

Tuesday, November 24, 2:30 pm

Speaker: John Ruan

Institution: Bishop's University

Title: A Chorus of 'Cosmic Messengers' Heralds a New Era of Astrophysics

Abstract: The 2017 discovery of the binary neutron star merger GW170817 through both gravitational waves (using laser interferometers) and light (using telescopes) marked the dawn of a new era of multi-messenger astrophysics. Our new ability to detect and study individual astronomical sources through both of these 'cosmic messengers' now enables novel approaches to answer a diverse array of fundamental questions in astrophysics. I will discuss the rich insights provided by multi-messenger observations of GW170817, including (1) the origin of the heaviest elements through observations of the associated kilonova, (2) the nature of short Gamma-ray bursts through observations of the X-ray/radio emission, and (3) the expansion rate of the Universe through the use of gravitational waves as standard sirens. However, these breakthroughs have also unearthed a plethora of new questions, thus motivating additional multi-messenger observations of new compact object mergers. I will discuss the unique challenges that we will face in this exciting endeavor over the next decade, and the role of next-generation Canadian telescope facilities in making the next landmark discoveries.