

Curriculum Vitae

Mohammad D. Niriy

(Wednesday, April 16, 2025)

➤ **Personal Information:**

Nationality: Persian

Birth on: August 1979

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Place of Birth (City, Country): Karaj, Iran

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➤ **Current Position**

Assistant Professor of Physics at Institute for Advanced Studies in Basic Science (IASBS) from Oct. 2010.

➤ **Educational Background**

Post Doctoral fellow at Institute for Advanced Studies in Basic Science (IASBS), Gavazang, Zanjan, Iran, Sep. 2009-Oct. 2010.

Ph.D. in Complex System Physics, Sharif University of Technology, Tehran, Iran, 2004-2008. Dissertation title: “*The Stochastic Properties of Burgers and Kardar-Parisi-Zhang Equations in The Strong Coupling Limit*”.

Master in Solid State Physics, Iran University of Science and Technology, Tehran, Iran, 2003-2004. Thesis title: “*Effect of Anomaly on Suppression of Critical Temperature and Hole Concentration in Plane Compounds*”.

Bachelor in Applied Physics, Sharif University of Technology, Tehran, Iran, 1997-2001.

High School Diploma in Mathematics and Physics, Shahid Soltani high school ([NODET](#)), Karaj, Iran, 1993-1997.

➤ **Publications**

1. M. D. Niriy, *Emergent order in the orientation of localized dipoles in a two-dimensional elastic array*, [Iranian J. of Phys. Res.](#) **24**, 4, 467 (2025).

1. S. Ismailzadeh and M. D. Niry, Comparison of the clock, stochastic cutoff, and Tomita Monte Carlo methods in simulating the dipolar triangular lattice at criticality, [Phys. Rev. E](#) **111**, 025308 (2025).
2. Z. Babae, M. Bagherikalhor, L. Elyasizad, M. D. Niry, and G. R. Jafari, Individual versus social benefit on heterogeneous networks, [Phys. Rev. E](#) **105**, 044307 (2022).
3. L. Elyasizad and M. D. Niry, *Local Violation of Conservation in the Abelian Sandpile Model through Fractal Patterns of Non-conservative Sites*, [J. Stat. Phys.](#) **184**, 1 (2021).
4. O. Farzadian, T. Oikonomou, M. R. R. Good, and M. D. Niry, *Entropic analysis of the localization–delocalization transition in a one-dimensional correlated lattice*, [Physica A](#) **545**, 123350 (2020).
5. M. Khoddam, Z. Sheidafar, M. D. Niry, and M. R. H. Khajehpour, *Criticality in collective behavior of biogenic single-domain nanomagnetites*, [Phys. Rev. E](#) **98**, 032133 (2018).
6. A. Goodarzinick, M. D. Niry, A. Valizadeh, and Matjaž Perc, *Robustness of functional networks at criticality against structural defects*, [Phys. Rev. E](#) **98**, 022312 (2018).
7. O. Farzadian and M. D. Niry, *Role of short-range correlation in facilitation of wave propagation in long-range ladder chain*, [Physica A](#) **505**, 49 (2018).
8. O. Farzadian and M. D. Niry, *Delocalization of mechanical waves in the ladder chain of DNA with correlated disorder*, [Physica A](#) **450**, 95 (2016).
9. M. Zarepour, M. D. Niry, and A. Valizadeh, *Functional scale-free networks in the two-dimensional Abelian sandpile model*, [Phys. Rev. E](#) **92**, 012822 (2015).
10. S. Rasouli, M. D. Niry, Y. Rajabi, A. A. Panahi, and J. J. Niemela, *Applications of 2-D Moiré deflectometry to atmospheric turbulence*, [J. of Applied Fluid Mechanics](#) **7**, 651-657 (2014).
11. M. D. Niry, J. Mostafavi-Amjad, H. R. Khalesifard, A. Ahangary, and Y. Azizian-Kalandaragh, *Formation of silver nanoparticles inside a soda-lime glass matrix in the presence of a high intensity Ar⁺ laser beam*, [J. Appl. Phys.](#) **111**, 033111 (2012).
12. A. Sheikhan, N. Abedpour, R. Sepehrinia, M. D. Niry, M. R. Rahimi Tabar, and M. Sahimi, *Anderson localization and propagation of electromagnetic waves through disordered media*, [Wave. Random Complex](#) **20**, 191 (2010).
13. A. Bahraminasab, M. D. Niry, J. Davoudi, M. R. Rahimi Tabar, A. A. Masoudi, and K. R. Sreenivasan, *Taylor's frozen-flow hypothesis in Burgers turbulence*, [Phys. Rev. E](#) (Rapid Communications) **77**, 065302 (2008).
14. A. A. Saberi, M. D. Niry, S. M. Fazeli, M. R. Rahimi Tabar, and S. Rouhani, *Conformal invariance in two-dimensional KPZ surface*, [Phys. Rev. E](#) **77**, 051607 (2008).

15. R. Sepehrinia, M. D. Niry, B. Bozorg, and M. R. Rahimi Tabar, and M. Sahimi, *Exact Lyapunov exponent of the harmonic magnon modes of one-dimensional Heisenberg-Mattis spin glasses*, [Phys. Rev. B](#) **77**, 104202 (2008).
16. A. Bahraminasab, S. M. V. Allaei, F. Shahbazi, M. Sahimi, M. D. Niry, and M. R. Rahimi Tabar, *Renormalization group analysis and numerical simulation of propagation and localization of acoustic waves in heterogeneous media*, [Phys. Rev. B](#) **75**, 1 (2007).
17. N. Abedpour, M. D. Niry, A. Bahraminasab, A. A. Masoudi, J. Davoudi, M. R. Rahimi Tabar, and M. Sahimi, *Stochastic ϕ^4 -theory in the strong coupling limit*, [Nucl. Phys. B](#) **761**, 93 (2007).
18. M. R. Rahimi Tabar, M. Sahimi, F. Ghasemi, K. Kaviani, M. Allamehzadeh, J. Peinke, M. Mokhtari, M. Vesaghi, M. D. Niry, A. Bahraminasab, S. Tabatabai, F. Fayazbakhsh, and M. Akbari, *Short-term prediction of medium- and large-size earthquakes based on Markov and extended self-similarity analysis of seismic data*, in *Modelling Critical and Catastrophic Phenomena in Geoscience: A Statistical Physics Approach*, Lecture Notes in Physics, 705, pp. 281-301, edited by P. Bhattacharyya and B. K. Chakrabarti (Springer, Berlin, 2006).
19. V. Daadmehr, M. D. Niry, and A. T. Rezakhani, *Suppression of superconductivity in Pr-doped 123-systems hole localization and hole clustering concepts in CuO₂ planes*, [Iranian J. of Phys. Res.](#) **6**, 3 (2006).

➤ **Other Academic Activities**

2. E. Leyla and M. D. Niry, *Local violation of conservation in the Abelian sandpile model with correlated dispersion of non-conservative sites* in 25th Annual IASBS Meeting on Condensed Matter Physics, Zanjan, 13-14 June 2019 (23-24 Khordad 1398).
3. E. Leyla and M. D. Niry, *The Abelian Sandpile Model with fractal binary patterns of Non-conservative Site* in *Avalanche Dynamics and Precursors of Catastrophic Events*, Les Houches, 4-8 February 2019.
4. K. Ahmadi and M. D. Niry, *Adaptation in the regular network of the 2-d Abelian sandpile model*, Sharif Neuroscience Symposium, Tehran, Iran, 6-7 March 2019.
5. A. Goodarzinick, M. D. Niry, A. Valizadeh, *Scale-free functional networks of 2D Ising model are highly robust against structural defects: neuroscience implications* in 25th Annual Computational Neuroscience Meeting: CNS-2016, Seogwipo City, Jeju-do, South Korea. 2-7 July 2016 published in page 33 of [BMC Neurosci.](#) **17**, 54 (2016).
6. F. S. Heydari, J. Mostafavi-Amjad, and M. D. Niry, *Modeling of formation of Ag nanoparticles in the Ag⁺/Na⁺ ion-exchanged glass matrix in the annealing process*, Iranian Physics Yearly Conference, 1395.
7. F. S. Heydari, J. Mostafavi-Amjad, and M. D. Niry, *Investigation the process of annealing and formation of Ag nanoparticles in the Ag⁺/Na⁺ ion-exchanged soda-lime glass matrix*, Iranian Physics Yearly Conference, 1395.

8. Z. Sheidaafar, M. Khoddam, M. D. Niry, *Study of rotational Brownian motion of magnetite nanoparticles in the cerebral cortex of brain in the external magnetic field*, Iranian Physics Yearly Conference, Isfahan University of Technology, Isfahan, Iran, 3 to 4 Dey 1394.
9. L. Iri, J. Mostafavi-Amjad, and M. D. Niry, *Relation of the wavelength to the size of the Ag nanoparticles induced in the ion-exchanged soda-lime glass matrix by thermal annealing method*, 22th Iranian Conference on Optics and Photonics, 2016.
10. F. S. Heydari, J. Mostafavi-Amjad, and M. D. Niry, *Modeling of the annealing process in the Ag^+/Na^+ ion-exchanged soda-lime glass*, 22th Iranian Conference on Optics and Photonics, 2016.
11. Mahboubeh Khoddam, Zahra Sheidafar, Mohammad Dehghan Niry, *Increasing sensitivity of the nanomagnetic particles in the nerve tissue to the external magnetic field by tuning interaction at the critical point*, Iranian Physics Yearly Conference, Isfahan University of Technology, Isfahan, Iran, 8 to 9 Bahman 1393.
12. M. Zarepour, M. D. Niry, and A. Valizadeh, *Similarity of the brain and the sandpile model*, Winter School on Quantitative Systems Biology, ICTP, Miramare, Trieste, Italy, 1 to 12 December 2014.
13. M. Zarepour, M. D. Niry, and A. Valizadeh, *Derivation of the functional network of the Ising and sandpile models and their comparison with the functional network of the brain*, Iranian Physics Yearly Conference, Sistan and Balochestan University, Sistan and Balochestan, Iran, 17 to 20 Sharivar 1393.
14. E. M. Razi, S. Rasoli, and M. D. Niry, *Wind average velocity measurement using temporal and spatial correlation of angle of arrival of light beam propagating through the atmosphere*, 19th Iranian Conference on Optics and Photonics, 2013.
15. S. Rasouli, M. D. Niry, A. A. Panahi, Y. Rajabi, and J. J. Niemela, *Observations of anisotropy in atmospheric turbulence by means of Moiré deflectometry*, 64th Annual Meeting of the APS [Division of Fluid Dynamics](#) 56 (2011).
16. M. Mortazavifar, M. D. Niry, A. Ghods, *Simulating earthquakes by Abalian sandpile model with considering dissipation in faults*, 15th Geophysical Conference of Iran, May 2012.
17. A. Ahangary, M. D. Niry, Y. Azizian, J. M. Amjad and H. Khalesifard, *Statistical analysis of size distribution of Ag clusters formed over the surface of Ag^+/Na^+ ion-exchanged soda-lime glasses as a result of interaction with an intense Ar^+ laser beam*, 17th Iranian Conference on Optics and Photonics International Center for Science, High Technology & Environmental Sciences, Mahan- Kerman, 8-10 February 2011.
18. Poster entitled, *Renormalization group analysis and numerical simulation of propagation and localization of acoustic waves in heterogeneous media*, with A. Bahraminasab, S. M. V. Allaei, F. Shahbazi, M. Sahimi, and M. R. Rahimi Tabar, in [Anderson Localization Transition: Introductory Training Course](#), Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, 14 to 25 July 2008.

19. V. Daadmehr, M. D. Niry, and A. T. Rezakhani, *Pr Anomaly on hole concentration and phase transition for $R_{1-x}Pr_xBa_2Cu_3O_{7-\delta}$ compounds*, in Iranian Physics Yearly Conference, Shahid Abaspour University, Tehran, Iran, 23 to 24 August 2004.
20. V. Daadmehr, M. D. Niry, and A. T. Rezakhani, *Effect of Pr anomaly on critical temperature in high temperature superconductor $Gd_{1-x}Pr_xBa_2Cu_3O_{7-\delta}$* , in 10th Meeting on Condensed Matter Physics, Institute for Advanced Studies in Basic Sciences (IASBS), Gava Zang, Zanjan, Iran, 13 to 14 May 2004.

➤ **Research Interests**

- Complex System
- Neuroscience
- Disordered System
- Stochastic Process

➤ **PhD students**

1. Zahra Babaee, *The heterogeneity effect of individual benefits on the social networks structure*, IASBS (**Joint supervisor**, Apr. 2023).
2. Abdorreza Goodarzinick, *Investigating the robustness of functional networks of the Ising model against structural defects*, IASBS (**Joint supervisor**, Jan. 2020).
3. Ali Akbar Ahangary, *Spin to orbital momentum coupling of photons as a result of a high power laser beam interaction with Ag^+/Na^+ ion-exchanged glass*, IASBS (Advisor, Oct. 2017).
4. Omid Farzadian, *Effect of repeated sequence on the propagation of mechanical waves in the chain with a long-range correlation like DNA*, IASBS (**Supervisor**, Feb. 2016).
5. Ebrahim Mohammady Razi, *Investigation of inhomogeneity and anisotropy of laboratory convective air turbulence*, IASBS (Advisor, Nov. 2014).

➤ **Master students**

1. Solomon Ahmadzadeh Badoli, *A study of the Kardar-Parisi-Zhang (KPZ) model in (1+1) dimensions using detrended fluctuation analysis (DFA)*, IASBS (**Joint Supervisor**, Feb. 2025).
2. Farsila Payandi, *Modeling the propagation of scalar waves in a 1d media despite nonlinear effects*, IASBS (**Supervisor**, Oct. 2024).
3. Mahdi Beshkani, *Investigating the effect of long-range wiring on the 2d neocortex perspective using the quasi-Ising model*, IASBS (**Supervisor**, Nov. 2024).
4. Zahra Shahsavari, *The combination of the 2-d Ising and the Kuramoto models*, IASBS (**Supervisor**, Nov. 2023).
5. Behnaz Rezaei, *Antibacterial effects of ion and nanoparticles of silver on Bacillus strain M10742*, IASBS (**Joint supervisor**, Mar. 2022).

6. Fateme Bolhasani, *Rotational Brownian dynamics of a system consisting of magnetic dipoles*, IASBS (**Supervisor**, Oct. 2022).
7. Hesam E. Derakhshan, *Numerical solution of the Kardar-Parisi-Zhang equation using the arbitrary Eulerian-Lagrangian method in 1+1 dimensions*, IASBS (**Joint supervisor**, Jun. 2022).
8. Leyla Elyasizad, *Local violation of conservation in the Abelian sandpile model through patterns with long-range correlation*, IASBS (**Supervisor**, July 2021).
9. Motahare Delbari, *Critical behavior of the 2-d Ising model in the presence of disorder*, IASBS (**Joint supervisor**, Feb. 2021).
10. Azam Tavassoli Koupani, *Study of antibacterial effects of an ion-exchanged glass with silver salt on E.coli K-12*, IASBS (**Joint supervisor**, Aug. 2019).
11. Keivan Ahmadi, *Adaptivity in the regular network of the 2-d Abelian sandpile model*, IASBS (**Supervisor**, Jul. 2019).
12. Mohammad Mahdavi Fatideh, *Antibacterial activity of silver nanoparticles produced by the thermal ion-exchange method*, IASBS (**Joint supervisor**, Jan. 2019).
13. Reza Chehelmiran, *Review of Mie scattering from spherical nanoparticles*, IASBS (**Joint supervisor**, Dec. 2018).
14. Reza Shakuri, *The study of 1+1 surface growth dynamics resulting from the deposition of granular particles*, IASBS (Advisor, Sep. 2016).
15. Latifeh Iri, *Surface plasmon resonance of silver nanoparticles in the Ag⁺/Na⁺ ion-exchanged soda-lime glass matrix*, IASBS (**Joint supervisor**, Apr. 2016).
16. Fahime-sadat Seyed Heydari, *Studying the process of reducing, diffusion and formation of Ag nanoparticles in the Ag⁺/Na⁺ ion-exchanged soda-lime glass matrix*, IASBS (**Joint supervisor**, Aug. 2016).
17. Zahra Sheidaafar, *Study of rotational Brownian motion of magnetic nanoparticles in the cerebral cortex*, IASBS (**Supervisor**, Feb. 2016).
18. Mahboubeh Khoddam, *Increasing the sensitivity of the magnetic nanoparticles in the nervous tissue to the external magnetic field by tuning interaction at the critical point*, IASBS (**Supervisor**, Apr. 2015).
19. Mohsen Shamsi, *Studying the process of transferring the orbital angular momentum to a laser beam passing through transparent uniaxial structures*, IASBS (**Supervisor**, May 2015).
20. Alireza Alipour, *The study of pattern formation in the drying process of a thin layer of a colloidal complex fluid of starch and saltwater solution*, IASBS (**Joint supervisor**, Sep. 2014).
21. Zahra Zarei, *Study of E. coli bacteria deposition process at the edge of evaporating drops of colloidal suspensions*, IASBS (Advisor, Oct. 2014).
22. Mahdi Zarepour, *Derivation of the functional network of the Ising and sandpile models and their comparison with the functional network of the brain*, IASBS (**Supervisor**, Apr. 2014).

23. Seyed Morteza Mortazavi Rad, *Dynamics of silver nanoparticles on the surface of ion-exchanged glass under interaction with high intensity Ar⁺ laser beam*, IASBS (**Supervisor**, Oct. 2013).
24. Mehdi Torang, *Simulation of X-ray production, using pyroelectric crystal by a specified electric field*, SRBIAU (**Joint supervisor**, 2012).
25. Mostafa Mortazavi, *Abelian sandpile model with fractal dissipation*, IASBS (**Supervisor**, Dec. 2011).
26. Ali Akbar Ahangary, *Statistical analysis of size distribution of Ag clusters formed over the surface of Ag⁺/Na⁺ ion-exchanged soda-lime glasses as a result of interaction with an intense Ar⁺-laser beam*, IASBS (Advisor, Oct. 2010).

➤ **List of courses**

1. **Stochastic Processes**
2. **Neural Signal Processing**
3. **Computational Physics**
4. **Complex Network**
5. Numerical Analysis
6. C++ Programming I, II
7. Advanced Classical Mechanics
8. Advanced Quantum Mechanics I, II, III
9. Advanced Electrodynamics I, II
10. Classical Mechanics I, II, III
11. Electromagnetics I, II, III
12. Mathematical Physics I, II, III
13. General Mathematics I, II, III