Mohammadreza Ebrahimi Khuzani

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EDUCATION

M.Sc. Particle Physics and Fields Theory 2018 - Expected 04/2021
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: 3.63/4.00
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
Particle Physics
Cosmology (Theoretical/Experimental)
Machine Learning and Data Analyze in Physics

PUBLICATIONS

I cannot publish this section in public, until an appropriate time.

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 2018
In Iranian university entrance exam for Masters degree in physics

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

Ranked Within The Top 5% Among More Than 300,0000 Participant 2013
In Iranian university entrance exam for Bachelors degree in physics

Succeeded as 5th ranked in Router Robot 2009
Provincial competition

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

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 ans 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

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

LaTeX, Excel, Microsoft Office Word, PowerPoint — Professional

Languages Skills

Persian: Native

English: Professional

-TOEFL iBT: Expected 100

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

Data Visualization

Matplotlib (Python), Seaborn (Python), Mathematica

Machine Learning

Scikit-learn, TensorFlow

Machine Learning Algorithms

Linear regression, Ridge regression, LASSO regression, Elastic Net, Decision tree regressor and classifier, Random forest regressor and classifier, Stochastic Gradient Descend (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), Logestic Regression, Softmax Regression, Deep Neural Network (DNN), Neural Network (NN), Convolutional Neural Networks (CNN)

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

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
Professor, Physics Department, Isfahan University of Technology, Isfahan, Iran
Email: b.mirza@iut.ac.ir

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

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

Masoumeh Tavakoli
Researcher, Isfahan University of Technology, Isfahan, Iran
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