

## LAU Albert Wai Kit

	Room 4206 The Hong Kong University of Science and Technology	albertkit2000@gmail.com <a href="https://awklau.github.io/">https://awklau.github.io/</a>
RESEARCH INTERESTS	Instrumentation and Experimental Astronomy. Strength in instruments development and photonic detectors.	
EDUCATION	<b>Doctor of Philosophy in Physics</b> The Hong Kong University of Science and Technology	Sep 2018 – Present
	Supervised by Prof. George F. Smoot and Prof. Kam-Biu Luk Expected Graduation: Spring 2022	
	<b>Bachelor of Science</b> The Hong Kong University of Science and Technology	Sep 2015 – Jun 2018
	First Class Honor in: Physics (First Major) Computer Science (Second Major) Astrophysics and Cosmology (Minor)	
	Exchange Program in University of Waterloo Physics and Astronomy Department	Dec 2016 – May 2017
RESEARCH EXPERIENCE	<b>Ultra Fast Astronomy: Development of Silicon Photomultiplier Based Astronomical Single Photon Imaging Detector</b>	Dec 2018 – Present
	<b>Supervisors: Prof. George F. Smoot and Prof. Kam-Biu Luk</b>	
	<ul style="list-style-type: none"> <li>Develop the Single-Photon Imager for Nanosecond Astrophysics (SPINA) system</li> <li>Designed based on position-sensitive silicon photomultiplier (PS-SiPM) technology</li> <li>Design and fabricated readout system, mechanical mounting and sensor cooling system for SPINA</li> <li>Performed initial On-Sky testing of SPINA system on the Nazarbayev University Transient Telescope at Assy-Turgen Astrophysical Observatory (NUTTeLA-TAO)</li> <li>Aiming for detection of Ultra-Fast optical transient event in our Universe</li> <li>Helped initial construction of the Quantum Optics for Astrophysics and Cosmology Laboratory in HKUST</li> </ul>	
	<b>Develop 2D Luminescence Imaging System</b>	Jun 2017 – Jun 2018
	<b>Supervisor: Prof. K. S. Wong</b>	
	<ul style="list-style-type: none"> <li>Develop a laser scanning microscope for luminescence imaging.</li> <li>Low cost optical system for microscopy with time and spectral resolution is designed and constructed.</li> <li>An data acquisition and scanning control system was developed, together with the driver software and Graphical User Interface.</li> </ul>	
	<b>Space Orbit Design Project</b>	Sep 2015 – Jun 2018
	<b>Supervisors: Prof. K. Y. Michael Wong and Dr. C. H. Yam</b>	
	<ul style="list-style-type: none"> <li>Develop Algorithm for fast estimating reachability problem of low thrust spacecraft.</li> <li>Written in Matlab, with computational cost reduced from <math>O(N^k)</math> to <math>O(N * k)</math>.</li> </ul>	
AWARDS AND HONORS	HKUST Awards:	
	The Overseas Conference Travel Grant	Sep 2022
	Best Teaching Assistant Award	Sep 2019
	Postgraduate Studentship (PGS)	Sep 2018 – Aug 2022

	The Overseas Conference Travel Grant	Nov 2017
	UROP Research Travel Sponsorship	Oct 2017
	HKUST Study Abroad Sponsorship	Dec 2016
	Paul Ching Wu Chu Scholarship for Physics Students	Nov 2016
	Physics Major Entry Scholarship	Nov 2015
	HKSAR Government Award:	
	Reaching Out Award 2016/17	Jan 2017
OBSERVATORY WORK EXPERIENCE	Assy-Turgen Observatory <ul style="list-style-type: none"> <li>Multiple visit to the Observatory for the Ultra-Fast Astronomy Project</li> <li>On-Sky testing of novel detectors and self-developed systems</li> </ul> Gustav Bakos Observatory <ul style="list-style-type: none"> <li>Practice experimental astronomy during exchange at University of Waterloo</li> </ul>	
RESEARCH COMPUTER SKILLS	Data and Image Processing/Analysis Languages <p>Python, Matlab, SAOImage DS9, PixInsight</p> General Programming Languages <p>C and C++, LabVIEW, MIPS Assembly Language</p> FPGA development tools <p>Verilog based FPGA programming (Xilinx Vivado) Linux on embedded FPGA MPSoC (Petalinux) Baremetal program on FPGA MPSoC (Vitis)</p> Computer Aided Circuit Board Design <p>Autodesk Eagle, Fusion 360, Altium Designer</p> Computer Aided 3D Design <p>Autodesk Inventor, AutoCAD, Fusion 360, SolidWork, Google Sketchup</p>	
VOLUNTEER SERVICES	Helper in Hong Kong Astronomical Society(HKAS) <ul style="list-style-type: none"> <li>Helper to organize Summer Astronomical Camps for secondary students.</li> <li>Hold public talks about astrophotography.</li> </ul> Academic Secretary, Student Astronomy Club, HKUSTSU <ul style="list-style-type: none"> <li>Control, Maintenance and Upgrade of society's telescopes.</li> <li>Hold popular science talks to promote Astronomy in HKUST.</li> </ul>	Jun 2016 – Jun 2019 Jun 2015 – Jun 2016
OTHER ACTIVITIES	Co-founder of Centauri Optics Limited <ul style="list-style-type: none"> <li>Develop low cost, portable microscopes for research and educational usage</li> </ul>	
REFERENCES	Available on Request	

## PUBLICATIONS

1. **Lau, A. W. K.**, Chan, Y. Y., Shafiee, M., Smoot, G. F., & Grossan, B. (2022). *Development of position-sensitive photon-counting imager for Ultra-Fast Astronomy*, In X-Ray, Optical, and Infrared Detectors for Astronomy X (Vol. 12191, pp. 312-329). SPIE.
2. **Lau, A. W. K.**, Chan, Y.Y. , Shafiee, M., Smoot, G. F., & Grossan, B. (2022). *A SiPM photon-counting readout system for Ultra-Fast Astronomy* The Open Journal of Astrophysics (2022), astro.2108.07526
3. **Lau, A. W. K.**, Mitra, A., Shafiee, M., & Smoot, G. F.). *Constraining HeII reionization detection uncertainties via fast radio bursts*. New Astronomy(2021), 89: 101627.
4. **Lau, A. W. K.**, Shafiee, M., Smoot, G. F., Grossan, B., & Zhanat M.(2020). *On-sky silicon photomultiplier detector performance measurements for millisecond to sub-microsecond optical source variability studies* Journal of Astronomical Telescopes, Instruments, and Systems 6.4 (2020): 046002
5. Li, S., Smoot, G. F., **Lau, A. W. K.**, Bekbalanova, M., Shafiee, M., & Stezelberger, T. (2019). *Program objectives and specifications for the Ultra-Fast Astronomy observatory*. Proceedings Volume 11341, AOPC 2019: Space Optics, Telescopes, and Instrumentation; 113411Y (2019).
6. **Lau, A.W.K.**, Yam, C.H. & Ming, T.S. *Searching Reachable Region of Low-Thrust Trajectories by Superposition and Greedy Optimization*, IAC-17,C1,IP,33,x37794.
7. Ming, T.S., Yam, C.H. & **Lau, A.W.K.** *Approximate Two-Point Boundary Value Problem Solutions to Low Thrust Trajectory by Superposition*, ISTS2017

## PRESENTATION

- |   |          |
|---|----------|
| Exploring the Energetic Universe 2022   | Sep 2022 |
| Energetic Cosmo Laboratory, Nazarbayev University, Kazakhstan                                       |          |
| Online Oral Presentation  |          |
| SPIE Astronomical Telescopes + Instrumentation 2022   | Jul 2022 |
| Montreal, Canada  |          |
| X-Ray, Optical, and Infrared Detectors for Astronomy X  |          |
| Oral Presentation   |          |
| ECL19: Exploring the Energetic Universe 2019  | Jun 2019 |
| Energetic Cosmo Laboratory, Nazarbayev University, Kazakhstan                                       |          |
| Oral Presentation   |          |
| 2018 Joint Annual Conference of Physical Societies<br>in Guangdong-Hong Kong-Macao Greater Bay Area | Jul 2018 |
| Macau, China  |          |
| Oral Presentation   |          |
| 68 <sup>th</sup> International Astronautical Congress (IAC2017)                                     | Oct 2017 |
| Adelaide, Australia   |          |
| Poster Presentation   |          |