

Using Cross Correlation Functions to Constrain the Host Environment of Fast Radio Bursts

Fast Radio Bursts (FRBs) are millisecond-duration radio wave transients that emit enormous energy with unknown origins. In this project, we aim to constrain the environment of galaxies hosting FRBs by measuring their cross correlations with other populations of galaxies. To explore the methodology, we construct realistic mock catalogs of FRBs and galaxies using a semi-analytical method.

To start with, we employ halos from N-body simulations in Takahashi et al. (2018). We then populate galaxies of these halos with the stellar mass and star-formation rate using the latest HOD model from the COSMOS survey in Weaver et al (2023). Two mock FRB catalogs are constructed using different mechanisms: One is the FRB rate proportional to the stellar mass of the host galaxies, representing a scenario that FRBs typically take place in old stellar populations. The other is the opposite case, where FRBs primarily occur in young stellar populations and their production rate is proportional to the star formation rate of host galaxies. The mock FRBs follow the energy distribution measured in Shin et al (2023). The dispersion measure (DM) of the mock FRBs is predicted from Macquart relation.

We will present the preliminary results in this poster.

Section

Galaxy/Extragalactic

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