

**Ibraheem F. Al-Yousef**   
Graduating Physics Student  
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[GitHub](#) [LinkedIn](#)

## EDUCATION

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

Expected 2023/09

## PUBLICATIONS

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**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

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**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

**Alternative Formulation of Quantum Mechanics** Worked with [Prof. Bahlouli](#) and [Prof. Alhaidari](#) in problems related to the formulation of quantum mechanics based on orthogonal polynomials. [[Published](#)]

KFUPM, Feb 2022 - Mar 2023

**Smart Thin Films** Working on the fabrication and characterization of smart thin films for light emitting display applications, as part of the undergraduate student research grant. Under the supervision of Dr. Kamal Hossain.

IRC-REPS KFUPM, Feb 2023 - Present

## COMPUTATIONAL SKILLS

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**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<sup>A</sup>T<sub>E</sub>X** Proficient in using L<sup>A</sup>T<sub>E</sub>X 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

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**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

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**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

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**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, Aug 2022 - Present

## HARD & SOFT SKILLS

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

## PROFESSIONAL CERTIFICATIONS

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‡ 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

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**Prof. Hocine Bahlouli**

*Professor · Theoretical Condensed Matter · Physics Department, KFUPM*

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

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