

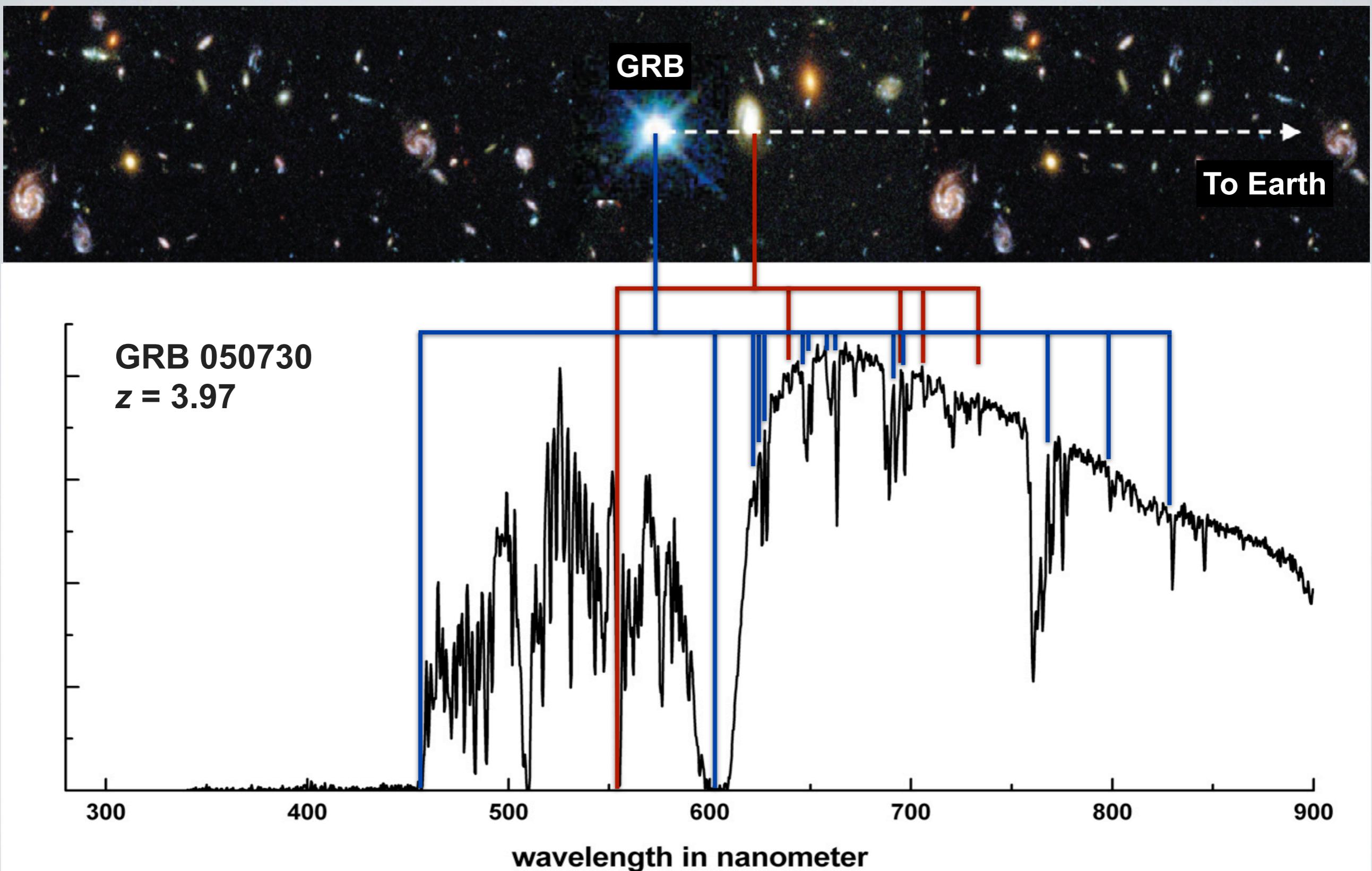


Galaxy counterparts of high-z sub-DLAs/DLAs towards GRBs

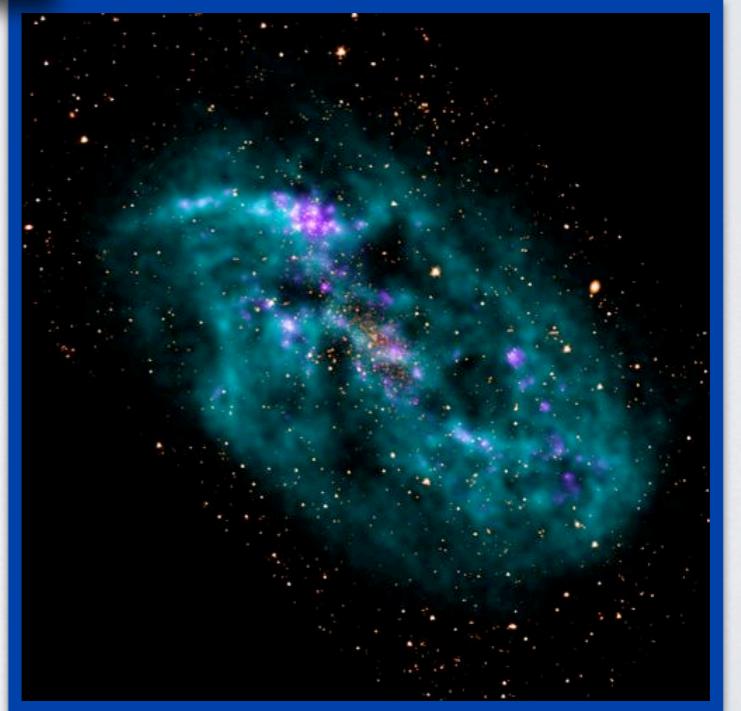
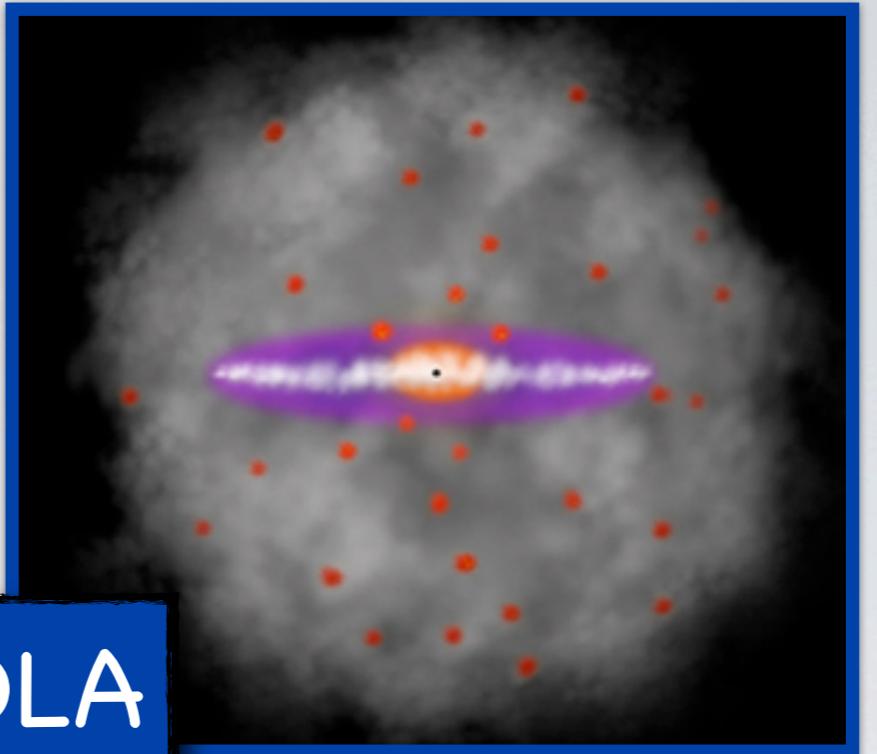
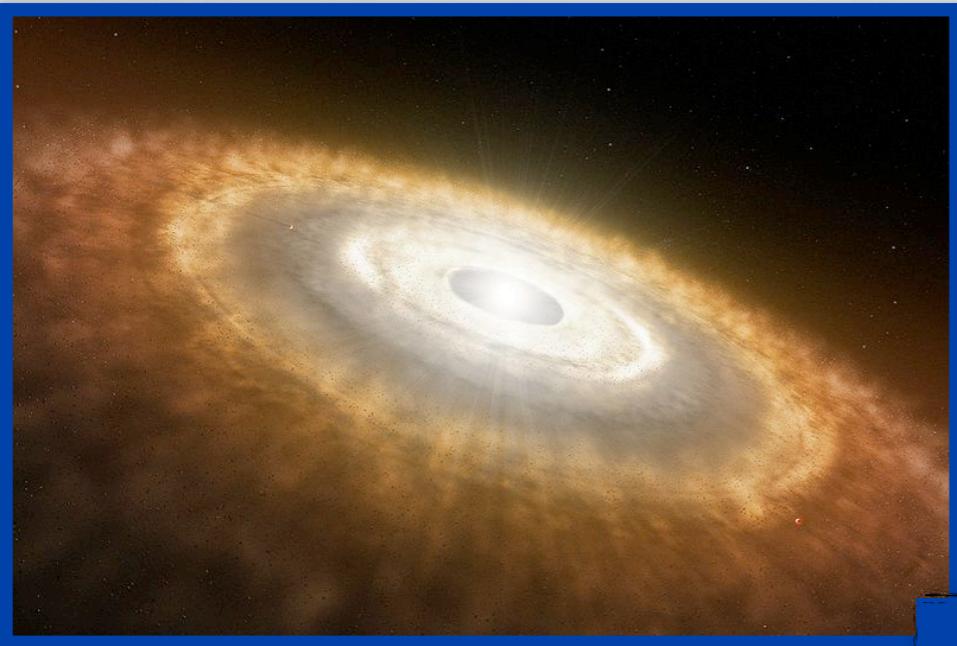
Steve Schulze

Gamma-Ray Bursts 2012 Conference

9 May, 2012



What are DLA galaxies?

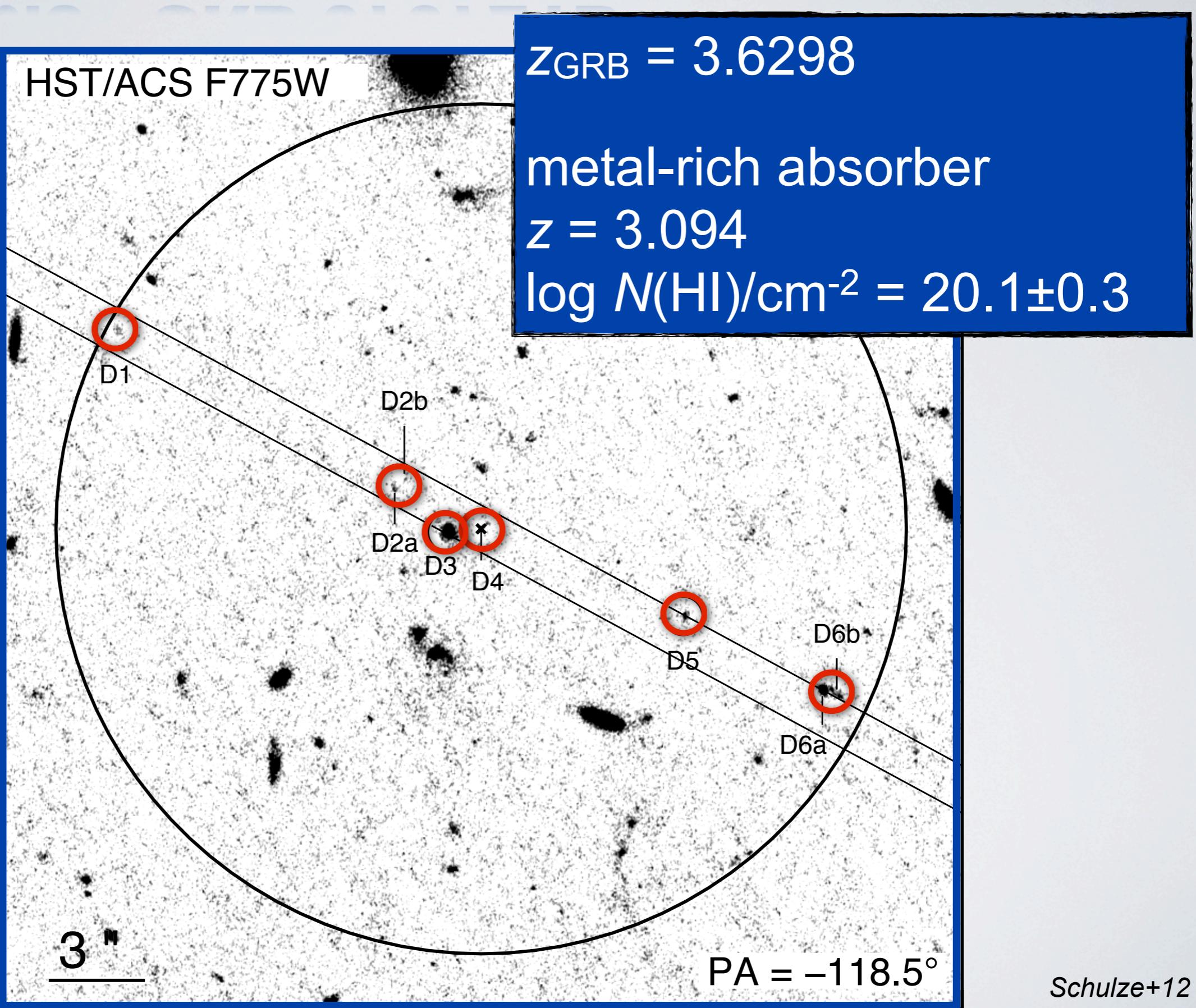


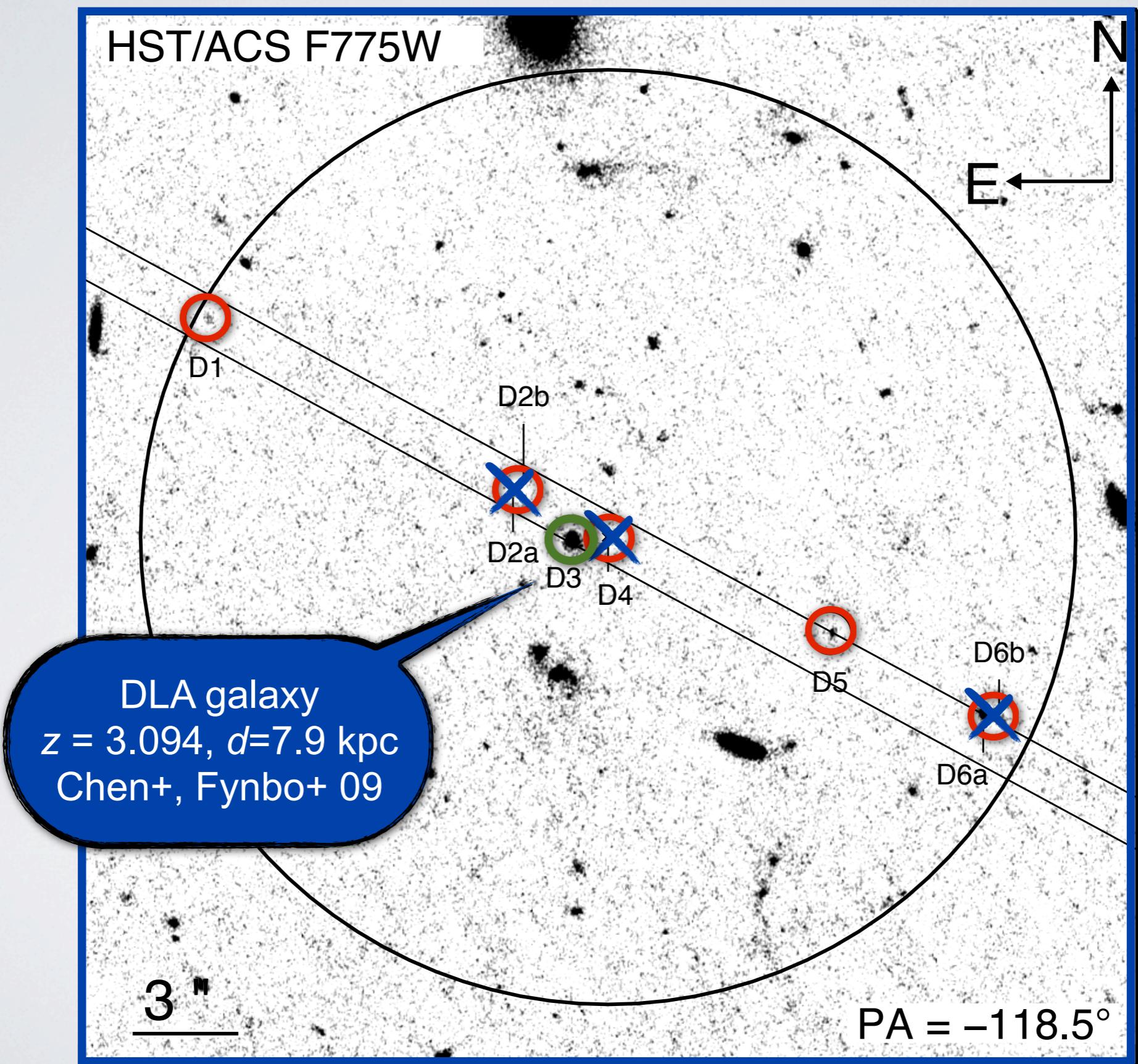
From Dailygalaxy, HST, NRAO, Wikipedia

Selection Criteria

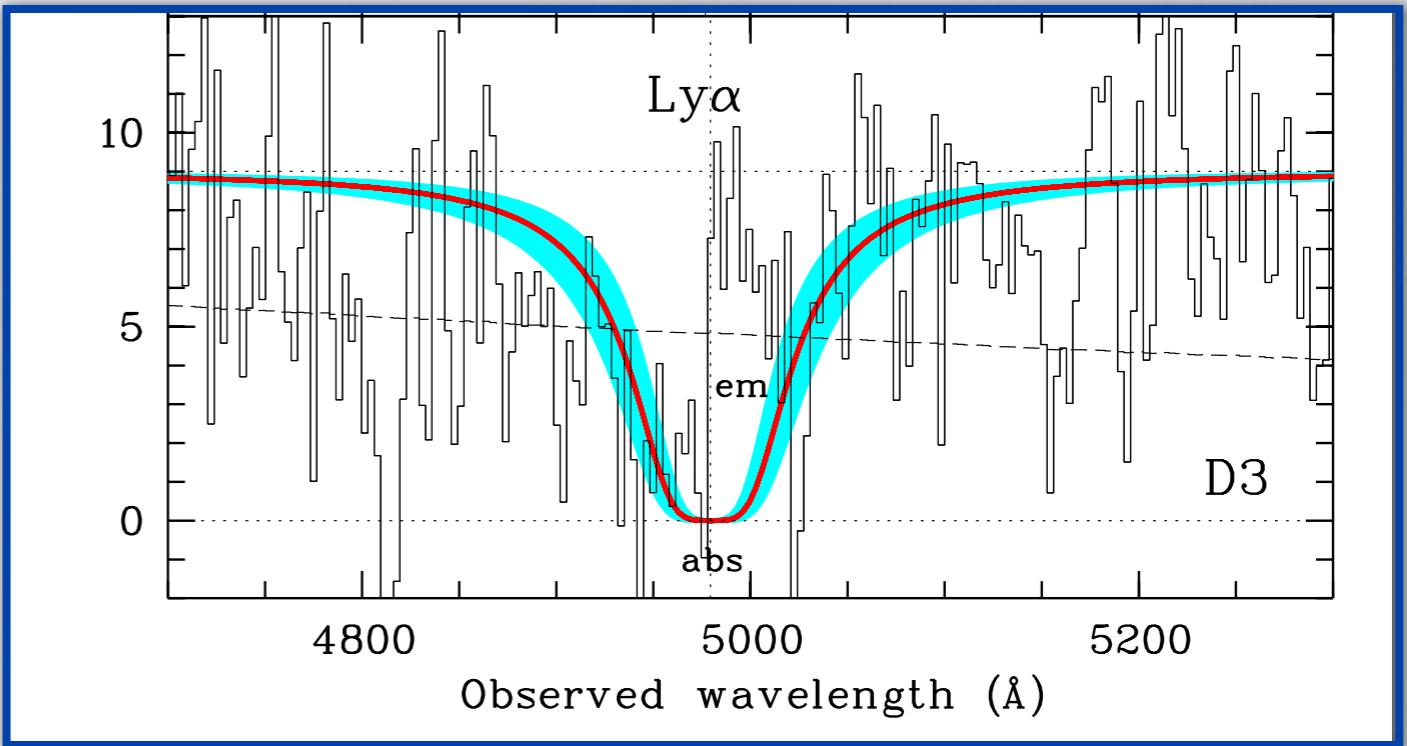
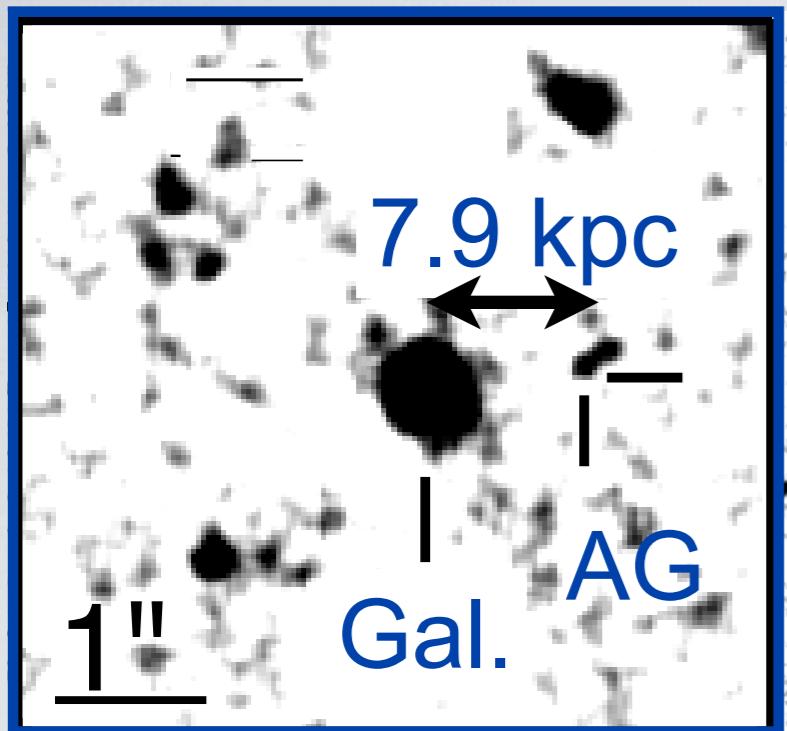
- $N(\text{HI}) > 10^{19} \text{ cm}^{-2}$
 - 7 absorbers in 6 GRBs
- Multi-filter data or spectra with different PAs
 - 5 absorbers in 4 GRBs

Example - GRB 070721B





Results



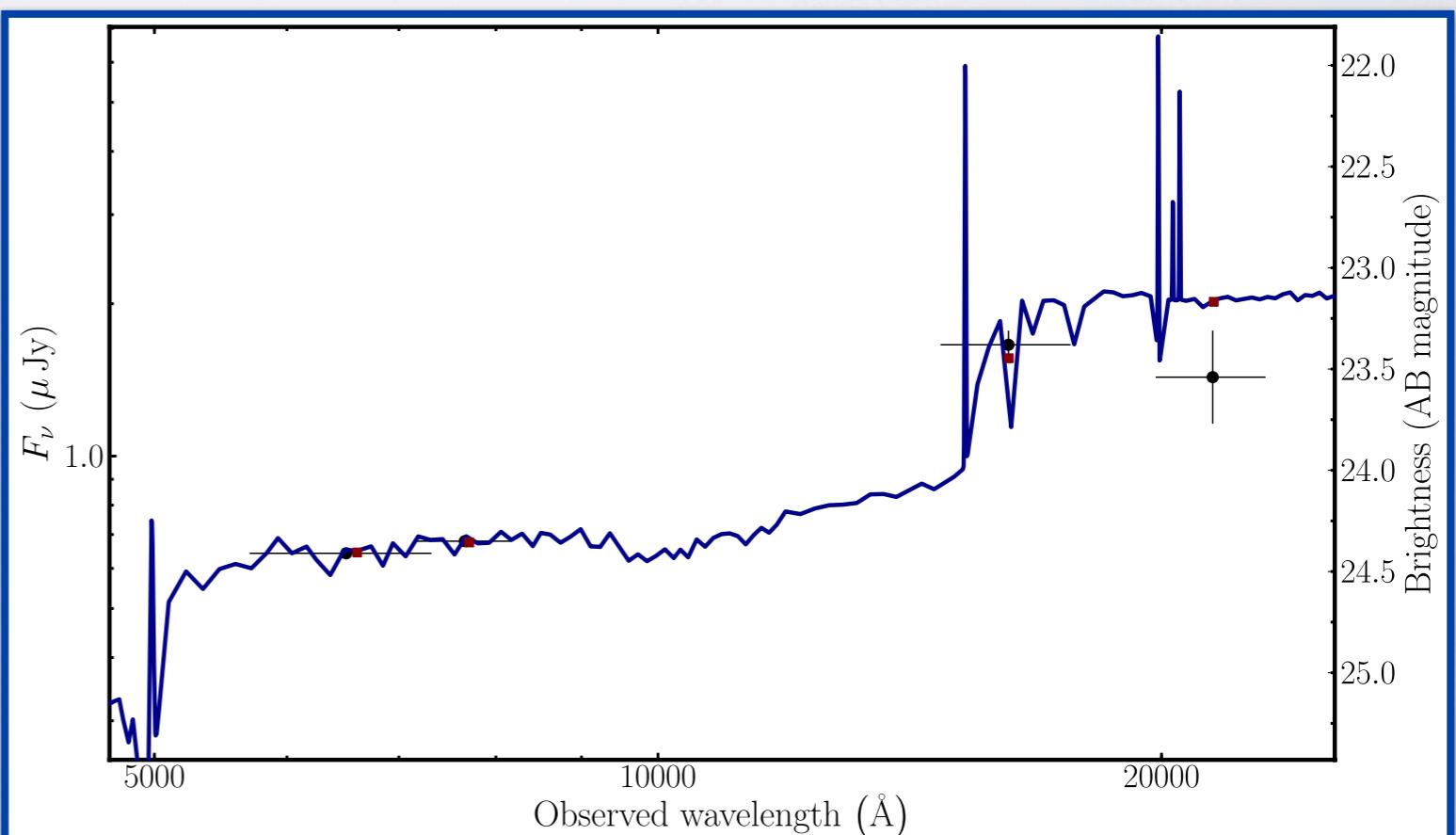
$F775W = 24.41$ mag
 $\log N(\text{HI})/\text{cm}^{-2} = 21.3 \pm 0.2$

$L \sim L_\star @ z=3$

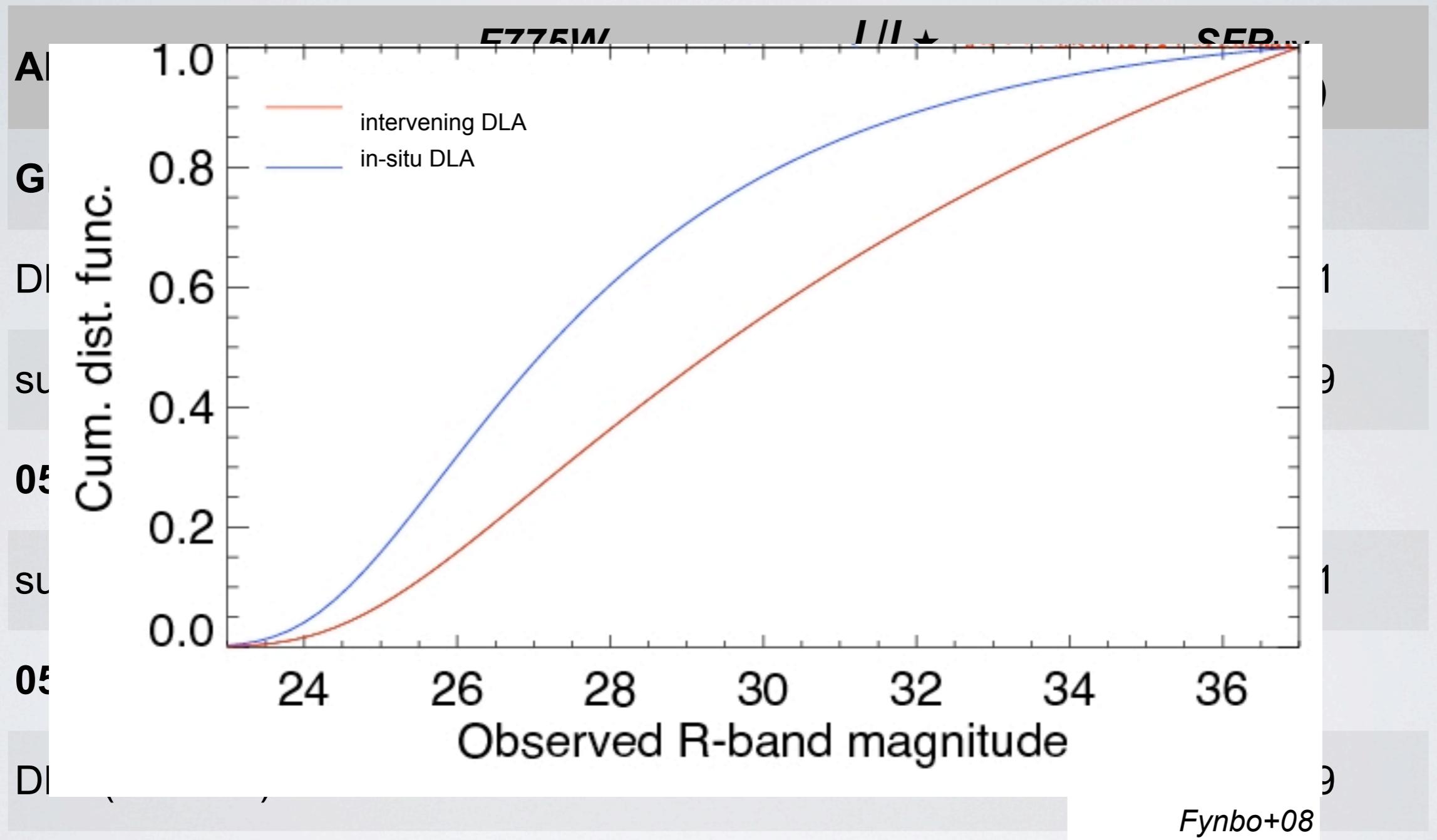
$A_V < 0.06$ mag

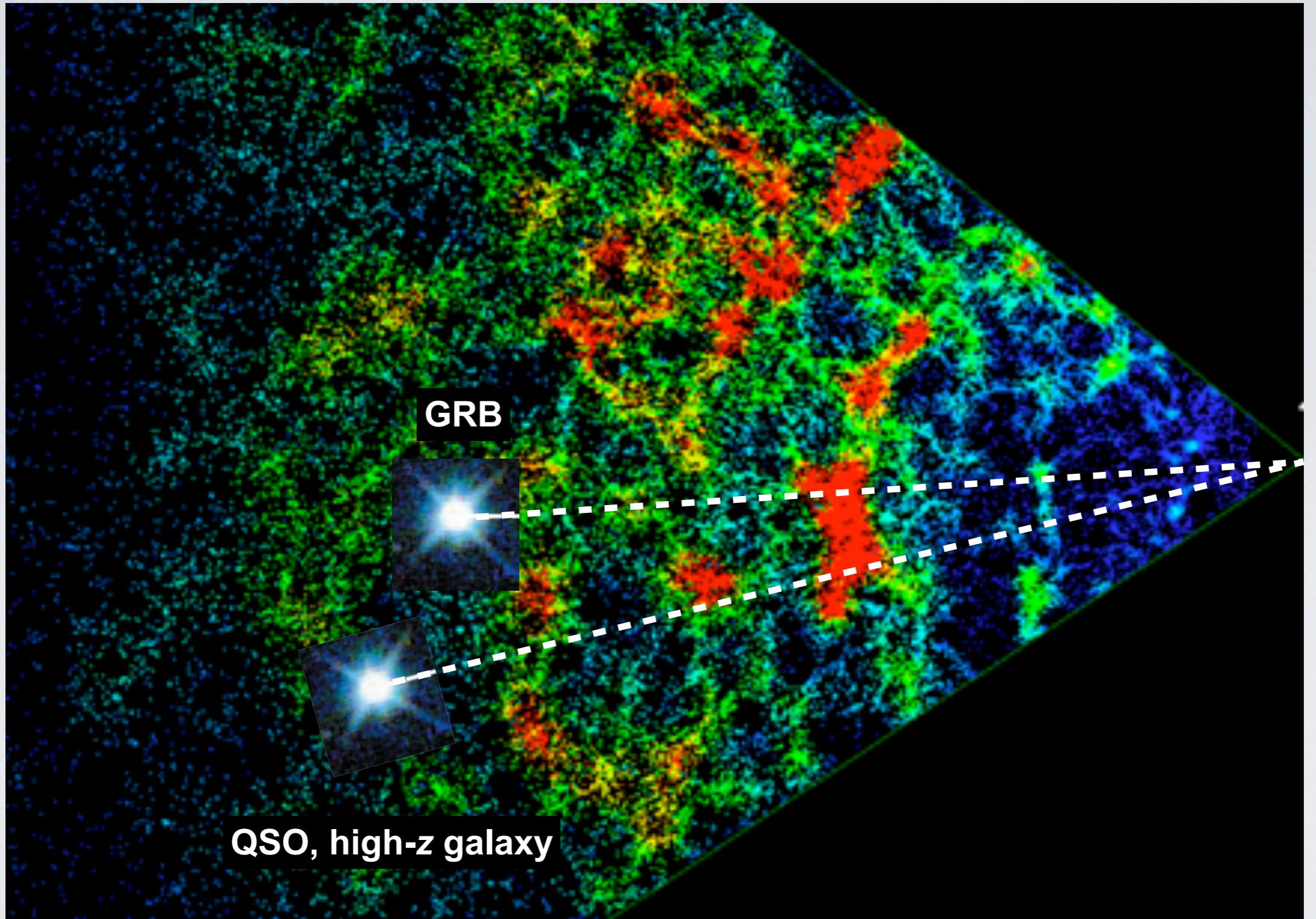
$SFR \sim 25 M_\odot / \text{yr}$

$\log M_\star/M_\odot = 10.1$

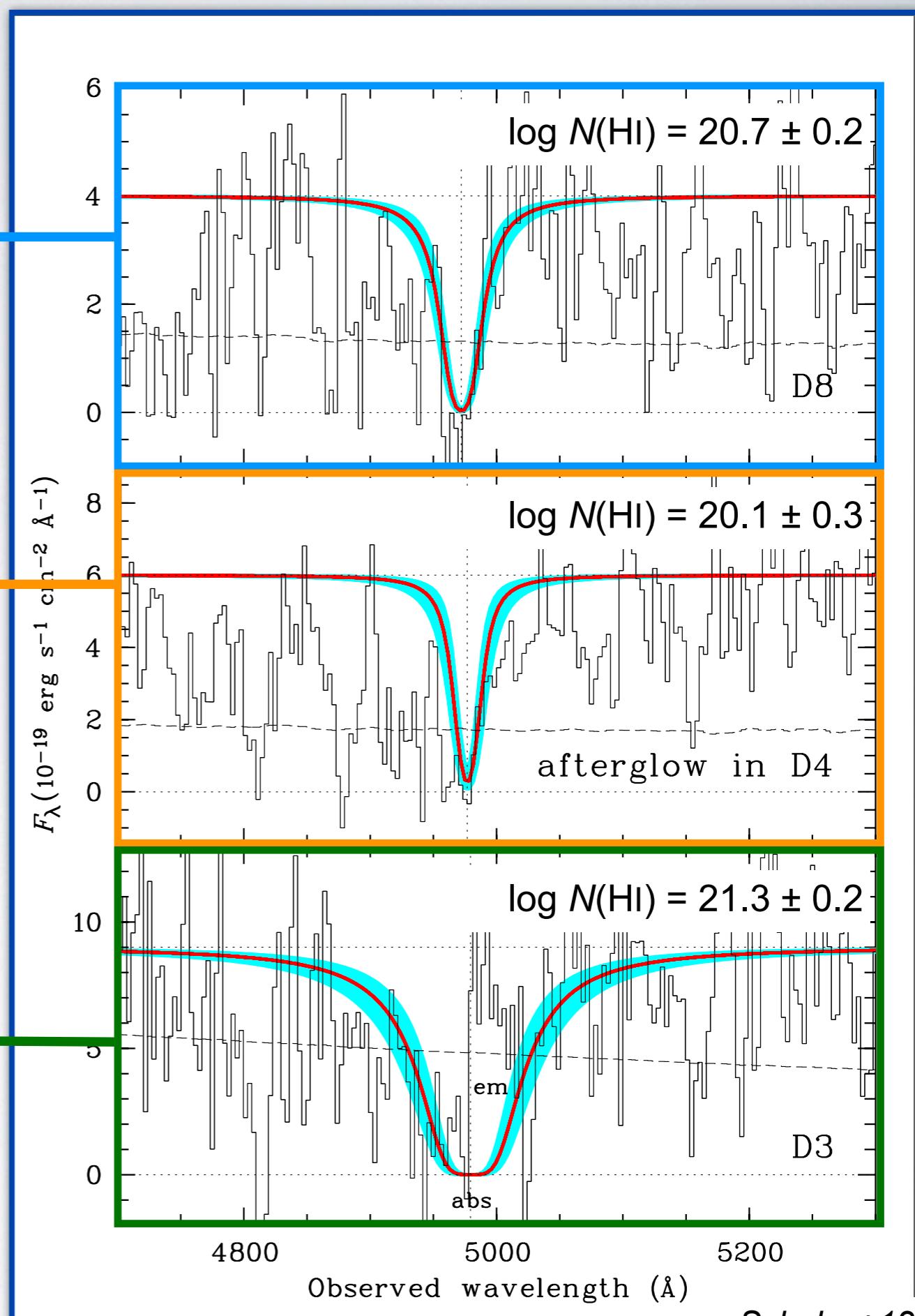
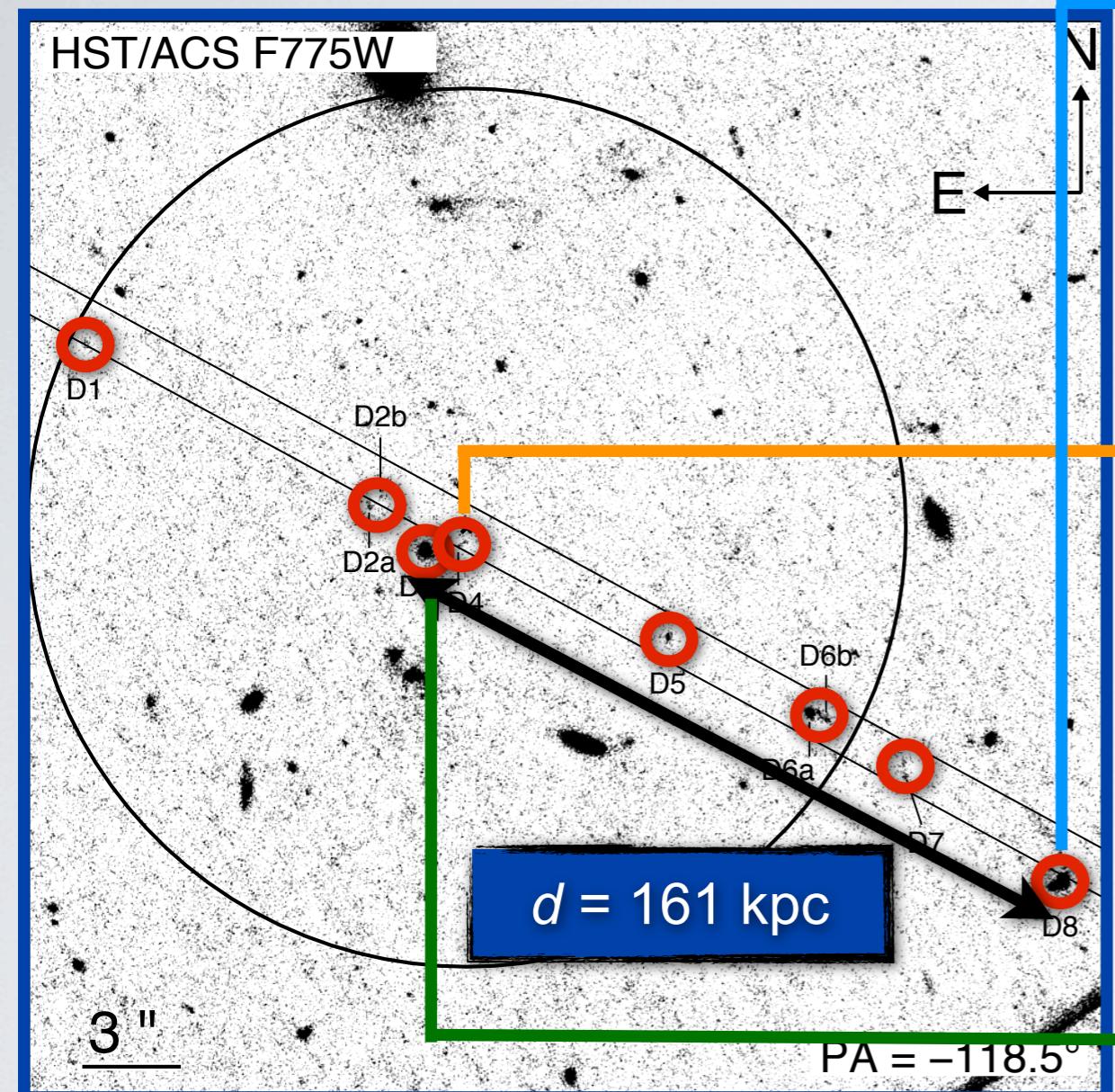


Absorber	$F775W$ 50/100 kpc	L/L_\star 50/100 kpc	SFR_{UV} ($M_\odot \text{ yr}^{-1}$)
GRB 050730 (z=3.969)			
DLA (z=3.564)	>25.7/>24.6	<0.5/<1.5	<0.4/<1.1
sub-DLA (z=3.022)	>25.7/>24.6	<0.4/<1.1	<0.3/<0.9
050820A (z=2.615)			
sub-DLA (z=2.360)	>26.7/>26.7	<0.1/<0.1	<0.1/<0.1
050908 (z=3.347)			
DLA (z=2.621)	>25.0/>24.7	<0.4/<0.6	<0.7/<0.9





From 2dF Galaxy Survey



Conclusions

- 4 GRB fields with 5 absorbers: $\log N(\text{HI}) > 10^{19}$
- DLA galaxy detected at $z = 3.094$
luminous LBG (moderately massive, and
moderate *SFR*, galactic outflow)
- Non-detections: $L < 0.35 L_\star$, $SFR < 1 M_\odot / \text{yr}$
- Correlated structures on a length scale of
137-161 kpc