

Syed Hassan Abbas Bukhari

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Education

- **Lahore University of Management Sciences** Lahore, Pakistan
MS Physics(18-years); CGPA: 3.75/4.00 Jul. 2020
Dissertation Title: Measurement-Induced Qubit Cooling
Dissertation Supervisor: Dr. Adam Zaman Chaudhry (Assistant Professor)
- **Quaid-i-Azam University** Islamabad , Pakistan
M.Sc. Physics(16-years); Percentage: 69% May. 2018
- **Islamia University Bahawalpur** Bahawal Pur, Pakistan
B.Sc. Physics, Mathematics (14-years); Percentage: 83% Aug. 2015

Research Interests

- Open Quantum Systems, Condensed Matter Theory, Quantum Information, Quantum Optics

Research Experience

- **Research Assistant** Jul. 2019 – Dec. 2019
Department of Physics, Lahore University of Management Sciences Lahore, Pakistan
 - Studied the effect of measurements on an open quantum system.
 - Studied and developed an optimal way for measurement-induced qubit cooling to perform less noisy computation.
- **Master's Dissertation** Sep. 2019 – July. 2020
Lahore University of Management Sciences Lahore, Pakistan
 - Measurement-Induced Qubit Cooling.

Teaching Experience

- **Lahore University of Management Sciences** Lahore, Pakistan
Graduate Teaching Assistant Spring 2020
 - **Modern Physics:** My job was to conduct weekly tutorials to help out students with the subject material and grade quizzes and assignments and later on everything was done online due to COVID-19.
- **Lahore University of Management Sciences** Lahore, Pakistan
Lab Instructor Spring 2019
 - **Physics Laboratory:** My job was to assist students in laboratory experiments and grade lab notebooks.

Job Experience

- **IQ era** Lahore, Pakistan
Instructional Designer Dec. 2020 – Present
 - **Physics:** IQ era is a US-based education startup. At IQ era, I am a Physics team leader and work with international colleagues from the UK, Hong Kong, Canada, and the USA. We are working on a non-traditional education system that mainly covers Cambridge's international education system.

Academic Research Projects

- **Quantum computing using Qiskit** Summer 2020
 - In this international summer school. I worked on the topic given below and implemented algorithms based on quantum circuits using Qiskit to run it on a quantum simulator and IBM quantum computer. .
 1. Grover's Search Algorithm and Quantum Oracle
 2. Quantum Phase Estimation
 3. Single-Qubit and Multi-Qubit States, Quantum Teleportation

4. Shor's Algorithm
5. Quantum Error Correction
6. Qubit Spectroscopy
7. Quantum Chemistry

• **Measuring the value of Boltzmann constant**

Fall 2018

- I studied the statistical behavior of the random motion of particles suspended in a fluid resulting from their collision with the fast-moving molecules in the fluid, and Boltzmann's constant was measured by observing the Brownian motion of polystyrene spheres in water.

• **Magnetic Sensor**

Fall 2018

- In this project, we studied the effect of magnets by measuring the magnetic field (transverse and longitudinal) using calibrated TMR sensors.

• **Power Method**

Fall 2017

- It was a theoretical and computational project. In this project, we developed FORTRAN language code to calculate the eigenvalue and eigenvector of a given $n \times n$ matrix.

• **Skin Effect**

Spring 2017

- In this project, we studied the skin effect. We made an experimental setup for calculating the skin effect and its parameters like the resistance of transmission cables at different frequencies. We also observed and studied the decrease of a magnetic field as it penetrates a thickness of metal and decreases current with the depth of wire.

Summer Schools/Workshops

• **4th National Symposium on Laser Matter Interaction**

Pakistan

Participant

Sept. 2020

• **Qiskit Global Summer School**

Pakistan

Participant & Lab Student

July. 2020

• **Workshop on In isotropic media and meta materials**

Islamabad, Pakistan

Participant

Jan. 2019

Professional Affiliations

• **Official YouTube Channel Quaid-i-Azam University**

Islamabad, Pakistan

Founder & Producer

Jan. 2017

• **QAU Physics Club**

Islamabad, Pakistan

Co-Founder

Sep. 2016 – Present

• **SPIE Student Chapter LUMS**

Lahore, Pakistan

Member

Jan. 2019 – Dec. 2019

• **SPIE Student Chapter LUMS**

Lahore, Pakistan

Treasurer

Spring 2020

• **Lahore Science Mela**

Lahore, Pakistan

Demonstrator

Oct. 2019

• **Q Pakistan**

Pakistan

Member

Oct. 2020

Awards & Honours

- Placed in Dean's Honour Roll for MS in Physics at LUMS.

2020

- Granted 100% merit scholarship for MS in Physics at LUMS.

2018-20

- Got the first position in bachelor of science at Khawaja Fareed Govt. P/G College.

2015

Skills and Interests

- **Programming:** FORTRAN, Python (Qiskit, Qutip), Linux, L^AT_EX.
- **Softwares:** Mathematica, MATLAB, Microsoft Office, OriginPro, PeakFit, LabView, Sakai LMS.
- **Interest:** Table Tennis, Swimming, Chess, Music, Physics Simulations, Psychology, Magic

Reference

- Dr. Adam Zaman Chaudhry
Assistant Professor and Chairman of Physics Department, LUMS, Lahore.
Email: adam.zaman@lums.edu.pk
- Dr. Ata Ulhaq
Assistant Professor of Physics, LUMS, Lahore.
. Email: ata.haq@lums.edu.pk