
Probing the Circumgalactic and Intergalactic Medium during the Epoch of Reionization with Lyman-alpha Emitting Galaxies

Raphael Sadoun^{*1}, Zheng Zheng , Jordi Miranda-Escudé , Renyue Cen , and Hy Trac

¹ICCUB – Spain

Abstract

Reionization is the last major phase transition in the Universe during which the Intergalactic medium (IGM) changed from a fully neutral to highly ionized state. As Lyman-alpha emission from star-forming galaxies is sensitive to the neutral gas environment, Lyman-alpha emitters (LAEs) are among the few observational probes to the reionization process. I will present results from radiative transfer calculations aimed at modeling the Lyman-alpha properties of LAEs during reionization. I will first show how the expected variation in the ionizing UV background level during reionization can account for the observed evolution in the fraction of Lyman-alpha emitters among dropout galaxies at $z \sim 6-7$. I will also describe our work on the statistical properties of LAEs at high- z from radiative transfer modeling of galaxies in high-resolution cosmological reionization simulations. As the simulation outputs are chosen to match the targeted redshifts of narrowband LAE surveys, our study provides an important tool to help interpreting observations and put constraints on the ionization state of the IGM at high- z .

^{*}Speaker