Liam L.H. Lau

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Education

2021- **Rutgers University**, *PhD*, Physics.
Advisors: Piers Coleman and Ananda Roy.

2017-2021 **University of Cambridge, Gonville and Caius College**, *MSci & BA (Hons)*, Natural Sciences.
First-class honours in the Physics route of Natural Sciences.

2010-2017 **Westcliff High School for Boys**, *A levels, GCSEs*, Westcliff-on-Sea, Essex, UK.

Publications

[1] **Liam L.H. Lau** and Shovan Dutta. Quantum walk of two anyons across a statistical boundary. **Phys. Rev. Research 4, L012007** Letter (January 2022).

[2] **Liam L.H. Lau** and Denis Werth. ODEN: A Framework to Solve Ordinary Differential Equations using Artificial Neural Networks. (Preprint) *arXiv:2005.14090*, (May 2020).

Awards, Prizes & Fellowships

Fall 2021 SAS Excellence Fellowship — *Rutgers University*

Aug 2021 Duncan Bruce Memorial Prize for Physics — *Gonville and Caius College, University of Cambridge*

Aug 2021 Senior Scholarship — *Gonville and Caius College, University of Cambridge*

Dec 2020 Winning Team — *PLANCKS London 2020 International Theoretical Physics Final*

Summer 2020 KNI Fellowship (cancelled due to Covid-19) — *Kavli Nanoscience Institute, Caltech*

Research Experience

Jul–Dec 2020 **Research Student in Quantum Dynamics** *TCM Group, Cambridge, UK* ; *Dr. S. Dutta*
I was in charge of the theoretical and numerical modelling of a quantum walk of particles with fractional exchange statistics on a 1D lattice across a domain wall separating regions of different exchange phases. I showed that the Hanbury Brown-Twiss interference of two particles is dominated by reflections of these bunched waves off the interface, producing strong measurable asymmetries.

Jul–Oct 2019 **Research Student in Cosmology** *KICC, University of Cambridge, UK*; *Dr. W. Handley*
Bayesian statistical analysis on tension between PLANCK and DES data.

Jul-Aug 2018 **Research Student in Experimental Surface Physics** *SMF Group, Cambridge, UK*; *Dr. J. Ellis*
Sample heating and cooling modules in Ultra High Vacuum.

Teaching Experience

Jun–Jul 2021 **UK European (EuPhO) and International Physics Olympiad (IPhO)** (10 hours)
Supervising the top 10 physics students in the UK and guiding them in problem Solving for physics. 1 Silver, 4 Bronze for IPhO. 2 Silver, 2 Bronze for EuPhO. Invited to lecture again in 2022.

Jul 2021 **British Physics Olympiad (BPhO) China Camp** (5 hours)
Created questions for an Oxbridge style supervision with Chinese students from ASDAN.

Computational Skills

Python, C/C++, MATLAB, Linux, Bash, LaTeX, vim, git, TensorFlow — *4 Years*

Mathematica — *1 Year*

Committee and Organizing Roles

Dec 2021–Present **Rutgers-Princeton Condensed Matter Forum for Graduate Students**.
Conceived and a member of the organizing committee of 3 Rutgers and 3 Princeton graduate students for a once semester forum on current research topics in Condensed Matter at both Rutgers and Princeton.

2019–2020 **Co-Chair of the Cambridge University Physics Society**.
Organized academic talks and social events for undergraduate physics students. Speakers included *Professor J. Cardy*- notable for his work on CFT and 2019 Nobel Prize Laureate, *Professor D. Queloz*.

2017–2019 **Captain of the Gonville and Caius College Basketball Team**.

In the media

Feb 2021 **University of Cambridge, TCM Research highlights**, Particles that mutate by moving from place to place.
http://www.tcm.phy.cam.ac.uk/highlights/220209IL6_sd843/

Feb 2021 **University of Cambridge, The Cavendish Laboratory press release**, Mutating Quantum Particles Set in Motion.
https://www.phy.cam.ac.uk/news/mutating-quantum-particles-set-motion

Jan 2022 **Physics Today**, *Commentary: Is physics too specialized?*, **Liam L.H. Lau** and Ethan Van Woerkom.
DOI: 10.1063/PT.6.3.20220113a
https://physicstoday.scitation.org/do/10.1063/PT.6.3.20220113a/full/

Talks Given

Jun 2020 **Seminar talk on the Debye-Waller Factor in Surface Helium Microscopy**, *Online*.
Led a discussion on the Debye-Waller factor theory and its application to inelastic scattering in the SHeM for the Surface Physics Group faculty of the Cavendish Laboratories and the University of Newcastle, Australia. https://doi.org/10.5281/zenodo.3944438

Jul 2019 **Airbus Fly Your Ideas International Finals**.
International finalist with team Seren. Presented to a live audience of 200 people.

Attended Conferences and Workshops

Jul 2021 **Condensed Matter in the City 2021**, *Quantum Materials to Quantum Information*.

Oct 2020 **KITP Conference**, *Frontiers of Quantum Computing and Quantum Dynamics*.

Jun 2020 **Princeton Summer School on Condensed Matter Physics** , *Magnetism in Quantum Materials*.

Referees

Prof. Piers Coleman — *coleman@physics.rutgers.edu*

Prof. Ananda Roy — *ananda.roy@physics.rutgers.edu*

Dr. John Ellis — *je102@cam.ac.uk*