Lucas Tsun-yin Leung

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Born: 9 April, 2000—Hong Kong, Hong Kong SAR
Nationality: HKSAR

Education

2021-2022 Current Course: *Mathematical Tripos*, Part III, University of Cambridge
Courses currently taking:
Quantum Field Theory; Statistical Field Theory; Symmetries, Particles and Fields; General Relativity; Differential Geometry

2018-2021 *Natural Sciences Tripos*, Part II Physics, University of Cambridge
Part II Courses taken:
Theoretical Physics I (Classical Field Theory); Theoretical Physics II (Topics in Quantum Theory); Thermal and Statistical Physics; General Relativity; Advanced Quantum Mechanics; Electrodynamics and Optics; Particle and Nuclear Physics; Quantum Condensed Matter Physics; Soft Condensed Matter; Astrophysical Fluid Dynamics

2018 Secondary Education with HKDSE, Queen's College, Hong Kong

Relevant Research Experience

2021 (Summer) Research Project with Dr. Michal Kwasigroch - *"Interaction between the RKKY and Kondo Effect using Mean Field Theory techniques"*

- This project is about exploring the intermediate stage when both RKKY and Kondo effects are both involved in the analysis of Kondo impurity lattices.
- The project is concurrent to a research project conducted in University College London where Wilson's renormalisation techniques are used to analyse a single impurity site.
- We have successfully built a preliminary model for the analysis and some results have been produced for analysis.

- The project is still ongoing as we are trying to construct a more complicated model involving anisotropy considerations of the lattice.

2020-2021 Research Review with Dr. Oleg Brandt - *"Experimental Scrutiny of Higgs Boson couplings and the Effective Field Theory interpretation"*

- This is part of the module in Part II Physics of the Natural Sciences Tripos.
- The review included some exploration of the current experimental techniques used in Higgs analysis at CERN and the theoretical analysis of it, mainly the effective field theory approach.
- The review mainly involved reading a lot of related articles and having discussion with experts in the field about the topics covered.
- The abstract is as follows: "The current state-of-the-art experimental analysis techniques for the analysis of Higgs boson couplings using the $\sqrt{s} = 13$TeV results from ATLAS are discussed in this short review. The $H \to ZZ^* \to 4l$ decay channel will be the main focus in illustrating some of the analysis methods. The Effective Field Theory approach is summarised together with its interpretations on the experimental data of the run. The results suggest a good agreement with the Standard Model and propositions of Beyond Standard Model effects from the data are inconclusive."

2020 Summer Research Project with Dr. Katarzyna Kowal - *"Stability of non-Newtonian lubricated viscous gravity currents"*

- This project was the non-Newtonian generalisation of viscous gravity current pertubations.
- *Mathematica* was used to derive the mathematical expressions and the preliminary results showed that shear-thinning fluids promoted growths of perturbations at high wavenumbers.
- The result will be later published in a paper.

2019 Summer Research Project with Prof. Marian Holness - *"The crystallization regime in the Skaergaard dykes: static vs convecting magma"*

- The project was an application of the analytical methods used in a previous paper.
- Images of microscopic slides were taken and the statistical distribution of the aspect ratio of plagioclase was analysed.

Other Relevant Experience

2018-2020 STIMULUS volunteer - Volunteering in local schools in teaching science

2015-2017 Committee member, and later Vice-Chairman of the Physics Society in Queen's College, Hong Kong

2015-2017 Tutor, and later Supervisor of the QCPhO Training Team - A student-led training team for the Physics Olympiad

Recent Awards

2021 *Senior Scholarship*, Trinity College (extended from 2019, not awarded in 2020 due to the COVID-19 Pandemic)
2019 *Senior Scholarship*, Trinity College
2019 *Norman Falcon Prize*, Trinity College
2018-2022 *Prince Philip Scholarship*, founded to enable talented Hong Kong students to pursue an undergraduate degree at the University of Cambridge.

Special Qualifications and Skills

Fluent in English, Mandarin and Cantonese
ATCL in Piano

Last updated: November 16, 2021