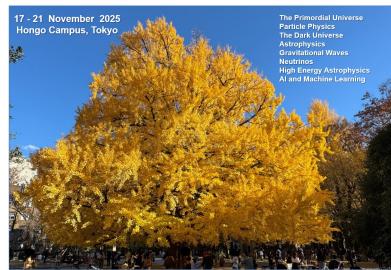


## Second International Conference on the Physics of the Two Infinities



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### Cosmology and Hubble tension from Gravitational-Wave Observations

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A persistent tension exists between the Hubble constant values inferred from early-Universe observations—such as the cosmic microwave background and baryon acoustic oscillations—and those obtained from local distance-ladder measurements. Gravitational waves (GWs) from compact binary coalescences provide a direct measurement of the luminosity distance from the waveform, offering an independent probe of the cosmic expansion, known as “standard sirens.” For neutron-star binaries, source redshifts can be determined through electromagnetic follow-up observations of counterparts detected in coincidence with GW events. In contrast, stellar-mass binary black holes lack electromagnetic counterparts, requiring alternative approaches to obtain redshift information. For ground-based detectors, two such approaches are currently in use: the dark siren and spectral siren methods.

In this talk, I will briefly review the methods used for the current GW observation and present recent results from the first part of the fourth LIGO–Virgo–KAGRA observing run. I will also discuss future prospects for cosmological measurements using GW observations.

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