

# Detection of Escaping Lyman Continuum Radiation in Two Local Starbursts Using FUSE

E. Leitet<sup>1</sup>, N. Bergvall<sup>2</sup>, B-G Andersson<sup>3</sup>, and E. Zackrisson<sup>4</sup>

<sup>1</sup>Uppsala Astronomical Observatory, Sweden, e-mail: elisabet.leitet@astro.uu.se

<sup>2</sup>Uppsala Astronomical Observatory, Sweden, e-mail: nils.bergvall@astro.uu.se

<sup>3</sup>Dept. of Physics and Astronomy, Johns Hopkins University, USA, e-mail: bg@pha.jhu.edu

<sup>4</sup>Tuorla Observatory, Finland, e-mail: ez@astro.uu.se

**Abstract.** We present the detection of escaping Lyman Continuum (LyC) radiation from two local starburst galaxies, Tol 1247-232 and Tol 0440-381, using archival data from the Far Ultraviolet Spectroscopic Explorer (FUSE). From profile fitting of metal lines, high densities of neutral gas were derived for both galaxies, implying that the LyC radiation is escaping from holes in the interstellar medium. The first results for one of the galaxies, Tol 1247-232, give an escape fraction ( $f_{esc}$ ) of 17–35 %. These new detections, together with that of the blue compact galaxy Haro 11 in Bergvall *et al.* (2006) where  $f_{esc}$  between 4–10 % was found, will have a feedback on cosmic reionization models.

**Keywords.** galaxies: evolution-starburst, cosmology: diffuse radiation, ultraviolet: galaxies

## Results

The detections were made using FUSE archival data, reduced with the latest pipeline CALFUSE v.3.1.7. The LyC leakage can be seen in the 2-dimensional spectra in Fig.1 for both galaxies, while Fig.2 show the 1-dimensional spectrum for Tol 1247-232. Using the spectral energy distribution model by Zackrisson *et al.* (2001), a preliminary  $f_{esc}$  for Tol 1247-232 of 17–35 % was derived for a standard Salpeter IMF, and 6–37 % for a range of IMF scenarios. This value is higher than what is considered to be normal for local starburst dwarfs (Heckman *et al.* (2001)), but is comparable to recent detections at high redshifts (e.g. Shapley *et al.* (2006)). For Tol 0440-381 further analysis is needed to quantify the escape fraction.

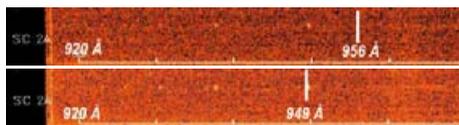


Fig.1: 2-dimensional spectra of Tol 1247-232 (upper) and Tol 0440-381 (lower), showing signal in the continuum on the shortwavelength side of the Lyman limit redshifted to 956 Å and 949 Å respectively. Also seen superimposed are geocoronal emission lines.

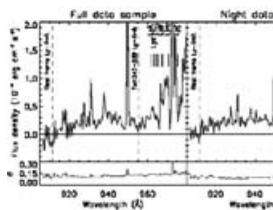


Fig.2: 1-dimensional spectra of Tol 1247-232 showing a clear signal in the continuum between the Lyman limit of the target galaxy and of the Milky Way.  $\sigma$  is the mean error per bin.

## References

- Bergvall, N., Zackrisson, E., Andersson, B-G, *et al.* 2006, *A&A* 448, 513.  
Zackrisson, E., Bergvall, N., Olofsson, K., *et al.* 2001, *A&A* 375, 814.  
Heckman, T.M., Sembach, K.R., Meurer, G.R., *et al.* 2001, *ApJ* 558, 56.  
Shapley, A., Steidel, C., Pettini, M., *et al.* 2006, *astr-ph/0606635*.