

Gravitational waves from ground and from space

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Gravitational waves detectors, for long only an ambitious concept, have entered the era of routine operations. After the first direct detection in 2015 and the spectacular kilonova detection 2017, LIGO/Virgo have entered their third operational run which has already added 5 more candidates to the catalog of gravitational waves sources in one month. Gravitational waves have not only confirmed the predictions of the General Theory of Relativity, but have already taught us about the existence of black holes with 30 solar masses and the origin of heavy elements. Future detections are expected to shed light on the question on how the large structures in the Universe, galaxies and galaxy clusters have formed.

Further ground-based detectors are expected to come online soon and the work on a space-borne gravitational detector (LISA) has started, promising an even richer scientific return. In this talk I will give an overview of the science of gravitational waves, the status of the current detectors and the future developments in both ground based and space based detectors.