The synergy of Euclid and Einstein Telescope: cosmology with gravitational waves

Wednesday 28 May 2025 09:00 (24 minutes)

Euclid is an ESA space mission launched in July 2023, designed to produce an all-sky map of galaxies with unprecedented precision. The mission will survey 14,500 square degrees with its Wide Survey, providing photometric redshifts for galaxies in the range 0 < z < 2 and spectroscopic redshifts between 0.84 < z < 1.98. Additionally, Euclid will conduct a Deep Survey covering 53 square degrees, featuring significantly longer exposures and higher completeness than the Wide Survey.

While the primary goal of the mission is to leverage galaxy clustering and weak lensing as cosmological probes to constrain the Universe's dark energy components and expansion history, its catalogs will also have immense legacy value for gravitational wave multimessenger studies.

To explore this potential, the Euclid Consortium has recently established a new Science Working Group on Gravitational Waves. Several studies are currently investigating the synergy between Euclid data and present and future GW observations, including LVK O4-O5 runs and the Einstein Telescope (ET).

In March 2025, Euclid released its first public catalog, Q1, covering 63 square degrees. Future data releases will progressively expand the galaxy catalogs, providing critical insights into the host galaxies of GW events detected by current and upcoming GW observatories, as well as the overall background galaxy distribution.

In this talk, we will discuss the Euclid mission and its synergy with GW observations, including ET.

For talks:

I want to present a poster if I cannot get a talk slot

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