THE CHINESE UNIVERSITY OF HONG KONG

Department of Physics

SEMINAR

Testing the General Relativity with Multi-Messenger Observations in the Era of LISA

by

Ms. Kaye Jiale LI (李佳樂小姐)
UCL Mullard Space Science Laboratory, UK

Date: September 25, 2023 (Monday)
Time: 4:30 - 5:15 p.m.
Place: Rm 327, Science Centre North Block, CUHK
~~*Rm G25, Science Centre North Block, CUHK*~~

ALL INTERESTED ARE WELCOME
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Abstract

The theory of general relativity has been the cornerstone of modern physics for over a century, and yet, many of its predictions remain untested. In recent years, the field of multi-messenger astronomy has emerged as a powerful tool for testing Einstein's theory, enabling us to study the universe through a combination of different cosmic messengers such as gravitational waves, electromagnetic waves, and cosmic rays. In this talk, we will explore how the upcoming Laser Interferometer Space Antenna (LISA) mission will revolutionise our understanding of gravity and astrophysics. LISA is a space-based gravitational wave detector that will be able to observe low-frequency gravitational waves, which are inaccessible to ground-based detectors. With its unprecedented sensitivity, LISA will enable us to probe a wide range of astrophysical phenomena, including the mergers of supermassive black holes, extreme-mass-ratio inspirals, and galactic binaries. We will also discuss how combining LISA observations with, for example, the optical observations and radio pulsar timing, will allow us to test the relativistic dynamics in binary and triple systems, to constrain the maximum mass of neutron stars and to test relativistic analog of quantum Aharonov–Bohm effect.