Arsalan Motamedi

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Education

2021–present	**MSc of Physics of Quantum Information**. University of Waterloo/ Institute for Quantum Computation, Waterloo, Canada Lucky to be co-advised by Dr. Raymond Laflamme, and Dr. Pooya Ronagh
2016–2021	**Bachelor of Electrical Engineering and Bachelor of Physics**. Sharif University of Technology, Tehran, Iran GPA: 19.09/20 Rank 4th out of 162 students in the EE department according to the last announced ranking in Sep. 2020. Technical area of EE: Communication networks and systems

Research

Broadly speaking, I enjoy spending time proving theorems, and designing algorithms. The fields that I enjoy working on, include quantum computation, to machine learning, and statistics. For now, I am working on designing a quantum Gibbs Sampler, by making use of differential equations. Here is a list of my previous works:

- Detection of Macroscopicity: In this project, we (including Koorosh, Sadjad, and I, under the supervision of Dr. Karimipour) investigated the complexity of detecting macroscopicity for some macroscopic quantum states. It has previously been shown by Susskind and Aaronson that the detection of macroscopicity for the Schrödinger's cat state is necromancy hard! We, however, show that not all kinds of macroscopicity are hard to detect by considering a broader class of states (not only Schrödinger cat ones).
- B.Sc. thesis: with Rouzbeh Ghaderi, under the supervision of Dr. Babaie-Zadeh, worked on designing an algorithm for the task of classification, using sparsity. We developed an algorithm, which was able to achieve a relatively high accuracy using methods from dictionary learning.

Honors and Awards

September 2015	**Gold medal in the 11th National Olympiad on Astronomy and Astrophysics**, *held in Tehran, Iran*.
December 2016	**Silver medal in the 10th International Olympiad on Astronomy and Astrophysics**, *held in Bhubaneswar, India*.
September 2021	**Marie Curie Award**, *Scholarship received from the University of Waterloo*.
September 2021	**Science Graduate Award (SGA)**, *A financial award received from the University of Waterloo*.

Selected Courses

96/100– Graduate	**Theory of Quantum information**, *Instructed by Dr. John Watrous*.
TBA– Graduate	**Quantum Error Correction and Fault Tolerance**, *Instructed y Dr. Debbie Leung, Dr. Michael Vasmer*.
TBA– Graduate	**Introduction to Quantum Information Processing**, *Instructed by Dr. Rchard Cleve*, Course project: Complexity of K-local Hamiltonian Problem.

TBA–Graduate	**Quantum Information Processing Devices**, *Instructed by Dr. Chris Wilson.*
18.5/20–Master	**Probabilistic Analysis in High-dimensions**.
20/20–PhD	**Quantum Computation Theory**, Course project: quantum decision tree and quantum random walk.
20/20–PhD	**Quantum Information Theory**.
19.5/20–Master	**Information and Coding Theory**, Course project: information-theoretic limits for community detection in networks.
19.6/20–Master	**Blind Source Separation and Sparse Representation of Signals**.
19.9/0–Master	**Thermodynamics and Statistical Mechanics III**.
18.5/20–Master	**Condensed Matter Physics**.
17.6/20	**Machine Learning**.
18.9/20	**Convex Optimization**.
19.7, 20/20	**Thermodynamics and Statistical Mechanics I, II**.
20, 20/20	**Quantum Mechanics I, II**.

Teaching Experiences

Winter 2022	**TA of PHYS 122**, *Duties include quiz and exam grading.*
Spring 2020	**TA of Mathematical physics I**, *Duties include HW design, recitation sessions, and HW grading.*
Fall 2019	**TA of Electromagnetism**, *instructed by Dr Amin Khavasi*, Duties include HW grading.
since 2016	**Teaching Astronomy and Astrophysics Olympiad subjects**, *at Iran's national Young Scholar's Club (YSC) and top high-schools of Tehran.*

Linguistic Skills

Persian, *Mother tongue.*

English, *Advanced - TOEFL iBT score: 112 (Reading:30, Listening:29, Speaking:26, Writing:27).*

Spanish, *Elementary.*

Arabic, *Elementary.*

Computer Skills

Python, C, MATLAB and LaTeX

Outside Science

I am a guitarist in both Flamenco and Classical styles. I used to practice up to 10 hours a day. However, after entering the academic world, I look at it as a hobby and play it for fun in my spare time. Having said that, it is no surprise that I enjoy listening to Vicente Amigo guitar songs. Also, I am into almost any piece of minimal art.