Update on the LIGO-Virgo-KAGRA searches of gravitational waves

Prof. José Antonio Font

University of Valencia

The observations of gravitational waves (GW) by the Advanced LIGO and Advanced Virgo detectors have opened an entirely new window to study the universe. The detection of the first signal in 2015, GW150914, associated with the merger of two black holes, confirmed a century-old prediction of General Relativity. Less than two years later, the first GW signal produced by a binary neutron-star merger, GW170817, was observed. Through the unprecedented, coordinated action of LIGO, Virgo and dozens of astronomical facilities, this landmark detection provided key evidence to start addressing some long-standing open issues. At present, the LIGO-Virgo-KAGRA (LVK) Collaboration has published three GW Transient Catalogs corresponding to the first three observational campaigns (O1 to O3). Those catalogs comprise 90 events exceeding the threshold to be considered of astrophysical origin, all of them associated with coalescing compact binaries. This talk will present an overview of the current state of the LVK detections, discussing the main findings from O3 and taking a brief look at the ongoing run O4.