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Photometric Tomography of the Intergalactic Medium at the Reionization Epoch

Friday 14 March 2025 16:05 (1h 55m)

The study of the intergalactic medium (IGM) and its interaction with light from distant galaxies provides crucial insights into the evolution of the universe. In this project, I will apply a technique called "photometric intergalactic medium (IGM) tomography" to reconstruct a map of the large-scale structure of the IGM in the early Universe using a publicly available photometric catalogue and data from the HSC and Subaru telescopes, and with the use of the COSMOS2020.

With this, I develop a spectral energy distribution (SED) fitting tool, using Markov Chain Monte Carlo (MCMC), to measure the IGM transmission along a sample of photometric background galaxies with Lyman α as a tracer of the IGM trasmission, which I will use to make a map of the IGM at the Epoch of Reionization (EoR).

This will firstly be done with a simple power-law to reconstruct the SED of the background galaxies, where the model will be characterized by two parameters, the UV magnitude, and the UV slope, to describe the SEDs of the galaxies. This model will then be improved upon with a more sophisticated SED model based on the BPASS (Binary Population and Spectral Synthesis) model, which accounts for contributions of binary stars and various stellar populations to the SED. This model will be characterized by parameters such as the star-formation rate, dust attenuation, metallicity, and cluster ages.

Field of study

Astrophysics

Supervisor

Koki Kakiichi

Author: RASHDAN, Omar Ahmad (NBI)

Session Classification: Poster session: Enjoy the posters!