

Cosmic Cartography 2022: Exploring the Cosmic Web and Large-Scale Structure



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Constraining the Cosmic Baryon Distribution with FRB Foreground Mapping

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The FRB can shed light on the ‘missing’ baryons problem, because the dispersion of the FRB signals encodes information about the ionized gas along the line-of-sight. The majority of this dispersion is expected to come from the diffuse IGM tracing the cosmic web. However, the cosmic variance significantly decreases the sensitivity of the FRB. We introduce a technique to estimate the density field in FRB foreground to reduce the cosmic variance. Applying Bayesian density reconstruction algorithm to galaxy catalogues in the f/g of localized FRBs allows reconstructing the density field, decreasing the uncertainties in the f/g structures by ~ 2 compared to the cosmic variance. Using Fisher Matrix, we predict that a sample of 30 FRB constrains the fraction of baryons in the IGM to $\sim 10\%$, and parameters of foreground galaxy halos to $\sim 20\%$. We introduce FLIMFLAM - an ongoing observational campaign to obtain spectroscopic redshifts of galaxies in front of 30 localized FRBs to map out the cosmic web.

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