

R. Abdelmouheymen Khamadja

MASTER'S STUDENT IN THEORETICAL PHYSICS

Constantine, Algeria

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Links are indicated by a ★ !

Education

University of Constantine 1

Constantine, Algeria

MASTER IN THEORETICAL PHYSICS

Sep. 2023 - June. 2025

- In Progress
- **Relevant Coursework:**
Quantum Mechanics, Quantum Field Theory(QED & QCD), General Relativity, Statistical Physics, Quantum Information and Quantum Computing, Standard Model, Astroparticles and Neutrino physics, Dark Matter and Dark Energy, Advanced Group theory, Numerical Physics, Introduction to Supersymmetry, Introduction to String theory.
- **Thesis:** Variational Quantum Algorithms, supervised by Dr. M. Taha Rouabah ★

University of Constantine 1

Constantine, Algeria

BACHELLOR IN THEORETICAL PHYSICS

Nov. 2020 - June. 2023

- **Grade:** 15.23_{/20} · **Rank:** 2nd
- **Relevant Coursework:**
Quantum Mechanics, Special Relativity, Relativistic Quantum Mechanics, Statistical Physics, Classical Field Theory, Particle Physics, Group theory, Differential Geometry, Numerical Physics.

Hechach Al Aid High School

Guelma, Algeria

BACCALAUREATE IN EXPERIMENTAL SCIENCES

Sep. 2020

- **Grade:** 16.67_{/20}

Experience

Constantine Quantum Technologies ★

Constantine, Algeria

GRADUATE RESEARCH ASSISTANT

sep. 2024 - present

- Working on scaling and improvement of Variational Quantum Algorithms (VQAs).
- Exploring noise resilience of VQAs.

Constantine Quantum Technologies ★

Constantine, Algeria

UNDERGRADUATE RESEARCH INTERN

Jun. 2023 - Sep. 2023

- Collaborated with a team of researchers working on Automated Warehouse Optimization using Quantum Annealing.
- Explored Classical and Quantum Approaches for Quantum Chemistry Electronic structure problems.

QAlgeria ★ (QWorld)

Constantine, Algeria

CO-FOUNDER AND BOARD MEMBER

Apr. 2023 - present

- Co-founded the local chapter (QCousin) of **QWorld**★ in Algeria.
- Mentored in **Qbronze128**★ (Apr. 2024), **QPrep16**★ (Nov. 2024), and **QBronze147**★ (Dec. 2024).

Papers

Ground State Energy Estimation on Current Quantum Hardware Through The Variational Quantum Eigensolver: A Comprehensive Study ★

ArXiv

N.E. BELALOUI, A. TOUNSI, **R. A. KHAMADJA**, M.M. LOUAMRI, A. BENSLAMA, D.E. BERNAL NEIRA, AND M.T. ROUBAH

Dec. 2024

Pre-print, Submitted to Journal of Chemical Theory and Computation★

Projects

Heisenberg Model Ground state preparation on Kagome lattice

Constantine, Algeria

COLLABORATIVE PROJECT (PAPER UNDER PREPARATION)

- A study on preparing the ground state of the Heisenberg model on a Kagome lattice using the Variational Quantum Eigensolver (paper under preparation).

Analysis of The Variational Quantum Eigensolver's resilience to noise and properties

Constantine, Algeria

COLLABORATIVE PROJECT (PAPER UNDER PREPARATION)

- Analysing the VQE's behaviour under different conditions and combinations or error mitigation techniques .

Entanglement of q-Deformed Coherent States

Constantine, Algeria

COLLABORATIVE PROJECT (PAPER UNDER PREPARATION)

- Focused on the study of bipartite entanglement within tripartite q-deformed coherent states, examining their entanglement properties.
- Investigated the monogamy of entanglement, analyzing the entanglement across subsystems.
- Utilized analytical and numerical methods to quantify entanglement and explore its dependence on deformation parameters.

Certificates

QWORLD

May 2023 **QBronze**★, Quantum Computing Basics (ID: QBronze 106-3)

[Remote](#)

Jun. 2023 **QCobalt**★, Quantum Annealing for Optimization Problems (ID: QCobalt 1-6)

[Remote](#)

Jul. 2023 **QNickel**★, Oracular Quantum Algorithms (ID: QNickel 7-238)

[Remote](#)

Jul. 2023 **QMercury**, Quantum Key Distribution (ID: QMercury 1-344)

[Remote](#)

WOMANIUM

Jul. 2023 **NAQC Basics**, Neutral Atoms Quantum Computing, QuEra-Womanium Training Program

[Remote](#)

Aug. 2023 **Quantum Computing Hardware**, Quantum Computing Hardware fundamentals

[Remote](#)

Aug. 2023 **Quantum Computing Software**, Different Quantum SDKs

[Remote](#)

Aug. 2023 **Quantum Sensing Technologies**, Different Quantum Sensing Technologies

[Remote](#)

PASQAL-CMC

Nov. 2024 **NAQC with Pulser** ★, Neutral Atoms Quantum Computing with Pulser

[Remote](#)

Achievements

Nov. 2024 **1st Place**, Pasqal-CMC Hackathon: Optimizing antenna placement using Neutral Atoms

[Remote](#)

Feb. 2024 **top 10 %**, QHack 2024 Coding challenges.

[Remote](#)

Skills

Quantum Programming

Qiskit, PennyLane, Cirq, Pulser

Collaboration

Teamwork, Interdisciplinary Communication, Leadership in Group Projects

Adaptability

Quick Learning, Flexibility in High-Stress Environments, Continuous Learning

Communication

Technical Writing, Presentation Skills, Effective Knowledge Sharing

Languages

Arabic (Mother Tongue), English (C1-Advanced) , French (B2-intermediate)

Talks & Presentations

Variational Quantum Eigensolver Tutorial with Qognite★

[Remote](#)

WOMANIUM GLOBAL QUANTUM PROGRAM 2023

Sep. 2023

- Presented a detailed pipeline of the Variational Quantum Eigensolver with an application with QMWare's SDK, Qognite

Quantum Computing, a short overview

[Remote](#)

PHYSICA CLUB & QUANTA CLUB

Apr. 2024

- Gave an introductory talk about Quantum Computing and Quantum Technologies to students from USTHB and Algiers 1 university