

Forecasting the detection capabilities of third-generation gravitational-wave detectors using GWFAST

Tuesday, September 27, 2022 10:20 AM (20 minutes)

The detection of gravitational waves in 2015, thanks to the LIGO and Virgo interferometers, opened a new window on our Universe, and the era of Multimessenger GW-EM Astrophysics has started with the observation of GW170817-GRB170817A. The discoveries during the first three observing runs already had an extraordinary impact on both 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 larger bandwidth, the Einstein Telescope and Cosmic Explorer will have outstanding potential, capable of triggering fundamental discoveries.

Forecasting the capabilities of these extraordinary instruments, which are able to detect hundreds of thousands of sources per year, is a crucial aspect. In this talk, I will present GWFAST, a novel Fisher-matrix code for GW studies, tuned toward third-generation detectors. After describing its main features and technical aspects, I will show the results of a comprehensive study of the capabilities of ET alone, and of a network made by ET and two CE detectors. In particular, to assess their potential, I will present the accuracy in the reconstruction of the parameters of both binary black hole, binary neutron star, and neutron star-black hole systems.

Primary author: Mr IACOVELLI, Francesco (University of Geneva)

Co-authors: MAGGIORE, Michele (Geneva University); MANCARELLA, Michele (Université de Genève); FOFFA, Stefano (Geneva University)

Presenter: Mr IACOVELLI, Francesco (University of Geneva)

Session Classification: Session 3