IBWS

INVITED LECTURE

The landscape of gravitational wave astronomy

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The direct detection of gravitational waves in binary black hole merger has opened a new window in observational astronomy. The first three observing runs of the ground based interferometers LIGO/Virgo have produced a broad range of science results, including the first observations of a binary neutron star merger and of a neutron star-black hole merger. The observations include some exceptional events and have produced the GWTC-2, GWTC-2.1, GWTC-3 catalogs of compact binary mergers, allowing tests of general relativity and studies of black hole and neutron star populations. The presentation will review ground based gravitational wave astronomy, the exceptional mergers, the catalogs. The review will also discuss the multi-messenger observations over the electromagnetic spectrum and with neutrinos and their relevance. Since the spectrum of gravitational waves is extended over a broad range of frequencies, other techniques for gravitational wave detection outside the sensitivity band of ground based interferometers will also be discussed.