The very high redshift component of the OTELO survey

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OTELO in a nutshell

The OSIRIS Tunable Filter Emission Line (OTELO) survey is a 2D-spectroscopic (R$\sim$700), blind tomography between Meinel bands in the NIR domain, on a selected 7.5 $\times$ 7.5 arcmin$^2$ field of the Extended Groth Strip.

The data-cube is defined by 36 slices with 12 Å of bandwidth each, sampled every 6 Å from 9280 Å towards the blue. Thus, each source accounts for a pseudo-spectrum with +36 spaxels of similar length.

Flux in each individual slice obeys the system transmission function as plotted beside. A multi-wavelength catalog with photo-z was concurrently built using ancillary data.

See the Posters of Marina Ramón-Pérez and Jakub Nadolny, or the Invited Talk of Jordi Cepa for more information about.

OTELO & LAEs at z$\sim$6.5

In the growing zoo of very high redshift sources, the Lyman-$\alpha$ emitters (LAEs) take up a singular niche. This emission is one of the most powerful tools to study galaxies during and after the reionization era.

Search of LAEs are mainly based on techniques as “dropout” (Steidel et al. 1996) or color excess in C-M diagrams, or by exploiting blind, slitless spectroscopic surveys. OTELO is able to combine both techniques in most cases.

Currently, we are studying a sample of 150+ candidates to very high-redshift galaxies in the OTELO field. A large number of interlopers is expected (i.e. cool dwarfs in the Galactic Halo, Balmer-break & other lower redshift galaxies).

An example of a LAE candidate (ID 6407) from OTELO survey is shown below.

ID 6407 not only stands out as a candidate to line emitter in the corresponding C-M diagram, but it exhibits a remarkable emission feature in the OTELO’s pseudo-spectrum. The line profile is consistent with predictions about the influence of the instrumental profile of tunable filters on the Ly-$\alpha$ line at high redshifts (de Diego et al. 2013). If the spectral feature shown corresponds to this line, ID 6407 is a LAE at $z_{\text{spec}}$=6.531, which is consistent with the first photo-z solution ($z_{\text{phot}}$=6.46).

An upper limit in rest-frame EW is $-18.6 \pm 5.1$ Å if continuum is actually sampled, with a moderate Ly-$\alpha$ luminosity of $\sim$3.49 $\pm$ 0.9 $\times$ 10$^{42}$ erg/s.

References:
de Diego, J.A. et al. (2013) AJ 146, 96