

New Perspectives onto the Universe in the Multi-messenger astro era

Friday, 4 November 2022 16:15 (40 minutes)

Since the revolutionary discovery of gravitational wave (GW) emission from a binary black hole merger in 2015, the remarkable GW detectors LIGO, Virgo and KAGRA have detected ninety compact object mergers. These events are transforming modern astronomy. In particular, the first binary neutron star merger, dubbed GW170817, was observed in both gravitational and electromagnetic radiation, thus opening up a new era in multimessenger astrophysics. The multi-messenger characterisation of such an event has enabled major advances into diverse fields of modern physics from gravity, high-energy and extragalactic astrophysics, nuclear physics, to cosmology. In this talk, I will discuss my work in strong-field gravity astrophysics and how combining observations, theory and experiment have been key in making progress in this field. I will present the challenges and the opportunities that have emerged in multi-messenger astrophysics, and what the future holds in this new era.

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