

# Einstein Telescope: science objectives and designs

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The detection of gravitational waves in 2015, thanks to the LIGO and Virgo interferometers, opened a new window on our Universe. The discoveries during the first three observing runs already had an extraordinary impact on astrophysics, cosmology, and fundamental physics.

The GW community is now looking at the next long-prepared step: 'third-generation' detectors. Thanks to an increase of more than one order of magnitude in sensitivity and a larger bandwidth, Einstein Telescope (ET) and Cosmic Explorer (CE) will have an outstanding potential, capable of triggering fundamental discoveries.

I will give a broad overview of the main science targets of ET, ranging from Astrophysics to Cosmology and Fundamental Physics. I will then show recent forecasts for the observational prospects of ET, also comparing the reference triangular design with a geometry consisting of two widely separated L-shaped interferometers. Finally, I will focus on more specific aspects of the science case, namely nuclear physics and primordial black holes.

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