

Mustafa A. Al Khafaji

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Technical Skills

- Experimental and theoretical quantum/atom optics
- Advanced numerical skills
- Electronics and circuitry
- Python, MATLAB, LabView

Work Experience

Fraunhofer Centre for Applied Photonics

Junior Researcher (part-time)

12/2023 – 05/2024

- Worked on a project researching an alternative method for coupling of multiple beams into a single fibre, utilising a glass cavity.
- Built and optimised the experimental configuration.
- Tested the setup functionality by generating a magneto-optical trap (MOT) with rubidium atoms.
- Calculated the MOT optical density using Beer's law with a Python script.

Student Researcher

04/2020 – 11/2023

- Developed my understanding of optics-based concepts from experts in the field of photonics.
- Expanded my experimental skills and developed my understanding of fibre optics.
- Enhanced practical and theoretical electronics skills.
- Performed a series of extensive tests to understand the behaviour of laser diodes.

University of Glasgow

Demonstrator (part-time)

09/2020 – 12/2022

- Demonstrate an understanding of several optics-based experiments.
- Assist undergraduate students with difficulties stemming from laboratory work.
- Grade and feedback submitted lab scripts and reports.
- Test student's understanding of experimental work through a viva style interview.

Education

University of Glasgow

PhD in Quantum/atom optics

2020 – 2024

Thesis: Complex light fields in polarisation state tomography and atomic spectroscopy

King's College London

MSc Theoretical Physics

2017 – 2019

Dissertation: Spinors and Supergravity

University of Hertfordshire

BSc (Hons) Physics

2014 – 2017

Dissertation: Internal Waves in the South China Sea / MATLAB (Numeric Simulation)

Publications

- **Al Khafaji, M. A.**, Cisowski, C. M., Jimbrown, H., Croke, S., Pádua, S., & Franke-Arnold, S. "Single-shot characterization of vector beams by generalized measurements." *Optics Express* Vol. 30, Issue 13, p. 22396, (2022).
- Wang, J., Chen, Y., **Al Khafaji, M. A.**, Svensson, S. J., Yang, X., Wang, C., Gao, H., Cisowski, C. M., & Franke-Arnold, S. "Exploring the ellipticity dependency on vector helical Ince-Gaussian beams and their focusing properties." *Optics Express*, Vol. 30, Issue 14, p. 24497, (2022).

- Wang, J., Svensson, S. J., Clark, T. W., Chen, Y., **Al Khafaji, M. A.**, Gao, H., Westberg, N., & Franke-Arnold, S. “Measuring the Optical Concurrence of Vector Beams with an Atomic-State Interferometer.” *Physical Review Letters*, Vol. 132, Issue 19, (2024).
- McWilliam, A., **Al Khafaji, M. A.**, Svensson, S. J., Pádua, S., & Franke-Arnold, S.. “Dynamic Mueller matrix polarimetry using generalized measurements.” *Optics Express* Vol. 32, Issue 12, p. 21909, (2024).

References Available Upon Request