

## **The Space Density of Redshift 5.7 LyA Emitters from a Deep, Keck Multislit Windows Search**

**Crystal Martin**, University of California, Santa Barbara, USA

**Abstract** We (C. Martin & M. Sawicki) present results from a deep  $z=5.7$  LyA emission line search with LRIS Keck I. The aim was to push further down the LyA luminosity function than is possible with narrowband imaging surveys while covering more area than surveys restricted to cluster caustics. The multislit windows technique does this by dispersing the light within the atmospheric windows and blocking light outside the window. Though we find many strong emission lines in this blind survey, the number of  $z=5.7$  LyA emitters brighter than  $0.6 L_{\text{star}}$  is at most two in this (approximately) four-square arcminute field. We argue that the LyA luminosity of a 'typical' star-forming galaxy cannot brighten much between redshift 3 and 5.7, nor can the number density of such objects increase much. This result raises the interesting question of whether there are enough bright, high-redshift galaxies to maintain the ionization of the intergalactic medium at  $z=5.7$ . To make our upper limit on the density of LyA emission consistent with the critical star formation rate would require a LyA escape fraction  $f_{\text{LyA}} \leq 0.2 f_{\text{Q}}$ , where  $f_{\text{Q}}$  is the escape fraction of Lyman continuum photons. While this LyA escape fraction is quite low, it does appear to be plausible given that only 25% of starburst galaxies at  $z=3$  have LyA in emission (Shapely et 2003). If our candidates are not confirmed to be LyA, however, then it would appear that much fainter galaxies (dwarfs) supply the bulk of the intergalactic radiation field at high redshift. I will also show numerical simulations (with A. Fujita) that explore the star formation efficiency and galactic wind strength required to get substantial leakage of ionizing radiation from high-redshift dwarf galaxies.