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Type: Oral presentation

Shedding light on galaxies at the end of the reionization epoch with long gamma-ray bursts.

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Long gamma-ray bursts (LGRBs) are unique tools to probe first galaxies. They are associated with massive stars and their bright afterglows can be used as powerful background sources capable of unveiling the gas along their line of sight. Afterglow spectroscopy allows detailed studies of the properties of the interstellar medium (ISM) of star-forming galaxies up to the highest redshift. Furthermore, the LGRB afterglow emission fades quite rapidly, allowing the study of the emission properties of their hosts, independently of their brightness at any wavelength.

In this talk, I will show the results obtained with VLT/X-shooter observation of the afterglow of GRB 210905A at $z = 6.318$. We detect neutral hydrogen, low-ionization, high-ionization and fine-structure absorption lines, as well as a tentative Lyman-alpha emission at velocity > 1000 km/s from the absorbing gas. We were able to determine the metallicity, kinematics and chemical abundance pattern, dust depletion and dust-to-metal ratio of the ISM at $z = 6.318$. I will place these results in the context of high-redshift GRB hosts and of very high-redshift galaxies.

These results show the very powerful potential of GRBs to access detailed information on the properties of very high-redshift galaxies, independently of the galaxy luminosity. Deep photometric and spectroscopic observations with VLT/MUSE, HST and JWST will offer the unique possibility of combining this information with the properties of the continuum and ionized gas of a $z > 6$ galaxy.

Field

Cosmology

Day constraints

I will be able to make my presentation every day preferably not Thursday 24th afternoon.

Auteur principal: SACCARDI, Andrea (Observatoire de Paris - GEPI)

Orateur: SACCARDI, Andrea (Observatoire de Paris - GEPI)

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