

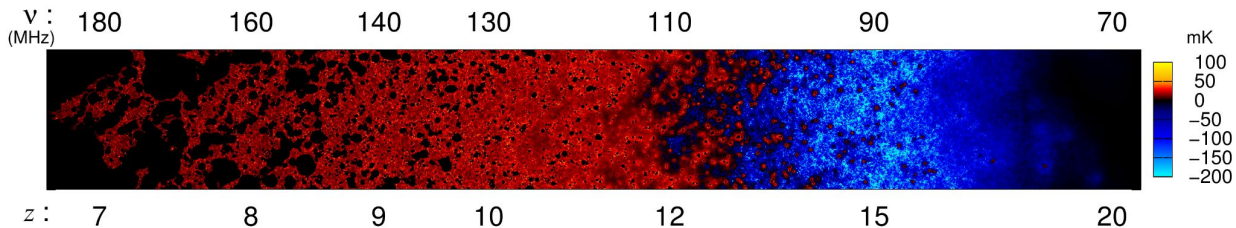
P3: Reionization constraints using 21 cm observations

Introduction: The redshifted 21-cm signal from neutral hydrogen in the IGM is the most promising probe of the EoR, as it has the ability to reveal many of the unknown facts about this epoch. Several low-frequency radio-telescopes such as LOFAR, MWA, HERA, EDGES, LEDA have dedicated their valuable resources to detect the EoR-HI signal. While none of the other attempts have to date claimed a detection of the signal, several of them have provided upper limits which can constrain the properties of the sources formed during the EoR as well as the physical states of the IGM during EoR.

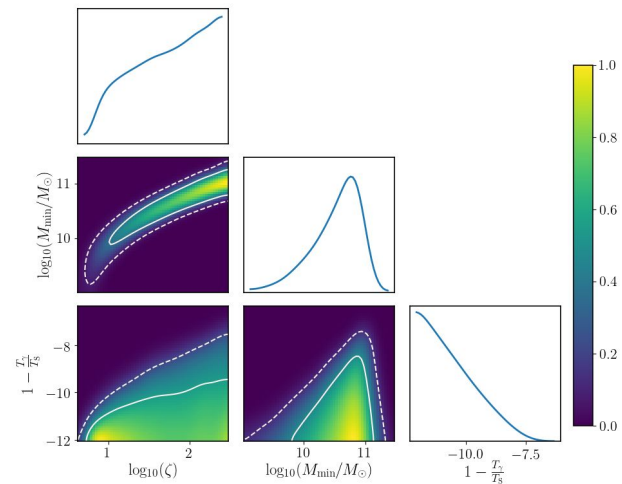
Project: Aim is to constrain the reionization simulation parameters or the source model parameters of EoR using one of the recent results on the EoR power spectrum.

Requirement: The project requires knowledge about running 21-cm prediction algorithms such as GRIZZLY (gfortran based) and Bayesian inference frameworks such as the Monte Carlo Markov Chains (MCMC, python).

References: E.g., arXiv:2002.07195, arXiv:2103.07483



View of Cosmic Dawn and EoR in redshifted 21-cm signal from the IGM. The Light-cone is simulated using GRIZZLY (Ghara+2015)



Constraints on the three GRIZZLY source parameters from the MCMC analysis using the LOFAR upper limit on 21-cm power spectrum (Mertens+2020) for redshift $z \approx 9.1$ (See Ghara+2020).

Ragunath Ghara

Department of Natural and Life Sciences,
The Open University of Israel.

ghara.ragunath@gmail.com

