

Ibraheem F. Al-Yousef

Graduating Physics Student

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[GitHub](#) [LinkedIn](#)

EDUCATION

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

Expected 2023/09

PUBLICATIONS

Ibraheem F. Al-Yousef, Moayad Ekhwan, H. Bahlouli, and A. D. Alhaidari, "Spectral Problem of the Hamiltonian in Quantum Mechanics without Reference to a Potential Function" *Axioms* **2023**, *12*, 334
doi:[10.3390/axioms12040334](https://doi.org/10.3390/axioms12040334)

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. [[Research Proposal](#)]

KFUPM, Aug 2022 - Jan 2023

Mathematical Physics Worked on solving undergraduate-level problems in a new formulation of quantum mechanics without a reference to a potential function. [[Published](#)]

KFUPM, Feb 2022 - Mar 2023

Thin Films Worked on the fabrication and characterization of Titanium-doped Indium-Tin-Oxide thin films for UV protection applications, as part of the undergraduate student research grant UXPLORE. Under the supervision of Dr. Kamal Hossain. [[Final Report](#)]

IRC-REPS KFUPM, Jan 2023 - Jun 2023

COMPUTATIONAL SKILLS

Mathematica Expert in Mathematica for a wide range of tasks, including both symbolic and numerical calculations, and simulating classical and quantum physics problems, as well as in my research on condensed matter and mathematical physics. [[Samples](#)]

Python Competent in using Python for computational physics and chemistry, with experience in quantum and classical methods such as Hartree-Fock and Monte Carlo. [[Samples](#)]

L^AT_EX Proficient in using L^AT_EX to create high-quality academic reports and presentations, with strong typesetting skills and expertise in customizing document styles using packages and templates. [[Samples](#)]

ADVANCED UNDERGRADUATE COURSES

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

Nuclear and Particle Physics (PHYS422) Nuclear models; Radioactive decays and models; Nuclear reactions; Two-body bound and scattering problem.

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; Model physical systems; Limitations and trade-offs in numerical methods; Compare simulations to analytical solutions and experimental data.

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

WORK EXPERIENCE

Medical Physicist Trained for two months as a Medical Physicist in medical imaging and nuclear medicine, gaining valuable exposure to quality assurance and control duties, and developing a strong understanding of the importance of ensuring safe and effective medical treatments.

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 Currently serving as President of the Physics Club at KFUPM, honing my leadership and teamwork skills in physics-related contexts, while contributing to the success of the club's initiatives and promoting social responsibility.

KFUPM, Aug 2022 - Present

Committee Member Selected to be serving on the Islamic Affairs Committee at KFUPM, gaining valuable experience in addressing issues related to the university's Islamic community while developing cultural sensitivity and community engagement skills.

KFUPM, Oct 2022 - Present

HARD & SOFT SKILLS

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

PROFESSIONAL CERTIFICATIONS

‡ Research Skills

KFUPM, Apr 2023

‡ Data Analysis Using Python

KFUPM, Oct 2021

‡ Business for Science and Engineering

KFUPM, Feb 2023

‡ Business Skills Training

KnowledgeHut upGrad, Jun 2020

‡ LabVIEW Programming

KFUPM, Mar 2022

‡ Soft Skills Training

KnowledgeHut upGrad, Jun 2020

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.