

Ali Emami Kopaei.

Personal Details

Name – Ali Emami Kopaei

Gender– Male

Place and Date of Birth – Iran | 07 June 1994

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Profile

I am currently a master student in physics at Sharif University of Technology. My field of research is centered around applications of classical machine learning for identifying different phases of matter, specially the topological quantum computing, topologically ordered phases as well as out-of equilibrium ones including many-body-localization and discrete time crystals. I have a very good experience in working with big data analysis, handling large matrix and parallel programming with the professional packages like PANDA,SLEPc,PETSc.

I am expert in convolutional neural network(CNN) with multi hidden layer and using different methods for optimization like gradient descent and Adam optimization with different cost function such as Quadratic cost and Cross-entropy cost. Some part of our work related to time dependent systems so we use recurrent neural network (RNN) to study the behavior of such systems with the combination of unsupervised learning such as learning by confusion.

Education

Master of physics,Sharif University of Technology

Grade : 18.15/20

October,2017-Present

Bachelor of Science in Physics,Esfahan University

Grade : 14.1/20 – GRE physics 830/990

September,2012-September,2016

Research interests:

- 1- out-of-equilibrium phases of matter
- 2- Quantum Many-Body Physics
- 3- Computational physics
- 4- Neural Network
- 5- Machine Learning
- 6- Quantum machine learning
- 7- Condensed Matter

Expertise in Computational Condensed Matter Physics:

1. Artificial Neural Network based Machine Learning
2. Deep Learning Phases of Matter
3. Tensor Network Methods (MPS,PEPS)
4. Exact Diagonalization
5. Density matrix renormalization group (DMRG)
6. time-evolving block decimation (TEBD)
7. Quantum Monte Carlo
8. Krylov Subspace Iteration Methods
9. Message Passing Interface (MPI)

Computational Skill

LINUX (★★★★★ - Expert)	SLEPc,PETSc,MUMPS packages(★★★★★ - Expert)
XLEATEX(★★★★★ - Expert)	TensorFlow(★★★★★ - Expert)
LATEX(★★★★★ - Expert)	ITensor libraries(★★★★★ - Expert)
SciKit-Learn(★★★★★ - Expert)	QuSpin and QuTiP Packages(★★★★★ - Expert)
Theano(★★★★★ - Expert)	Microsoft Office (★★★★★ - Expert)
Tenpy(★★★★★ - Expert)	IPE (★★★★★ - Expert)

Programming Language and Software: Python, Matlab, C++, Mathematica, Fortran90.

Honors

Ranked top 0.5% in the university arrival test around the country in Physics

Ranked 9th in the university arrival test around the country in Photonics

Received research grant from sharif university in 2018

Received research grant from sharif university in 2019

Publications

H.Yarloo, **A. Emami Kopaei** and A.Langari “Homogeneous Floquet time crystal from weak ergodicity breaking” (submitted to PRB) (download the pdf [here](#))

A. Emami Kopaei, H.Yarloo and A.Langari “Investigation of the ANNNI model in high frustrated regime with Neural Network ” (in preparation)

Conference Publications:

Yarloo.H, **A.Emami Kopaei** and Langari.A “Detection of Scarred Time Crystals using confused Recurrent Neural Network” 15th Physics Society of Iran Conference on Condensed Matter 2019

A.Emami, Kopaei Yarloo.H, and Langari.A “Unveiling Floating Phase Through Artificial Neural Network” 4th Iran National Conference in Composition Physics 2020

Conference and Workshop

July 2018 : Deep Learning with TensorFlow, Laboratory of Intelligent Systems, Sharif University of Technology, Tehran, Iran, July 19, 2018.

July 2018 : Deep Learning with TensorFlow, Laboratory of Intelligent Systems, Sharif University of Technology, Tehran, Iran, July 19, 2018.

Sep 2018 : machine learning application in condensed matter , Tehran University , Tehran, Iran, Sep 11, 2018.

September 2016 : Advanced school on condensed matter physics - Many-body localization, School of Physics, IPM, Tehran, Iran, Sept. 17-18, 2016

Invited Talks:

Sep 2019: 15th Physics Society of Iran Conference on Condensed Matter

Teaching Experience

Nov 2019: Introduction to Electrodynamics II (Instructor: Dr.Langari), Sharif University of Technology

Feb 2019: Introduction to Electrodynamics I (Instructor: Dr.Langari), Sharif University of Technology

Feb 2019: Fundamentals of Statistical and Thermal Physics (Instructor: Dr.Moghimi), Sharif University of Technology

Languages

Persian

★★★★★ - Native speaker

English

★★★★☆ - Highly proficient in speaking and writing

REFERENCESE

PROF. ABDOLLAH LANGARI from Department of Physics Sharif University of Technology
langari@sharif.edu

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PROF. SAMAN MOGHIMI-ARAGHI from Department of Physics Sharif University of Technology
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PROF. MOHSEN AMINI from Department of Physics Isfahan University
mamini_1@ictp.it

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