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# New Perspectives onto the Universe in the Era of Multi-Messenger Astrophysics

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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 at least 220 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 multi-messenger astrophysics. The multi-messenger characterisation of such an event has enabled major advances into diverse fields of modern physics from gravity, high-energy astrophysics, nuclear physics, to cosmology. In this talk, I will discuss our 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, particularly in the past 8 years, and what the future holds in this new era

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