THE CHINESE UNIVERSITY OF HONG KONG

Department of Physics

COLLOQUIUM

Probing Supermassive Black Holes with ALMA

by



Professor Martin BUREAU
Department of Physics
University of Oxford, UK

Date: November 29, 2024 (Friday)
Time: 2:00 - 3:00 p.m.
Place: L2, Science Centre, CUHK

(Light refreshments will be served at SCNB 1/F lobby from 3:30 to 3:50 p.m.)

ALL INTERESTED ARE WELCOME
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Abstract

Supermassive black holes are now known to lurk at the centres of most galaxies, and are believed to play a key role in the evolution of galaxies. Here, I will present key results from the mm-Wave Interferometric Survey of Dark Object Masses (WISDOM), a high resolution survey of molecular gas in galaxy nuclei. First, I will explain how dynamical black hole mass measurements are made, what the challenges are, and how these are solved using state-of-the-art technologies, all the while drawing on basic physics. Second, I will discuss substantial ongoing efforts to rapidly but accurately measure the masses of supermassive black holes, and present many new spectacular measurements from the Atacama Large Millimeter/ submillimeter Array (ALMA). Third, I will compare molecular gas and megamaser measurements and introduce the newly-discovered "mm fundamental plane of black hole accretion", that is surprisingly tight and holds for a wide variety of active galactic nuclei and stellar-mass black holes. These efforts open the way to literally hundreds of measurements across galaxies of all morphological types, both active and non-active, with a unique method. They thus promise to revolutionise our understanding of the co-evolution of galaxies and black holes.

Enquiries: 3943 6303