



DEPARTMENT OF PHYSICS
THE UNIVERSITY OF HONG KONG

Physics
Colloquium

Physics Colloquium

Advancing Fundamental Understanding of Nature: ATLAS Searches for New Physics



October 8, 2025 (Wednesday)



4:30 p.m.



KB132, 1/F, Knowles Building,
Main Campus, HKU



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Abstract:

The Standard Model (SM) is the most precise and successful framework for describing the fundamental constituents of matter and their interactions. Yet observations such as dark matter and the matter-antimatter asymmetry point to New Physics beyond the SM, motivating continued searches to deepen our understanding of nature. The ATLAS experiment—a flagship detector at the CERN Large Hadron Collider (LHC) and one of the world's largest international collaborations—operates at the highest collision energies available, offering a unique opportunity to probe such new phenomena. In this talk, I will briefly review the LHC and ATLAS's general search strategies, then highlight recent results from New Physics searches and discuss future prospects.

Key Reference:

1. Exploration at the high-energy frontier: ATLAS Run 2 searches investigating the exotic jungle beyond the Standard Model, ATLAS Collaboration, *Physics Reports*, 1116, 2025, 301-385
2. The quest to discover supersymmetry at the ATLAS experiment, ATLAS Collaboration, *Physics Reports*, 1116, 2025, 261-300
3. Review of searches for vector-like quarks, vector-like leptons, and heavy neutral leptons in proton-proton collisions at $\sqrt{s}=13$ TeV at the CMS experiment, CMS Collaboration, 1115, 2025, 570-677
4. Dark sector searches with the CMS experiment, CMS Collaboration, 1115, 2025, 448-569

Biography:

Yang Liu is an Assistant Professor in the School of Science at Sun Yat sen University (Shenzhen). He received a B.S. in Physics from Wuhan University (2015) and a Ph.D. in Experimental Physics from the Institute of High Energy Physics, Chinese Academy of Sciences (2020). From 2020 to 2022, he was a Chung Yao Chao Fellow at Nanjing University, before joining Sun Yat sen University in 2022. His research within the ATLAS experiment focuses on new physics searches, tau lepton reconstruction and identification, and semiconductor detector R&D. He received the Chung Yao Chao Scholarship in 2020 and has served as the team representative for the Sun Yat sen University ATLAS group since 2022.

Anyone interested is welcome to attend.

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