

DANIEL JAMES HUNT

DPhil Particle Physics, University of Oxford

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📍 Oxford, UK

WHO AM I?

I am a finishing DPhil student on the LUX-ZEPLIN (LZ) experiment. Working under Prof. Hans Kraus, I have made leading contributions in analysis of low-energy backgrounds and small electroluminescence signals in LZ. I have experience in data analysis, machine learning, public engagement, and detector simulation

WHAT DO I WANT TO DO?

- Lead analysis of low-energy signals in LZ, with the end goal of an S2-Only result with world-leading sensitivity to light dark matter candidates
- Work on R&D for XLZD and CrystaLiZe, including using existing understanding of low-energy backgrounds to motivate detector design choices
- Engage with lecturing, teaching, and outreach wherever possible: direct dark matter detection is a uniquely intuitive subject for the general public

SKILLS

Data Analysis: Handling data from multiple physics collaborations and analysis frameworks

Simulations: Working with several simulation frameworks, using combinations of GEANT4, Garfield++, and COMSOL

Communication: Working in communication-intensive roles both inside and outside of academia

Management: Chairing and managing meetings, from both academic and non-academic roles

Interests/Hobbies: Swimming, badminton, home-brew alcohol, "bad" films

PHD

Oct. 20 - Ongoing **DPhil Particle Physics**

University of Oxford

"Improving sensitivity to low-mass signals in the LUX-ZEPLIN experiment"

Supervised by Prof. Hans Kraus

- Design of analysis cuts targeting accidental coincidence events, and modelling of accidentals in varying TPC operating conditions
- Analysis of small-S2 backgrounds, and rejection of S2-Only backgrounds using unsupervised and supervised machine learning techniques
- Validation of pulse and event classification, and identification of anomalous electroluminescence pulses
- Calibration and operation of the MIGDAL experiment

OTHER EDUCATION

Sep. 16 - Aug 20 **MSci Particle Physics**

University of Birmingham

- First class honours
- Electives in lagrangian mechanics, advanced quantum mechanics, and quantum field theory
- Masters' project with Dr. E. Goudzovski on the NA62 experiment
- Introduction of MCP-PMT arrays to simulations of the NA62 KTAG system
- Demonstrated timing resolution on K^\pm of 6 ps in GEANT4

RESEARCH

Jun. 19 - Aug. 19

NEWS-G

University of Birmingham, supervised by Prof. K. Nikolopoulos and Dr. I. Katsioulas

First GEANT4/Garfield++/COMSOL simulations of neutrons, protons and alpha particles in a nitrogen-filled SPC, for the application of neutron spectroscopy

Jun. 20 - Sep. 20

KLEVER

INFN, supervised by Dr. M. Moulson and Dr. T. Spadaro

Demonstration of the feasibility of tagging SPS-energy K^0 through GEANT4 simulation of the proposed KLEVER pre-shower detector (PSD)

Aug. 19 - Sep. 19

ATLAS

University of Sheffield, supervised by Prof. T. Vickey

Identification of surface damage to ATLAS ITk components using a convolutional neural network

OTHER WORK

Sep. 21 - Aug. 22	Lab Demonstrator 1st Year Undergraduate General Physics Lab. Supervising and educating students on baseline experimental principles, and marking project reports	University of Oxford
Jun. 19 - Jul. 19	Teacher Leading lessons for several weeks for a variety of classes, ages 11-16, in Chemistry and Physics	Dame Elizabeth Cadbury Secondary School, Birmingham
17-20	Outreach Officer Delivering open day tours of the university, and leading physics workshops for classes of secondary school students	University of Birmingham
17-20	Science Tutor Tutoring several students in GCSE and A-Level physics and mathematics	Freelance

VOLUNTEER WORK

Aug. 23 - Ongoing	Communications Officer <ul style="list-style-type: none">Managing all social media outlets for ACORN OxfordManaging phone campaigns to organise member defence for vulnerable members of the communityRecent successful campaign for the franchising of bus services in the Oxfordshire areaWorking on an potential national campaign to ensure council flood protections, pushing ACORN towards environmentalism	ACORN the Union, Oxford Branch
Jul. 21 - Aug. 22	Treasurer <ul style="list-style-type: none">Managing budget of ~ £20,000 provided to the St. Peter's College postgraduate communityMaximized efficiency of budget through wholesale purchase of goodsSpearheaded redesign of the Middle Common Room using funds saved throughout the year	St. Peter's College, University of Oxford
Jul. 18 - Sep. 20	Outreach Coordinator <ul style="list-style-type: none">Leading role in outreach sessions during several annual British Science Week events, in partnership with local secondary schoolsPresented on multiple occasions at weekly events on astroparticle physicsCo-ordinated with researchers across the UK to present their work for astrosoc, in the fields of exoplanets and astrochemistry	AstroSoc, University of Birmingham
Jul. 18 - Sep. 19	Year Representative / Secretary <ul style="list-style-type: none">Hosting and managing events for undergraduate physics studentsChairing and taking minutes for committee eventsManaged several charity events with Birmingham "bad film society", as well as a tutoring scheme with Dame Elizabeth Cadbury Secondary School	Poynting Physical Society, University of Birmingham

REFERENCES

PROF. H. KRAUS

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DR. P. MAJEWSKI

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