



Contribution ID: 37

Type: **Contributed Talk (20 minutes)**

Constraining Λ CDM cosmological parameters with Einstein Telescope mock data

Wednesday 8 June 2022 12:00 (20 minutes)

We investigate the capability of Einstein Telescope to constrain the cosmological parameters of the non-flat Λ CDM cosmological model. Two types of mock datasets are considered depending on whether or not a short Gamma-Ray Burst is detected and associated with the gravitational wave event using the THESEUS satellite. Depending on the mock dataset, different statistical estimators are applied: one assumes that the redshift is known, and another one marginalizes over it assuming a specific prior distribution. We demonstrate that (I) using mock catalogs collecting gravitational wave events to which a short Gamma-Ray Burst has been associated, Einstein Telescope may achieve an accuracy on the cosmological parameters of $\sigma_{H_0} \approx 0.40 \text{ km s}^{-1} \text{ Mpc}^{-1}$, $\sigma_{\Omega_{k,0}} \approx 0.09$, and $\sigma_{\Omega_{\Lambda,0}} \approx 0.07$; while (ii) using mock catalogs collecting also gravitational wave events without a detected electromagnetic counterpart, Einstein Telescope may achieve an accuracy on the cosmological parameters of $\sigma_{H_0} \approx 0.04 \text{ km s}^{-1} \text{ Mpc}^{-1}$, $\sigma_{\Omega_{k,0}} \approx 0.01$, and $\sigma_{\Omega_{\Lambda,0}} \approx 0.01$. These results show an improvement of a factor 2-75 with respect to earlier results using complementary datasets.

Which topic best fits your talk?

Cosmological Sources of GW

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