



DEPARTMENT OF PHYSICS
THE UNIVERSITY OF HONG KONG

Physics
Colloquium

Physics Colloquium

Explore the Time Frontier: from Galileo to Cosmic Antennae



September 25, 2024 (Wednesday)



5:00 p.m.



**MWT4, 1/F, Meng Wah Complex,
Main Campus, HKU**



Prof. Di Li

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National Astronomical Observatories of China*

Abstract:

Human's perception and philosophy of the cosmos depend on our collective sensors. Modern optical sky surveys in the 20th century gave rise to the concept of dynamic Universe, the forefront of which currently is situated in radio bands and manifests itself as fast radio bursts (FRB). FRB researches have been awarded the 2023 Shaw prize and the 2024 Marcel Grossman Award. We built the largest radio telescope, namely, the Five-hundred-meter Aperture Spherical radio Telescope (FAST), which has been leading the field of characterizing repeating FRBs ever since the its inception in 2020. With close to 100 FAST-based papers on FRBs, including 5 on Nature and 2 on Science, we started to establish an evolutionary picture for FRBs. With compact objects being the leading candidate engine of FRBs, the utter lack of short-time-scale periodicity present a major mystery regarding FRBs' origin. Recently, we invented the Pincus-Lyapunov diagram to help ascertain the stochastic nature of FRBs. The P-L diagram quantify FRBs to be less chaotic than Earthquakes, but way more random, akin to a Brownian motion on the energy-time bi-variate space. This stochastic behavior presumably reflects the young ages of FRBs. To help systematically localize and discover multi-band counterparts, we are building a next generation FRB machine, namely Cosmic Antennae (CA), the aim of which is to increase the discovery rate by orders of magnitude over all current radio telescopes.

Biography:

Dr. Li, a radio astronomer, is currently a Chair professor of Tsinghua University and the Chief Scientist of the FAST telescope operated by the NAOC. He pioneered several observing and data analysis techniques, including HI narrow self-absorption (HINSA) and a new inversion algorithm for solving the dust temperature distribution. Dr. Li has led multiple significant discoveries, including the first detection of interstellar molecular oxygen, the largest set of fast radio burst (FRB) events, the slowest pulsar in globular clusters, etc. He proposed and implemented a novel high-cadence-CAL technique that multiplied the survey efficiency of FAST. He has published more than 300 peer-reviewed journal articles, including 6 on Nature and 2 on Science. He won the Distinguished Achievement Award of the Chinese Academy of Sciences (CAS), the 3rd National Innovation Award, and the Marcel Grossman Award ("For his groundbreaking contributions to the scientific definition of the most sensitive radio telescope and his numerous innovations in characterizing the dynamic universe"). He took on many leading and/or advisory roles in national and international organizations, including the Steering Committee of Australia Telescope National Facility (ATNF), the Science and Engineering Advisory Committee of the Square Kilometer Array (SKA), and the advisory panel of the Breakthrough Listen initiative.

Anyone interested is welcome to attend.

Enquiries:

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