Double-peaked Lyman-alpha emitters seen with MUSE

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Abstract

Lyman-alpha emitters (hereafter LAEs) are a well-studied class of high-redshift star-forming galaxies, emitting a significant fraction of their luminosity in the strongest recombination line of Hydrogen, the Lyman-alpha line, at 1216Å rest-frame.

Since the first light of the Multi Unit Spectroscopic Explorer (MUSE) at ESO/VLT, in 2014, our knowledge of LAEs in the redshift range $3 < z < 6$, has greatly improved: we discovered galaxies thanks to their Lyman-alpha emission, that were undetected in the HST data and we characterized several of their properties.

But so far, most of the studies conducted exclude the double-peaked LAEs from the sample. To understand the diversity of the LAE population, a deep investigation has to be done. These galaxies are particularly interesting because they may provide a new way to investigate the redshift evolution of the Intergalactic Medium (IGM) Lyman-alpha transmission.
I started this project by studying the MUSE Ultra Deep Field 10 (UDF10): a field of 1×1 of 30h deep. I developed a detection method that takes into account the diversity of double-peak lines in the MUSE 3D data. It is a challenging task knowing that none of the double-peak lines look like the other ones. My method is selective and has to be improved but at least I am sure that the LAEs are really double-peaked. It was found out that 19% of the parent sample is double-peaked. I will present the results I obtained on this dataset, their implications on the galaxy environment and the possible improvements I can apply to the method I will use for the next dataset I am studying: the MUSE eXtreme Deep Field (MXDF), a 140h deep field.

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