Ibraheem Faisal Al-Yousef

Senior Undergraduate Physics Student

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GitHub LinkedIn

EDUCATION

B.S. in Physics, King Fahd University of Petroleum and Minerals (KFUPM) `Expected Spring 2022`

RESEARCH EXPERIENCE

Condensed Matter Theory Worked on solving prototypical quantum spin Hamiltonians in the language of Jordan-Wigner fermions. With a proposal of using Jordan-Wigner fermions to exactly solve an extension of Kitaev honeycomb model. Under the supervision of Dr. Michael Vogl. [Reasearch Proposal]

`KFUPM, Aug 2022 - Dec 2022`

Alternative Formulation of Quantum Mechanics (Background) Working with Prof. Bahlouli and Prof. Alhaidari in problems related to the formulation of quantum mechanics based on orthogonal polynomials.

`KFUPM, Feb 2022 - Present`

COMPUTATIONAL SKILLS

Mathematica Done multiple numerical projects including quantum and classical physics using Mathematica. Mainly on symbolic calculations, derivations, and visualizations. [Samples]

Python Used in computational chemistry course, in calculating atomic and molecular properties using a variety of quantum and classical methods including Hartree-Fock, and Monte Carlo. [Samples]

LaTeX I have been using LaTeX to typeset all of my academic reports and presentations. [Samples]

ADVANCED UNDERGRADUATE COURSES

Undergraduate Research (PHYS497) Second quantization; Jordan-Wigner transformation; Bogoliubov diagonalization; Phase diagrams; Correlation functions.

Solid State Physics (PHYS432) Crystal bonding; Lattice vibrations; Thermal properties of insulators; Free electron theory of metals; Band theory; Semiconductors; Superconductivity.

Physics of Semiconductor Devices (PHYS336) Energy band diagrams; PN junctions; Light Emitting Diodes; Semiconducting Laser Diodes; Photo detectors; MOSFET and JFET; Solar-cells; Bipolar transistors.

Computational Physics (PHYS373) Monte Carlo simulations; Simulation techniques; Programming methods; Comparison of ideal and realistic systems; Limitations of physical theory.

Computational Chemistry (CHEM313) Hartree-Fock theory; Density Functional Theory; Molecular Mechanics; Molecular Dynamics; Monte Carlo simulations; Conformation search.

WORK EXPERIENCE

Medical Physicist Trained as medical physicist for two months in medical imaging & nuclear medicine sections. This experience exposed me to the duties of medical physicists and the challenges they face.

`King Fahad Specialist Hospital in Dammam, Jun 2022 - Aug 2022`

Physics Grader Worked as a part-time job grader for PHYS102. This work experience has further enriched my knowledge in physics and exposed me to a vital part of the teaching experience.

`KFUPM, Feb 2022 - Jun 2022`

VOLUNTEERING

Physics Club's President Worked as the president of the physics club at KFUPM for a year. This experience has helped me to be a contributing team member and leader, especially in physics related areas.

`KFUPM, Aug 2022 - Present`

Committee Member Was nominated, and selected, to be a member of the Islamic Affairs Committee at KFUPM. This experience has exposed me to the issues and resolutions related to KFUPM Islamic community.

`KFUPM, Aug 2022 - Present`

HARD & SOFT SKILLS

- ⊙ Leadership
- ⊗ Teamwork
- ⊕ Presentation
- ⊙ Research
- ⊙ Competitiveness
- ⊗ Teaching
- ⊕ Critical thinking
- ⊙ Problem Solving

PROFESSIONAL CERTIFICATIONS

‡ Data Analysis Using Python

`KFUPM, Oct 2021`

‡ LabVIEW Programming

`KFUPM, Mar 2022`

REFERENCES

Prof. Hocine Bahlouli

Professor · Theoretical Condensed Matter ·Physics Department, KFUPM

Email: bahlouli@kfupm.edu.sa Phone: (966)013-860-2097

Prof. Bahlouli [Website, Scholar] is my instructor for three undergraduate courses: quantum mechanics I and II as well as classical mechanics.

Dr. Michael Vogl

Assistant Professor · Theoretical Condensed Matter ·Physics Department, KFUPM

Email: michael.vogl@kfupm.edu.sa Phone: (966)013-860-4056

Dr. Vogl [Website, Scholar, arXiv] is my undergraduate research supervisor.

Dr. Saeed Al-Marzoug

Assistant Professor · Bose Einstein Condensate and Nonlinear Physics ·Physics Department, KFUPM

Email: marzoug@kfupm.edu.sa Phone: (966)013-860-7316

Dr. Al-Marzoug [Website, arXiv] is my advisor.