorder in Thomas-Fermi-Dirac approximation, Iranian physical conference, Yazd, Iran (2015).
2. **M. N. Najafi***, S. Moghimi-Araghi, Application of SLE(κ, ρ) on Statistical Models, The 36th Conference of the Middle European Cooperation in Statistical Physics, 5-7 April 2011, Lviv, Ukraine.
3. **M. N. Najafi***, S. Moghimi-Araghi, S. Rouhani, SLE(κ, ρ) on 2D percolation systems, 5th International Conference on Stochastic Analysis and its Applications, University of Bonn, Germany (5-9 September 2011).
4. **M. N. Najafi***, S. Moghimi-Araghi, S. Rouhani, Off-Critical Statistical SLE, New quantum states of matter in and out of equilibrium, April 10- June 1, 2012, Firenze, Italy.
5. **M. N. Najafi***, Fokker-Planck Equation for conformal invariant curves, 7th Conference on statistical physics and complex systems, December 12-13 2014, Zanjan, Iran.
6. **M. N. Najafi***, Ising Model on Fractal Geometry, 12th Conference on condensed matter physics, January 27-28 2015, Isfahan, Iran.
7. **M. N. Najafi***, Effect of Coherence Length on the transport of Electron in 2D non-equilibrium Electron Gas, Annual RIAPA meeting on low dimensional systems, 25-26 May 2015, Tabriz Univ. Tabriz, Iran.
8. **M. N. Najafi***, Two-Dimensional Blume-Capel Model, RG Point of View, 21th conference on condensed matter physics and school on complex fluids. May 27-29, 2015, IASBS, Zanjan, Iran.
9. **M. N. Najafi***, Application of Schramm-Loewner evolution to the Ising model, Iranian physical conference, Mashhad, Iran (2015).

10. **M. N. Najafi***, H. Dashti-Naserabadi, Two-dimensional induced model of three dimensional BTW model, Iranian physical conference, Mashhad, Iran (2015).
11. **M. N. Najafi***, B. Sheikhi-Shahrivar, Statistical study of non-equilibrium 2D electron gas in the Thomas-Fermi-Dirac approximation, conference on many particle systems, Khaje-nasir university, Tehran, Iran (2015).
12. **M. N. Najafi***, Geometrical properties of the Ising model on the 2D percolation lattice, condensed matter physics conference, Isfahan, Iran (2014).
13. **M. N. Najafi*** Statistical investigation of the fluid movement in the 2D porous media, 8th statistical physics conference, Isfahan, Iran (2015).
14. **M. N. Najafi***, Ito calculations for the two particle distribution function in the Rossi-Sarma approximation for graphene, Iranian physical conference, Yazd, Iran (2017).
15. **M. N. Najafi***, R. Khodadoost, Application of SLE to the charge iso-lines of graphene, Low-dimensional systems conference, Tabriz, Iran (2017).
16. **M. N. Najafi***, A. Ramezanzpour, M. A. Rajabpour, On the sum of powers of principal minors, Zanjan, Iran (2024).
17. A. Shoja, **M. N. Najafi*** Complex network description of SLE, Condensed matter physics conference, Zanjan, Iran (2025).

Thesis Supervised

• PHD:

1. F. Adli (Advisor), Thermodynamic study of systems with various non-extensive statistics and their applications (2019).
2. M. Hosseinpour (Advisor), Non-linear dynamics of laser in nano-suspension of metallic nano particles, (2018).
3. S. Tizdast, Combination of $c = 0$ and $c = 1/2$ conformal field theories, an SLE investigation (2020).
4. J. Cheraghalizadeh, Statistical field theory on the fractal lattices (2020).
5. M. Maleki, Application of generalized statistics in gravity and cosmology (2019).
6. N. Valizadeh (Advisor), The growth of interfaces and depinning transition in the patterned random media (2022).
7. V. Adami, The structure of complex networks (2025).
8. M. Pirgholi (Ph. D candidate), Mott-Insulator transition in interactive 2 dimensional electron gas.
9. M. Beyrami (Ph. D candidate) t-J model for triangular lattice with spin-orbit interactions.
10. H. Esmaeili, Many body description of intermediate statistic particles (2024).
11. A. Shoja (Ph. D candidate) Complex network duality in self-organized critical systems.
12. N. Arghand (Ph. D candidate) Neuronal Non-linear dynamics; non-linear transfer functions.
13. M. Dournama (Ph. D candidate) Quantum Many body theory for particles with fractional statistics.

• MSC:

1. S. Bahrampour (M. Sc.), A review on the quantum Hall effect and its relation to conformal field theory, (2015).
2. M. Beyrami (M. Sc.), A review on the Kondo effect and its relation to conformal field theory, (2015).
3. Mohammad Reza Azin, The application of q-deformed statistics in metallic solids, (2015).
4. N. Ahadpour (M. Sc.), statistical investigation of the Dirac points in graphene and the rule of the disorder within the Thomas-Fermi-Dirac approximation (2015).
5. K. Ahadzadeh, Investigation of the fluid movement pattern in 2D porous media (2016).
6. N. Cheraghpour, The qp-deformation and its applications, (2015).
7. R. Khodadoost (M. Sc.), A review on the multi-SLEs, (2016).
8. S. Noori-Gashti, Statistical mechanics and thermodynamics in the relativistic frames, (2016).
9. Z. Moghadam (M. Sc.), The effect of micro-flicks in the rare events in sandpiles, (2018).
10. Samira Esfaniarpour Boroujeni, Study of the quantum transitions in entangled spin chains, (2015).
11. T. Sheikhlou (M. Sc. candidate), Bose-Einstein condensate model for the dark matter, (2019).
12. Gholizadeh (M. Sc. candidate), The retardation effects of signal propagation in random systems, (2019).
13. M. Rashidi (M. Sc. candidate), elastic backbone of Gaussian free field, (2019).
14. M. Abedi (M. Sc. candidate), The invasion BTW model, (2019).
15. F. Yousefi (M. Sc. candidate), Application of BTW model for the earthquake, weighted by the cross-correlations, (2019).
16. M. Rastkar, Black holes from quantum and thermodynamic perspective. (2016).

17. B. Sheikhi-Shahrivar (M. Sc.), Study of the non-equilibrium 2D electron gas with the short- range interactions in the Thomas-Fermi-Dirac approximation, (2014).
18. S. Tizdast, The Fokker-Planck equation for Schramm-Loewner evolution, (2016).
19. J. Cheraghalizadeh, Statistical models on the fractal lattices, (2018).
20. S. Doostdari, Statistics of cracks in coffee (2020).
21. M. A. Seifi-Mirjafarlou, Fisher-Hardwig method for entanglement entropies, (2020).
22. M. Ravanbakhsh, Synchronization in complex networks: the Kuramoto model (2020).
23. F. Madadi, Generalized Forest Fire models (2022).

Projects and Funds

• PROJECTS:

1. **M. N. Najafi**, Simulation of Fluid Movement in the Oil Reservoirs for Controlling and Optimizing of the Petroleum Production, *University of Mohaghegh Ardabili* (2013-2014).
2. **M. N. Najafi**, Geometrical properties of the Darcy model in oil reservoirs analysis, *Iran National Science Foundations (INSF)* (2013-2014).
3. **M. N. Najafi**, Determination of the role of disorder in transport of graphene via studying the charge level lines, *Iran National Science Foundations (INSF)* (2015-2016).
4. **M. N. Najafi**, Monte-Carlo study of charge transport of two-dimensional electron gas, *Iran National Science Foundations (INSF)* (2016-2018).
5. **M. N. Najafi**, Signal propagation in small world network model for the brain, *University of Mohaghegh Ardabili* (2016-2017).
6. **M. N. Najafi**, Fluid Propagation in two-dimensional cross-sections of three-dimensional reservoirs, *University of Mohaghegh Ardabili* (2016-2017).
7. **M. N. Najafi**, The nature of metal-insulator transition in two-dimensional electron gas systems, *University of Mohaghegh Ardabili* (2017-2018).
8. **M. N. Najafi**, The Automaton model of fluid propagation in three-dimensional porous media with Ising-like porosity pattern, *University of Mohaghegh Ardabili* (2017-2018).
9. **M. N. Najafi**, Soliton solution of fractional non-linear Schrodinger equation, *University of Mohaghegh Ardabili* (2025).

PostDoc Projects

• POSTDOCS:

1. **Neda Valizadeh**, Depinning transition in the correlated random media, *Science foundations of Iran (INSF)* (2023-present).