Tracking down reionization using the IGM thermal history

Elisa Boera*[1]

[1]University of California [Riverside] – United States

Abstract

During the HI reionization, the UV radiation from the first luminous sources injected vast amount of energy in the intergalactic medium, photo-heating the gas to tens of thousands of degree Kelvin. This increase in temperature has left measurable imprints in the thermal history of the cosmic gas: a peak in the temperature evolution at the mean density and a smoothing out of the gas in the physical space by the increased gas pressure following reionization (i.e. Jeans smoothing effect). The structures of the HI Lyman-alpha forest at high redshift are sensitive to both these effects and therefore represent a powerful tool to understand when and how reionization happened.
I will present a novel investigation of the IGM thermal history using the Lyman-alpha forest flux power spectrum at z_˜5. For the first time, we extended the measurement down to the smallest scales currently detectable by high-resolution quasar spectra. These scales have been proven to be the most sensitive to different reionization scenarios and allow new constraints on the timing and the heat injection by reionization.
I will show the new results and I will discuss their consistency with different reionization models.

*Speaker