

Mohammadreza Ebrahimi Khuzani

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EDUCATION **M.Sc.** Particle Physics and Fields Theory 2018 - 2021
Isfahan University of Technology (IUT), Isfahan, Iran
(Ranked 2nd university in physics and generally top 5 best in Iran according to [U.S.News](#))
GPA: 3.73/4.00
Thesis Title: *Private*
Supervisor: [Prof. Behrouz Mirza](#)

B.Sc. Atomic and Molecular Physics 2013 - 2018
Semnan University, Semnan, Iran
GPA (Major): 3.02/4.00
Supervisor: [Prof. Mehrdad Ghomi Nejad](#)

RESEARCH INTERESTS Black Holes and their Thermodynamic
Machine Learning and Data Analyze in Physics
Particle Physics
Cosmology (Theoretical/Experimental)

PUBLICATIONS *Due to privacy, I cannot publish this part*

AWARDS AND HONORS Achieved 1st Ranked Among Graduating Class 2020
Isfahan University of Technology

Awarded Full Scholarship From Isfahan University of Technology 2018

Ranked Within The Top 2% Among More Than 20,000 Participant
In Iranian university entrance exam for Masters degree in physics 2018

Selected as The Most Active Student in Science and Teamwork
Semnan University 2016

Ranked Within The Top 5% Among More Than 300,000 Participant
In Iranian university entrance exam for Bachelors degree in physics 2013

Succeeded as 5th ranked in Router Robot
Provincial competition 2009

Awarded 1st Ranked in Painting Art, Watercolor
Provincial competition 2006

EXPERIENCES Research Experience

- Investigated 1D-Ising model to minimize RMSE for predicting the spins interactions in **machine learning** 2021
github.com/mohammadreza-ebrahimi/1D-Ising-model
- Reviewed **CERN Electron Collision data** to predict the electron mass in **machine learning** 2021
github.com/mohammadreza-ebrahimi/CERN-collision-data
- Reviewed 270 data to predict of the G_0W_0 band-gaps by developing regression model in **machine learning** 2021
github.com/mohammadreza-ebrahimi/band-gap
- Developed a program in **xAct** to derive 5-d and 4-d Schwarzschild and BTZ solution 2021
github.com/mohammadreza-ebrahimi/Schwarzschild-xAct
- Analyzed higher dimension rotating black holes solution by novel theory of deriving rotational black holes metric 2020
- Examined holographic equipartition in Binachi Type I cosmology 2019

Teaching Experience

- Lectured xAct, diffgeo and grTensor package for almost 20 researcher in 4 sessions. (IUT-MEET) 2019 - Now
- Guided Mathematica and MAPLE for 3 general relativity projects 2019 - Now
- English language, physics and mathematics 2018 - 2019

Work Experience

- Assistant director of Semnan physics association, holding *Physics Day* with about 200 participant, experiments instructor 2014 - 2015
- Managed 80 percent of iOS software fixing 2013 - 2015
- Created artwork on wood as handicrafts 2005 - 2010

SKILLS

Computer and Technical Skills

Programming

Python, Shell & Bash scripting, C/C++ Professional

Software

Mathematica, xAct and diffgeo (3 years of experience), MAPLE and grTensorIII, PowerPoint, Office Word Professional

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|---|---|--------------|
| | Notation, Computation and Quantized Hamilton Dynamics package in Quantum-Mathematica | Intermediate |
| | Operating System Unix/Linux, Windows, Mac OS, iOS, Android | Professional |
| | Version Control System (VCS) Git, GitHub | Professional |
| | Notebooks Jupyter-Notebook, Kaggle | Professional |
| | Document Preparation L ^A T _E X, Excel, Microsoft Office Word, PowerPoint | Professional |
| | Languages Skills Persian: Native English: Professional -TOEFL iBT: 87 (R:23, L:21, S:22, W:21) Arabic: Limited Working Proficiency | |
| Data Science and Machine Learning Skills | I have created a portfolio for introduction to machine learning here . Data Analysis & Visualization Python: NumPy, Pandas, SciPy, Matplotlib, Seaborn C++: ROOT Mathematica, Maple | |
| | Data Visualization Matplotlib (Python), Seaborn (Python), Mathematica, Maple | |
| | Machine Learning and Deep Learning Scikit-learn, PyTorch, TensorFlow | |
| | Machine Learning Algorithms Linear regression, Ridge regression, LASSO regression, Elastic Net, Decision tree regressor and classifier, Random forest regressor and classifier, Stochastic Gradient Descent (SGD), k-Nearest Neighbors (kNN), Principal Component Analysis (PCA), Batch GD, k-Means, t-distributed Stochastic Neighbor Embedding (t-SNE), Mini Batch GD, Support Vector Machine (SVM), Logistic Regression, Softmax Regression, Deep Neural Network (DNN), Neural Network (NN), Convolutional Neural Networks (CNN), Bayesian Neural Network, GANs, Advanced GANs | |
| | Machine Learning Concepts Linear algebra, Calculus, Supervised learning, Unsupervised learning, Reinforcement learning, Loss function, Cost function, Data engineering, Optimizer, | |

Adam optimizer, Gradient descent, Gradient Descent (GD), Singular Value Decomposition (SVD), Hyperparameter optimization, SVM kernel, Metrics, Precision, Recall, F1 score, Confusion matrix, Sparse matrix

ACADEMIC PROJECTS

Mohammadreza Ebrahimi, "*Holographic Equipartition and Friedman Equations*", Prof. Behrouz Mirza, Isfahan University of Technology, Winter 2019

Mohammadreza Ebrahimi, "*Mind Effects on Matter*", Prof. Mehrdad Ghomi Nejad, Semnan University, Fall 2016

Mohammadreza Ebrahimi, "*Developed and implemented a random number creator for investigating experimental mind effects.*", Prof. Mehrdad Ghomi Nejad, Semnan University, Fall 2016

Mohammadreza Ebrahimi, "*Investigated Philosophical Concepts of Physics and Quantum, Analyzed 5 books*", Semnan University, Fall 2015

Mohammadreza Ebrahimi and N.Tajick, "*Condensed Matter and Thin Film*", Dr. Fatemeh Shariatmadar Tehrani, Semnan University, Spring 2017

SELECTED COURSES

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|------------------------------------|--------------------------------|
| General Relativity (18.3/20) | Physics Laboratory I (17.6/20) |
| Adv. Particle Physics I (18/20) | Physics Laboratory I (19.5/20) |
| Adv. Particle Physics II (17.5/20) | Optic Laboratory (17/20) |
| Electrodynamics (17.2/20) | Quantum Mechanic (18.5/20) |
| Adv. Quantum Mechanics (17.5/20) | General Chemistry (17/25/20) |
| Seminar (19/20) | English Language (20/20) |
| Fundamental Physics (18/20) | Family and Population (20/20) |

REFERENCES Behrouz Mirza

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Ahmad Shirzad

Associate Professor, Physics Department, Isfahan University of Technology, Isfahan, Iran
Email: shirzad@theory.ipm.ac.ir

Mehrdad Ghominejad

Associate Professor, Physics Department, Semnan University, Semnan, Iran
Email: mghominejad@semnan.ac.ir

Masoumeh Tavakoli

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