X-ray properties of the z ~ 4.5 Lya Emitters in CDF-S and ECDF-S

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Motivation

The AGN contamination to high redshift LAEs.

Many high redshift LAEs have shown large EWs of Lyman alpha emission, deep X-ray observations can help to check the contribution from Active Galaxies. Very small percentiges of AGN contamination were reported, from at least ~ 5% at z~2.25 (Nilsson et al. 2009), 1%-5% at z~3 (Gawiser et al. 2007; Ouchi et al. 2008; Lehmer et al. 2008), <5% at z~4.5 (Malhotra et al. 2003, Wang et al. 2004) to <1% at z~5.7 (Ouchi et al. 2008).

The star-formation acitvity of high redshift LAEs at X-ray band.

Deep X-ray data could also provide a upper limit to the SFR of the LAEs (e.g., Ranalli et al. 2002).
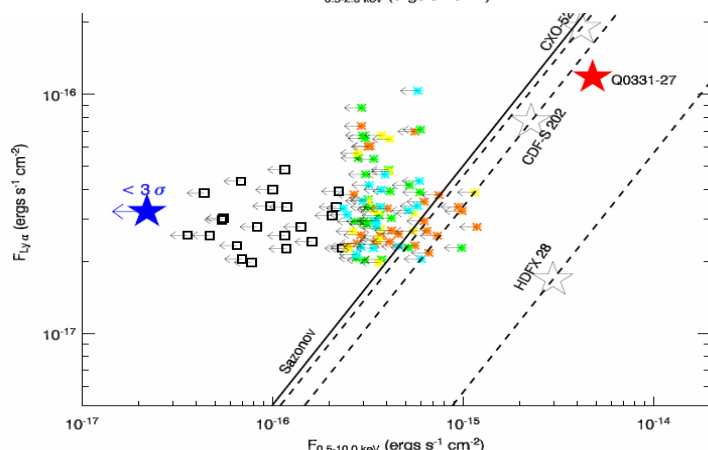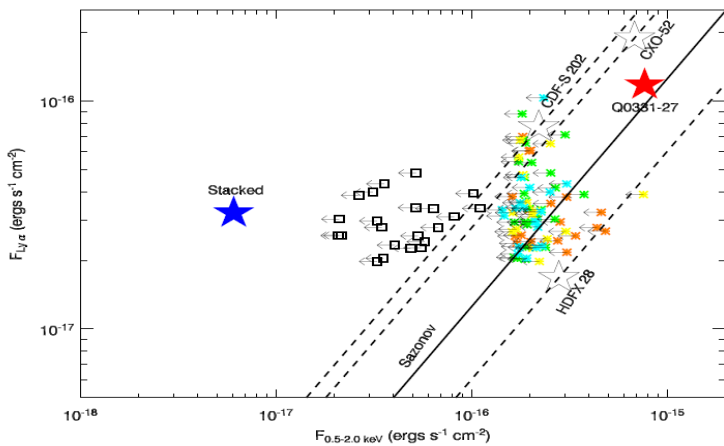
In this paper[11], we seek to match the z~4.5 LAEs with the deepest, 2Ms X-ray observation of CDF-S and 3 times larger, 240ks observation of E-CDF-S.
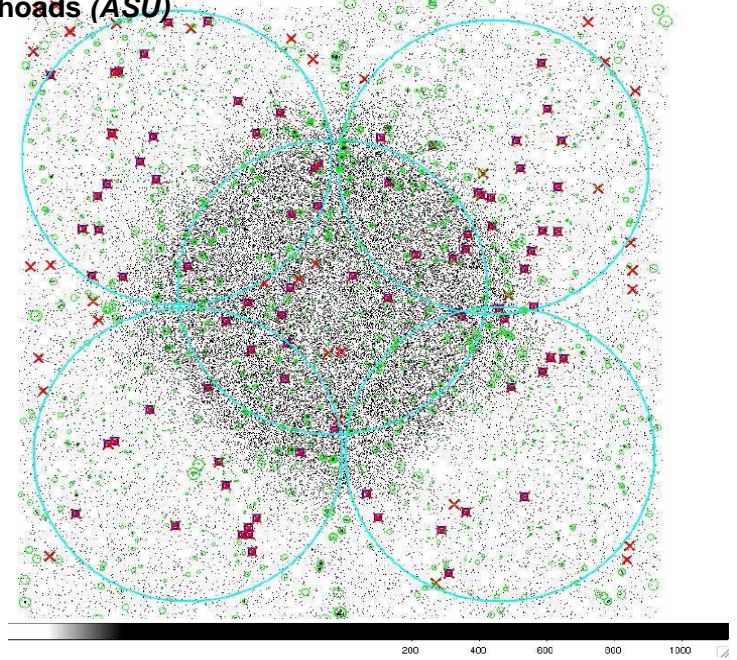
Data

Optical: 113 LAEs from Narrowband Imaging (NB665, NB656 and NB673) of GOODS-CDFS (Finkelstein et al. 2008，2009)
X-ray: 2 Ms CDF-S (0.1 deg^2) + 240ks E-CDF-S (0.3 deg^2)

Results & Discussion

- One LAE (*J033127.2-274247*) was detected in X-ray in E-CDFS, was identified as a z=4.48 broad line AGN (Treister et al. 2009).
- Stacking 52 Ms (36 Ms CDF-S + 16 Ms ECDFS), gave the 3 sigma upper limits of z=4.5 LAEs:
  F(0.5-10 keV) < 2.2×10^{-17} erg/cm^2/s
  F(2-10 keV) < 2.8×10^{-17} erg/cm^2/s
- At soft band, we resolve a weak signal as
  F(0.5-2 keV) = 6.1×10^{-18} erg/cm^2/s with S/N=3.4

- **AGN Contribution to LAEs:**
  less than 3% (6%) of our LAEs could be possible high redshift type 1 (type 2) quasars
- **SFR upper limit at z~4.5:**
  F(0.5-2 keV) = 6.1×10^{-18} erg/cm^2/s ➔
  ➔ *L(2.75-11 keV) = 1.2×10^{42} ergs/s.* ➔
  ➔ *SFR = 113+/-15 M$_\odot$/yr.*

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