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LYMAN ALPHA EMITTERS IN GRAVITATIONAL LENSED FIELDS

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We study the luminosity function of Lyman Alpha Emitters (LAEs) at redshifts between $z \sim 6.5$ in strong gravitational lensed (GL) fields by clusters of galaxies, using OSIRIS tunable filters (TFs) at the GTC. OSIRIS TFs enhance the emission line contrast, together with the total flux magnification produced by the lens, will be used to detect faint LAEs and to extend the low luminosity queue of the Luminosity Function (LF) of LAEs.

The field containing the cluster of galaxies MS2053.7-0449 (Verdugo et al. 2007) was selected because it contains studied strong GL. From the LF of LAEs (Le Delliou et al. 2006), we expect to detect about 20 such objects per cluster field with $F \geq 2 \times 10^{-17}$ erg s^{-1} cm^{-2}. Narrow-band (FWHM = 12 Å) high-quality photometry (convolved to the worst seeing) at contiguous wavelengths (tuned central wavelengths λ_c = 9122, 9128, 9134, 9140 & 9146 Å) from OSIRIS-GTC's TFs (Cepa et al. 2003) were compared against each other to look for drop-out candidates (Steidel et al. 1995). Observations were performed with 3 exposures per λ of 210 s each (with a triangular offset pattern of 10″ to eliminate diametric ghosts). Seeing varied from 0.75″ to 0.82″. Standard IRAF procedures were used for reduction. Sky (OH) emission rings were subtracted with the IRAF package TFred[6]. Offsets per λ were aligned and combined to generate a single image (*slice*) with exposure time of 630 s. A *deep* image was created combining all slices, resulting in an $t_{exp} = 3150$ s.

We developed an algorithm to detect drop-out candidates at a photometric redshift between $z_{phot} = 6.514 \pm 0.01$. Five objects were detected with a S/N > 3 (Figure 1). The effective central wavelength (λ_{eff}) of TFs changes as a function of radial distance from the optical center and the λ_c. For candidate LAE 292 $\lambda_{eff} = \lambda_c - 21.4$ Å; for candidate LAE 928 $\lambda_{eff} = \lambda_c - 12.7$ Å; for candidate LBG 889 $\lambda_{eff} = \lambda_c - 16.7$ Å. Counts of each candidate and for each wavelength have been graphed to create pseudo-spectras. A routine has been made to simulate the detection of LAE candidates through OSIRIS' TFs; those similar to the measured pseudo-spectra are shown in Figure 2.

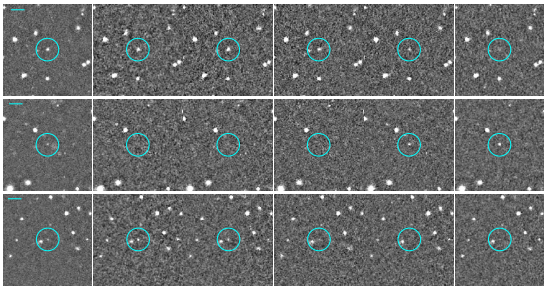

Fig. 1. From top to bottom: candidates LAE 292, LAE 928 & LBG 889. Left to right: *deep*, 9122, 9128, 9134, 9140 & 9146 Å. Bar shows a 6″ scale.

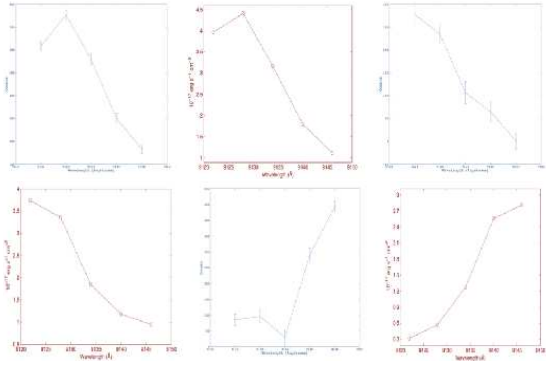

Fig. 2. Comparison of observed pseudo-spectra (blue) and random simulated LAE detections (red). Left to right: candidates 292, 928, & 889.

Additional photometry & MOS will allow further points in the LF of LAEs. Our results will be compared with the SUBARU LAE survey (Kashikawa et al. 2011; Ouchi et al. 2008).

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[6]`www.aao.gov.au/local/www/jbh/ttf/adv_reduc.html`.