Contribution ID: **44** Type: **Talk**

Exploring the sources of the reionization behind lensing clusters with MUSE (Geoffroy de la Vieuville)

Wednesday, 11 September 2019 10:40 (18 minutes)

In our current understanding of the reionization era, the sources responsible for the transition of the universe from a neutral Hydrogen state to an ionized state are likely faint, low mass, star-forming galaxies. One way to study this type of population is to determine the Luminosity Function (LF) of galaxies selected from their Ly-a emission. However, the current studies and their conclusions are in general limited by the lower luminosity that can be reached by the surveys.

In an attempt to reach lower luminosity regime, we are working in lensing clusters with deep VLT/MUSE observations. MUSE is a large field of view integral field unit ideal to work on the galaxy luminosity function as it allows a complete and blind selection of Lyman-a Emitters (LAEs) without any photometric preselection. In addition, MUSE provides a continuous redshift range of 2.9 < z < 6.7 for LAEs that overlaps with the end of the reionization era, making MUSE well suited to study and provide constraints on the sources of reionization.

The combined used of large IFU data cubes and lensing fields makes this analysis computationally challenging. To get around this difficulty, we have developed new methods to account for the contribution of each individual LAE, including the effective-volume and completeness determinations. The volume computation is based on the simulation of the detection process of individual LAEs in the source plane reconstruction of MUSE cubes to account for both the lensing effects and the individual spatial and spectral profiles of LAEs.
To the cost of a significant increase in complexity and a lower volume of universe explored, both due to the lensing effect, we build the LAE LF using a Monte-Carlo process to account for all possible sources of uncertainties, for a population of LAEs with $39.5 \leq \log L \leq 43$ selected across multiple deep MUSE observations. The resulting LFs provide an unprecedented level of constraints on their faint end shape down to $\log L \sim 40.5$. The analysis of the LFs revealed that the LAE population has roughly a similar level of contribution as the UV selected population (LBG) to the total cosmic ionizing emissivity at z~6. And depending on the relative intersection of the two population, their union may produce enough ionizing flux to keep the universe reionized at z~6.
These results were obtained on a first sample of four lensing clusters as part of a large program conducted in the framework of the MUSE GTO. During the presentation, I will also discuss the results derived with an enlarged sample including up to eight lensing clusters, therefore improving the statistics and significance of the faintest population of highly magnified LAEs

Primary authors: Mr DE LA VIEUVILLE, Geoffroy (IRAP); PELLO, Roser (IRAP); MAHLER, Guillaume (University of Michigan); RICHARD, Johan (CRAL); MUSE GTO CONSORTIUM

Track Classification: Reionization and First Light