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Fast Radio Bursts: Mock Generation and Cosmological Parameters Constraints

Fast Radio Bursts (FRBs) are a relatively recent discovered object in cosmology and astrophysics, whose origin is still an open problem. They are a class of brief ($\sim$ ms) and bright ($\sim$ Jy) radio transients that have been detected by a number of radio telescopes around the globe. There is a new generation of radio telescopes coming online, such as the BINGO, CHIME, SKA and others, which are going to make possible that many more samples of FRB will be detected in the near future. In this work, we have used the code FRBlip to study how effective BINGO will be to detect FRBs considering the interferometry between its horns and other three proposed external detectors i.e., horns with or without mirrors, and phased arrays devices. With this analysis, the Phased Arrays device, together with the BINGO's horns, proved to be the best setup to detect FRBs in our context. The increase in the detection rate is in the one order of magnitude compared to the other detectors in a certain period. With this study, we have simulated FRB mocks in order to verify if the cosmological quantities, i.e., as the redshift distribution and the dispersion measure (DM) extracted from the signal, will have statistical weight to be used to constrain cosmological parameters. In principle, there are degeneracies contained in the prediction of the DM of the FRBs which would allow cosmological parameters to be constrained in different degeneracy directions than the CMB and Intensity Mapping (IM) surveys such as BINGO. E.g., the CMB measures well the parameter $\Omega_b h^2$, whereas IM experiments have a better handle on the cosmological distances and FRB measurements should measure a ratio of Ω_b and h. We explore to what extent a combination of these experiments can shed a light on the values of the parameters described above.

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