

Gamma-rays and Gravitational-waves in the Multi-messenger Era

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The most brilliant signatures of stellar death in the universe, gamma-ray bursts (GRBs) are ultra-relativistic jets of plasma and radiation formed by two known progenitors: Type Ic supernovae and binary neutron star mergers. These progenitors are also thought to produce gravitational-waves, or enormous distortions of spacetime predicted by Einstein via his theory of general relativity. On August 17, 2017, joint observations spectacularly confirmed that a gravitational-wave signal (GW170817) and a gamma-ray burst (GRB 170817A) were produced by the same binary neutron star merger, with an association probability of 5.3 sigma. These observations ushered in a new era of multi-messenger astronomy - one in which we can study the characteristics and evolution of neutron stars and black holes together with the radiation processes created by these systems. In this talk, I will introduce GRB astronomy, detail how I look for coincident GRBs and gravitational-waves, and highlight how such detections can maximize the science return of multi-messenger observations.