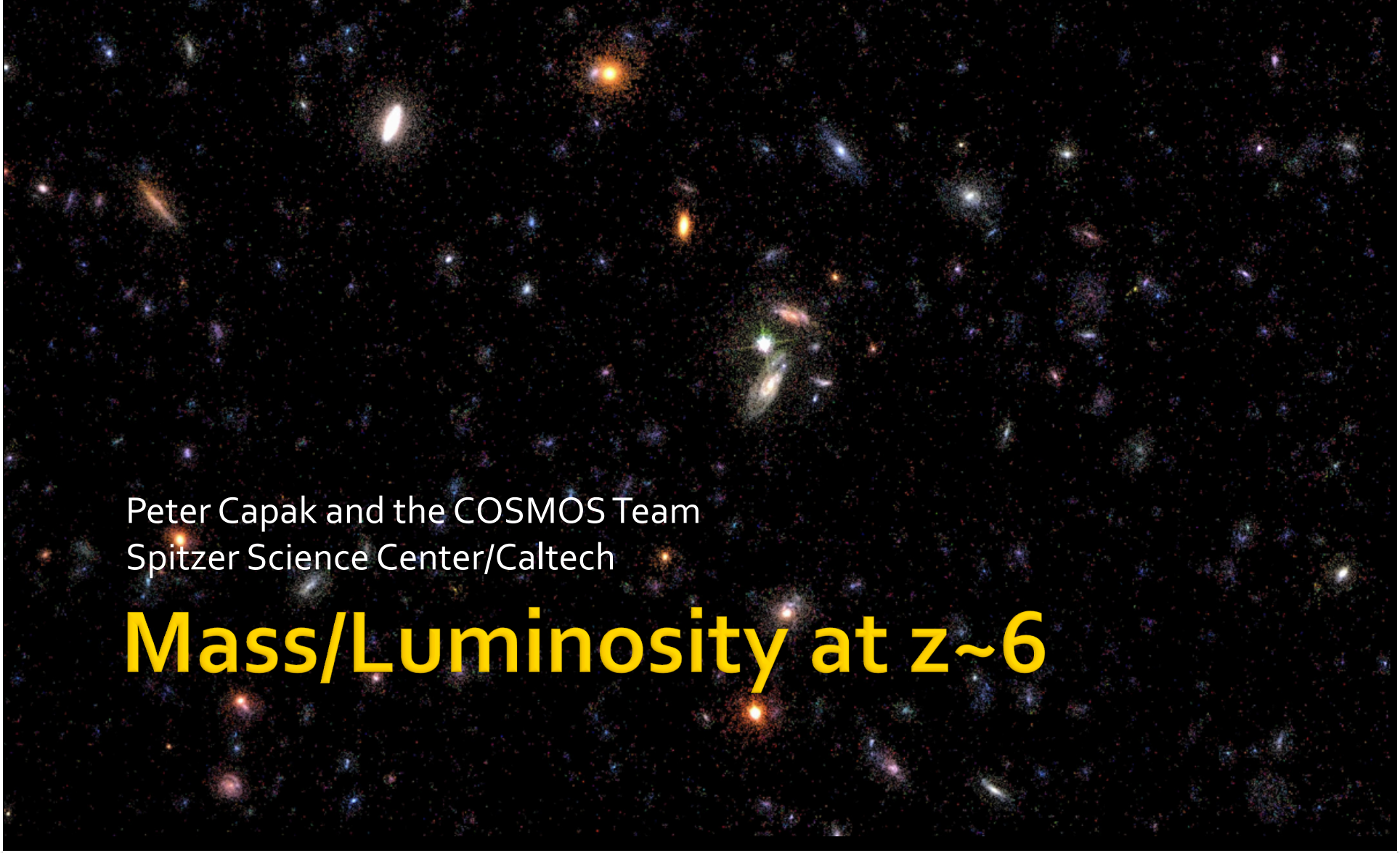


Peter Capak and the COSMOS Team
Spitzer Science Center/Caltech

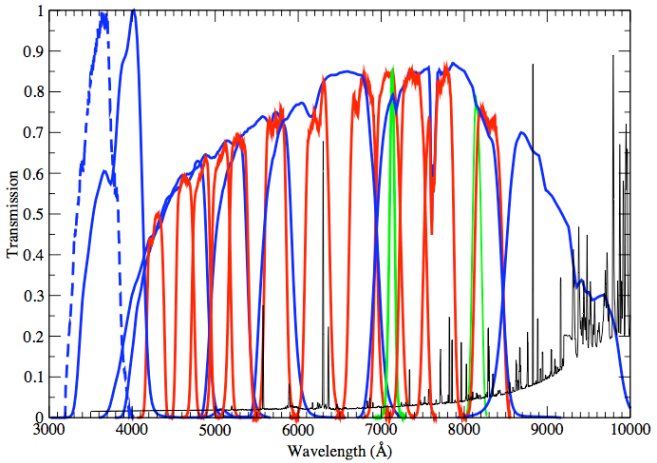
Mass/Luminosity at z~6

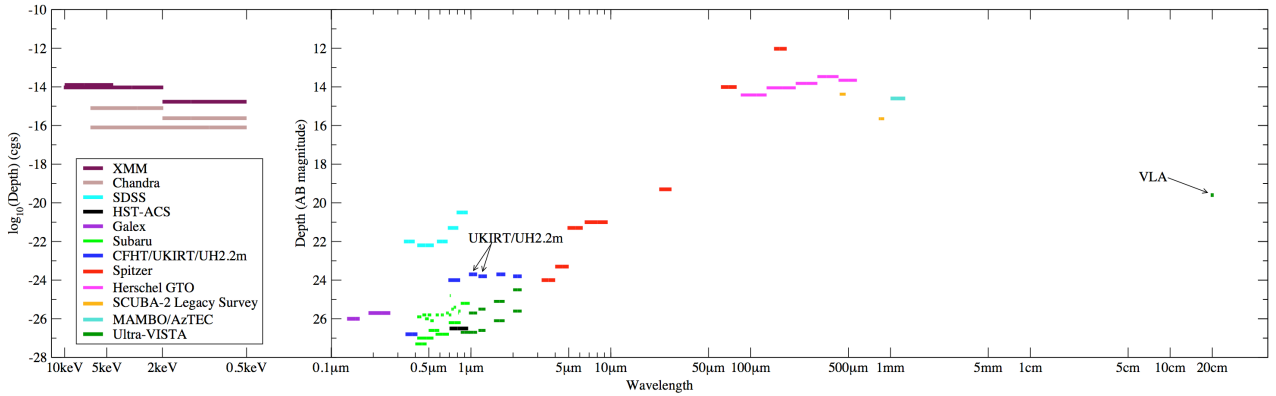
Outline

- Selecting Galaxies At Z>4 With COSMOS
- Deep Keck Spectroscopy
  - First Few Masks
  - Z=5.7 LAEs
- Luminosity Function Evolution At 4<z<6
- Extreme Objects
- Mass Function Evolution At 4<z<6

Selecting Galaxies At Z>4 With COSMOS

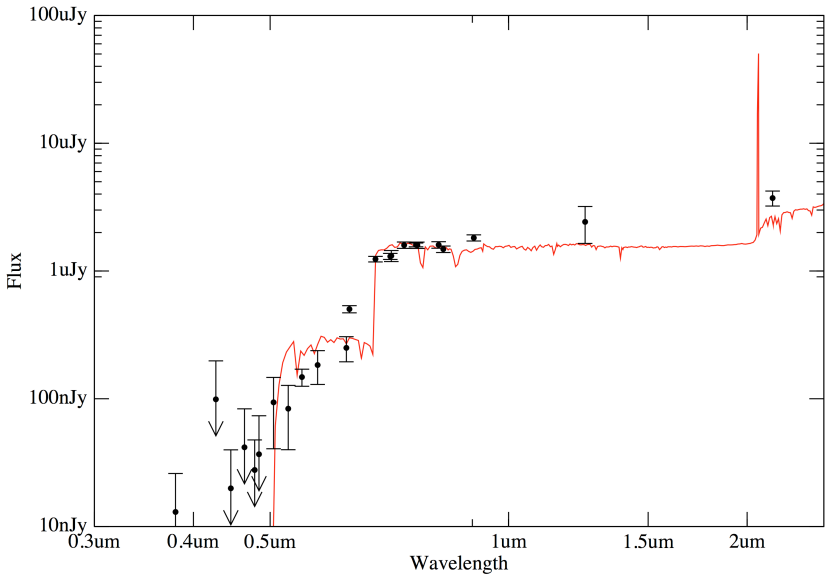
- Cosmos is Deep, Wide, and Pan-Chromatic
- Selection:
  - B,G,V,R,I dropouts
  - LAE in Narrow and IA filters
  - Photo-z
  - Sub-mm/Radio
  - X-ray



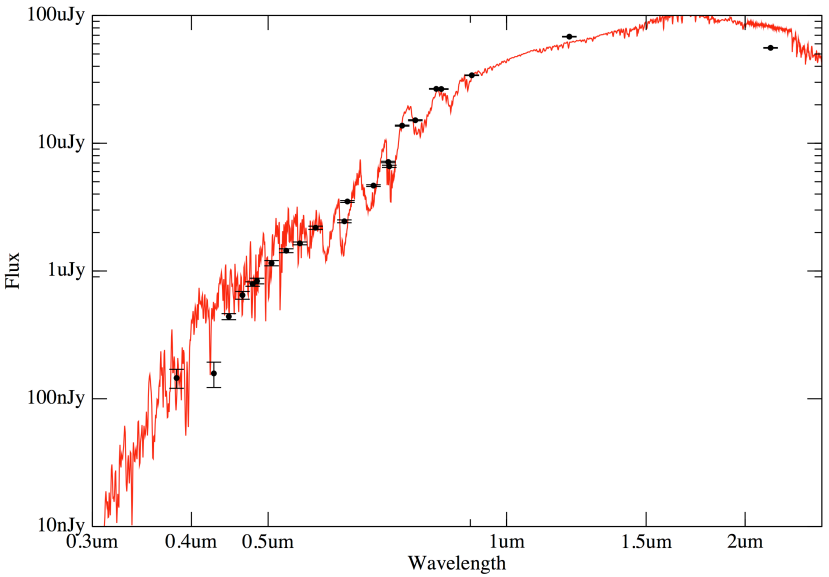


Selecting Galaxies At Z>4 With COSMOS

Z=4.5 Galaxy



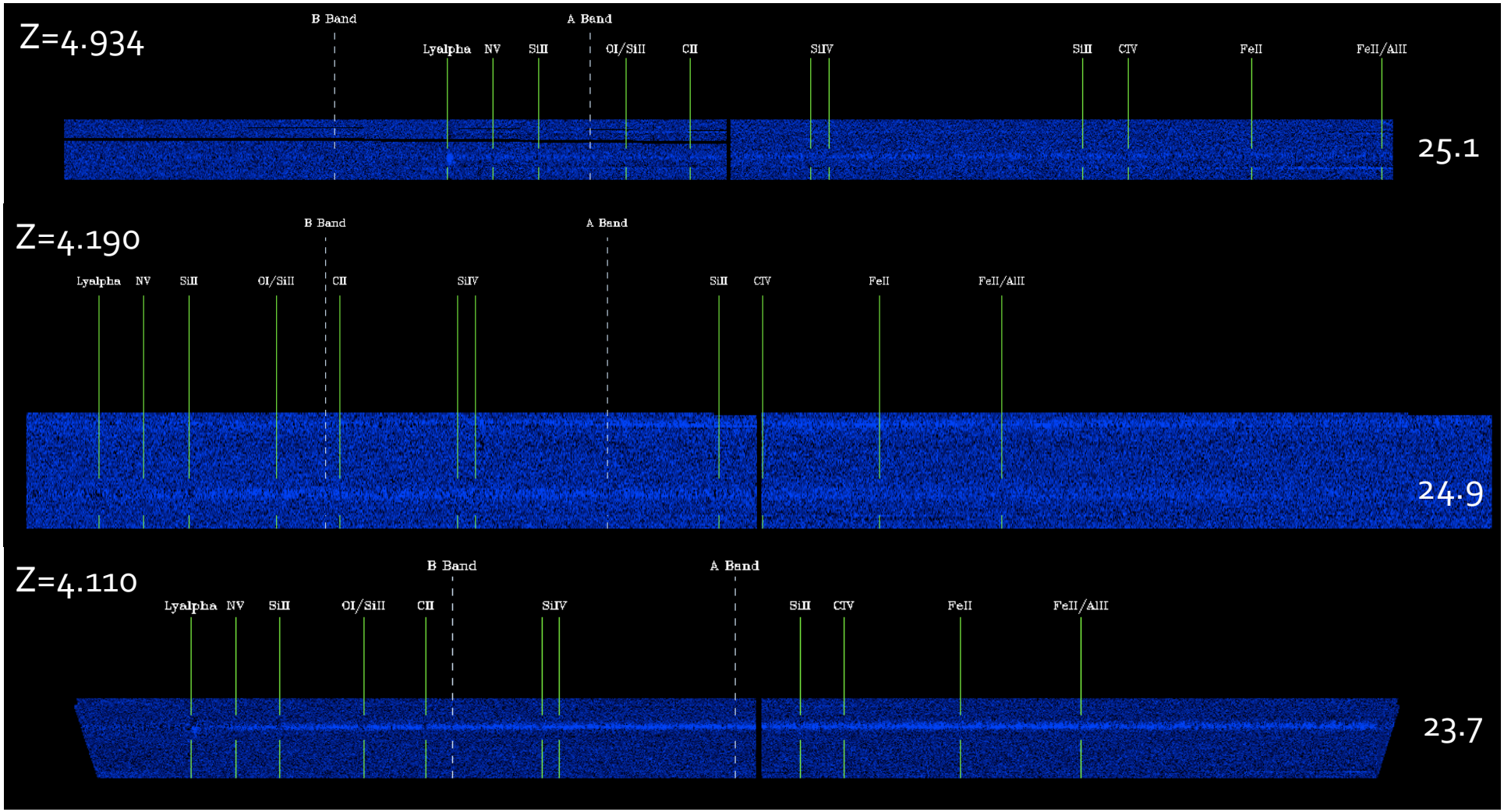
M Star

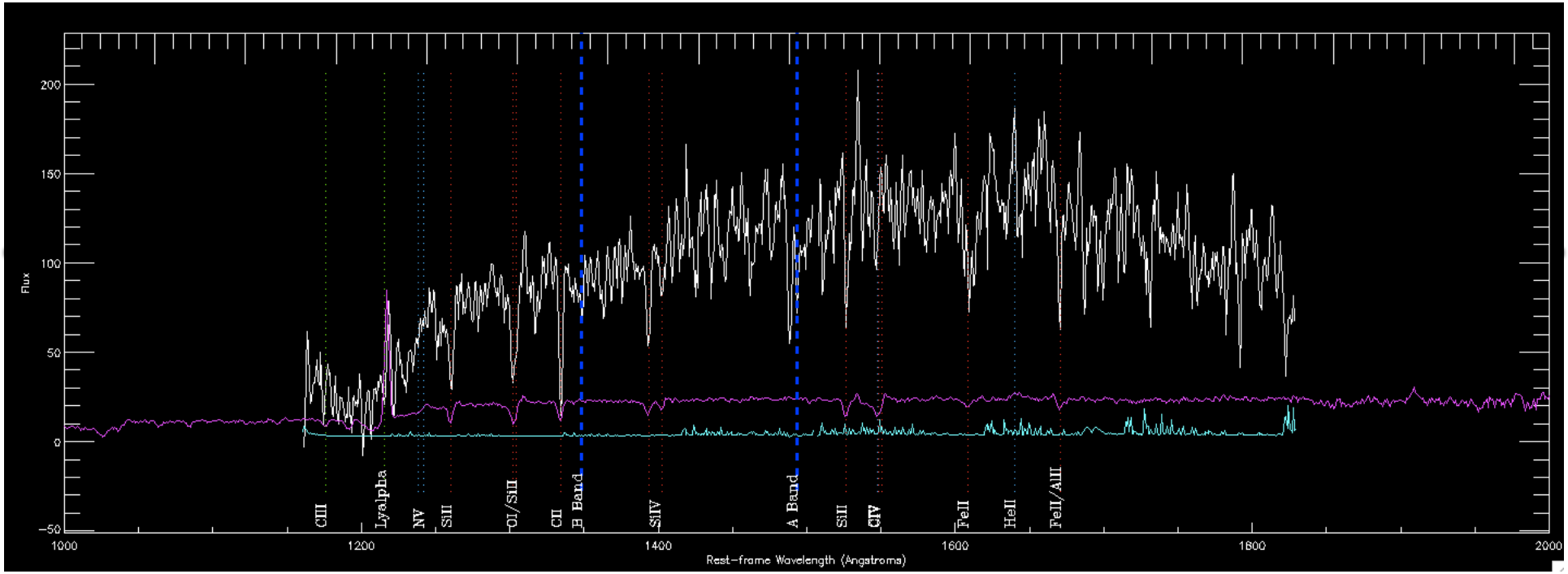


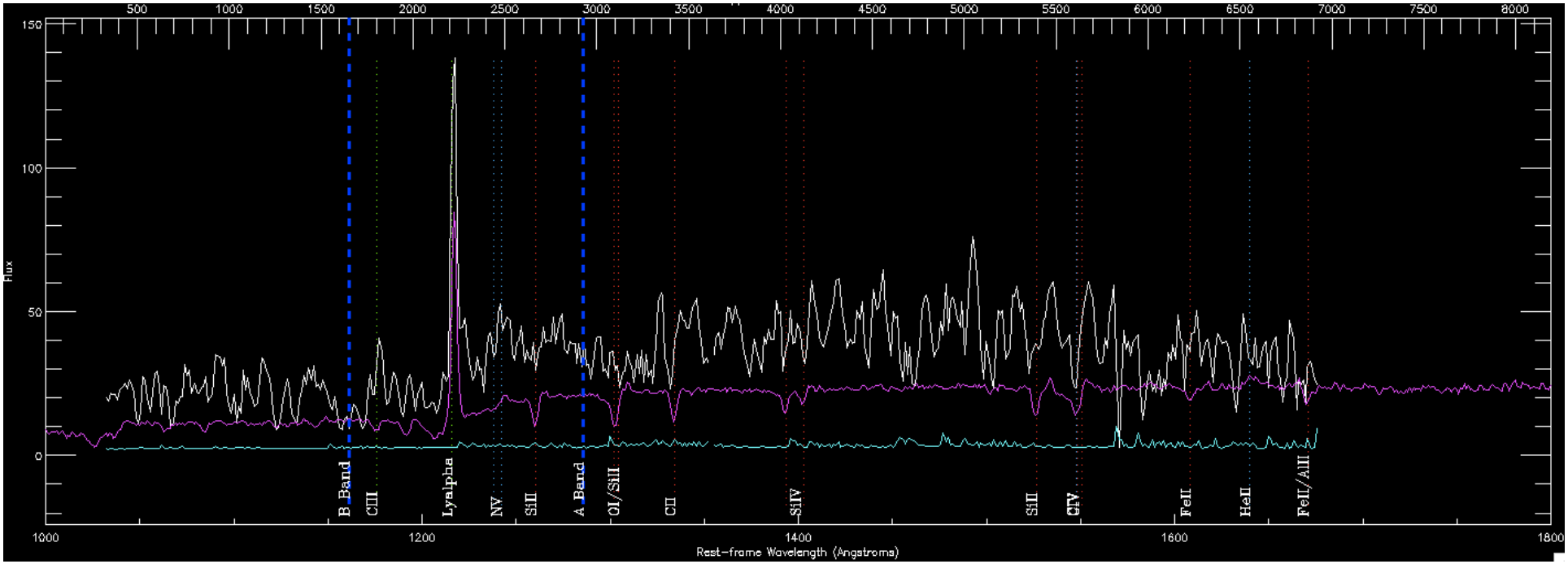
- R~20 spectra for all objects
- Differentiates between object types

Deep Keck Spectroscopy

~300 Confirmed objects at Redshift 4<z<5.9, z'<25 or IRAC ch2 < 23.5 or LAE




Flux
Rest-frame Wavelength (Angstroms)
CIII
Lyalpha
NV
SiII
OI/SiII
CII
B Band
SiIV
A Band
SiII
CIV
FeII
HeII
FeII/AlII


Flux
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B Band
CIII
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CIV
FeII
HeII
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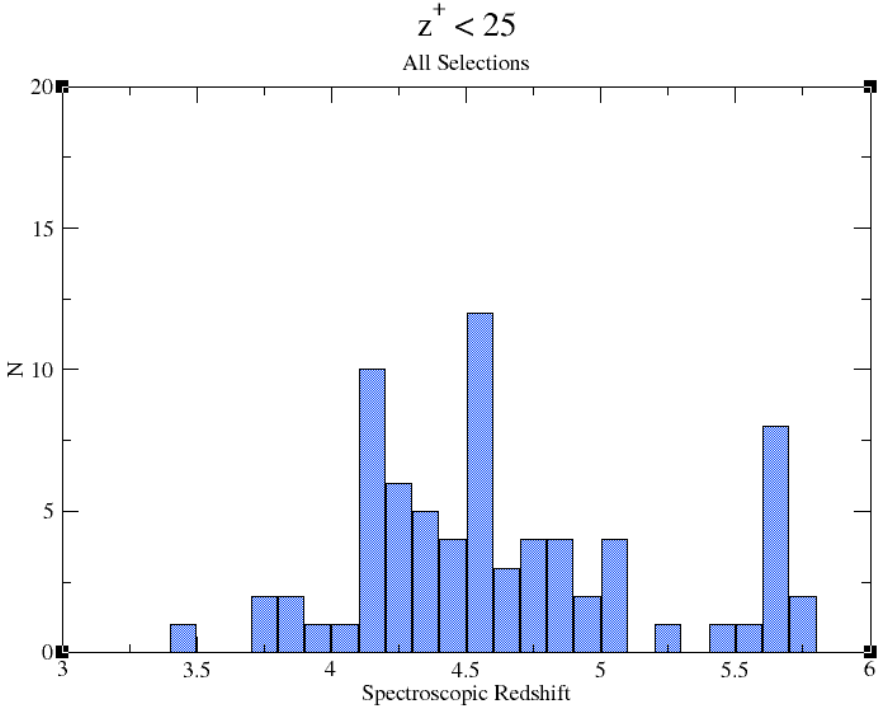
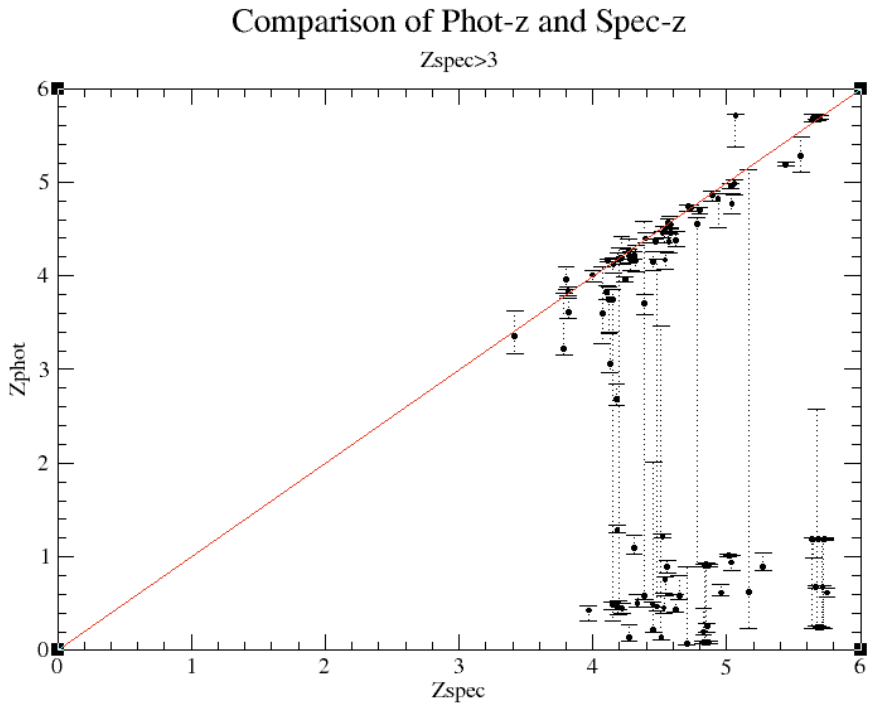
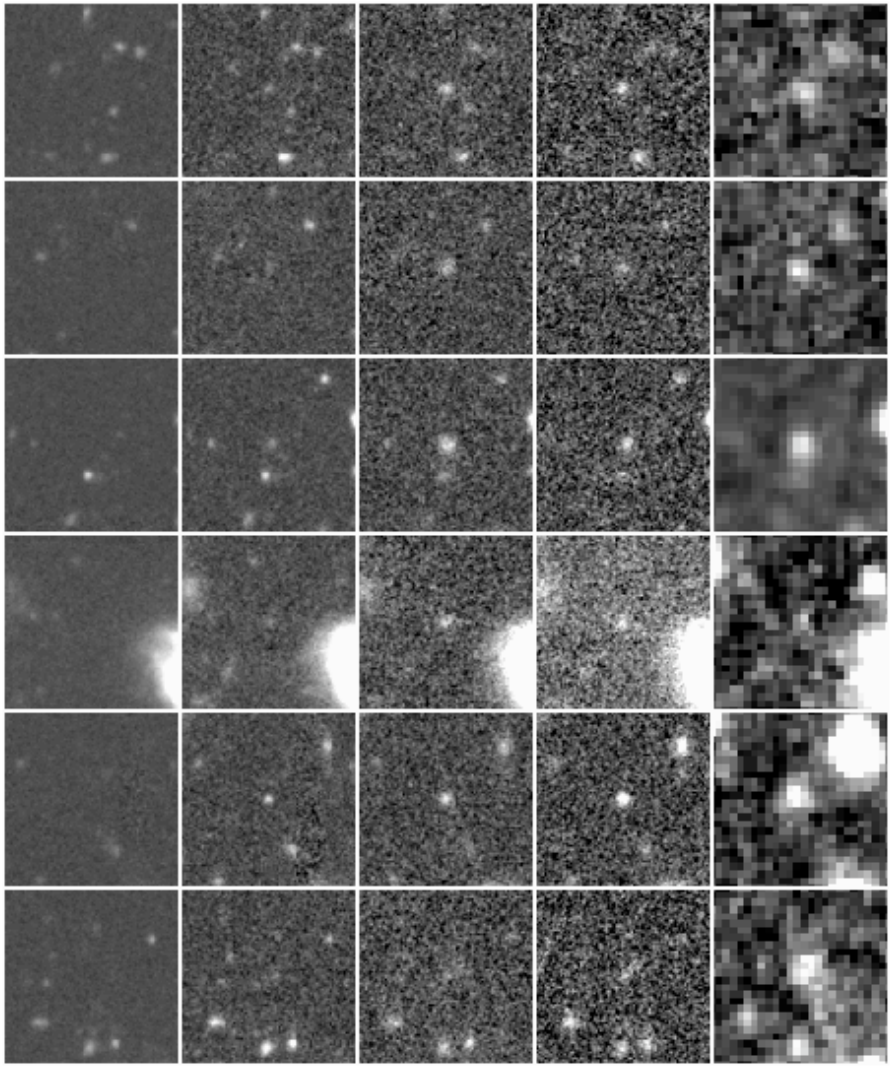
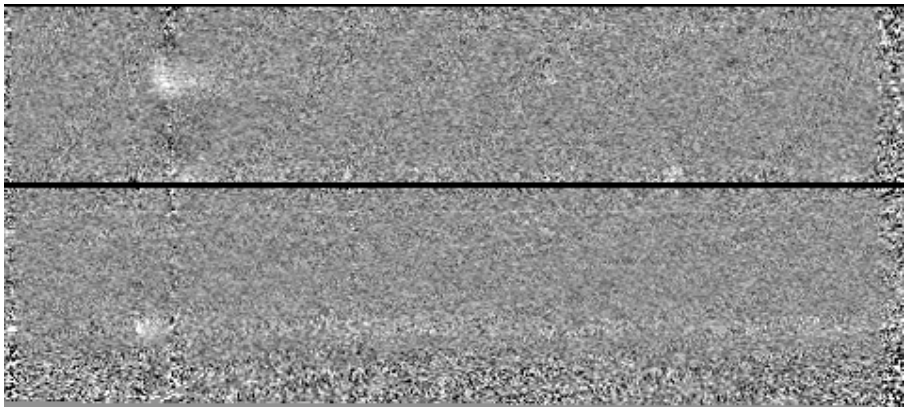
Deep Keck Spectroscopy



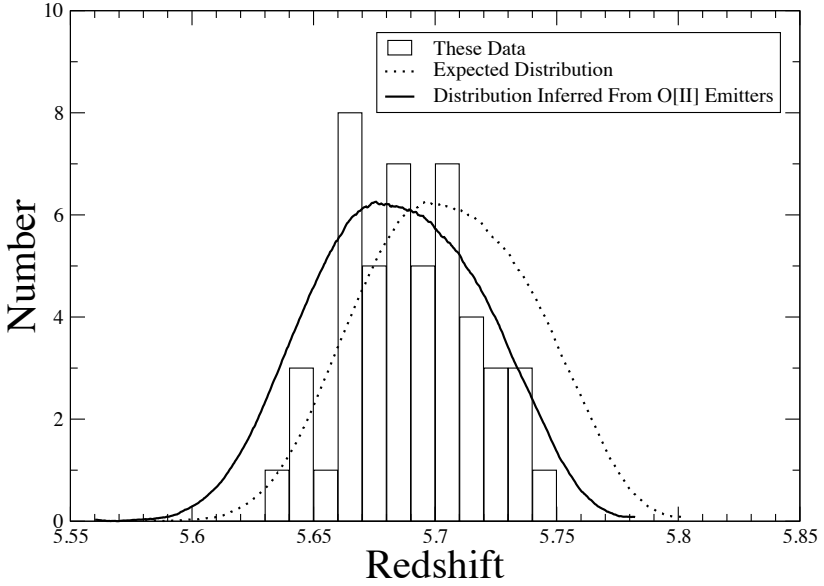


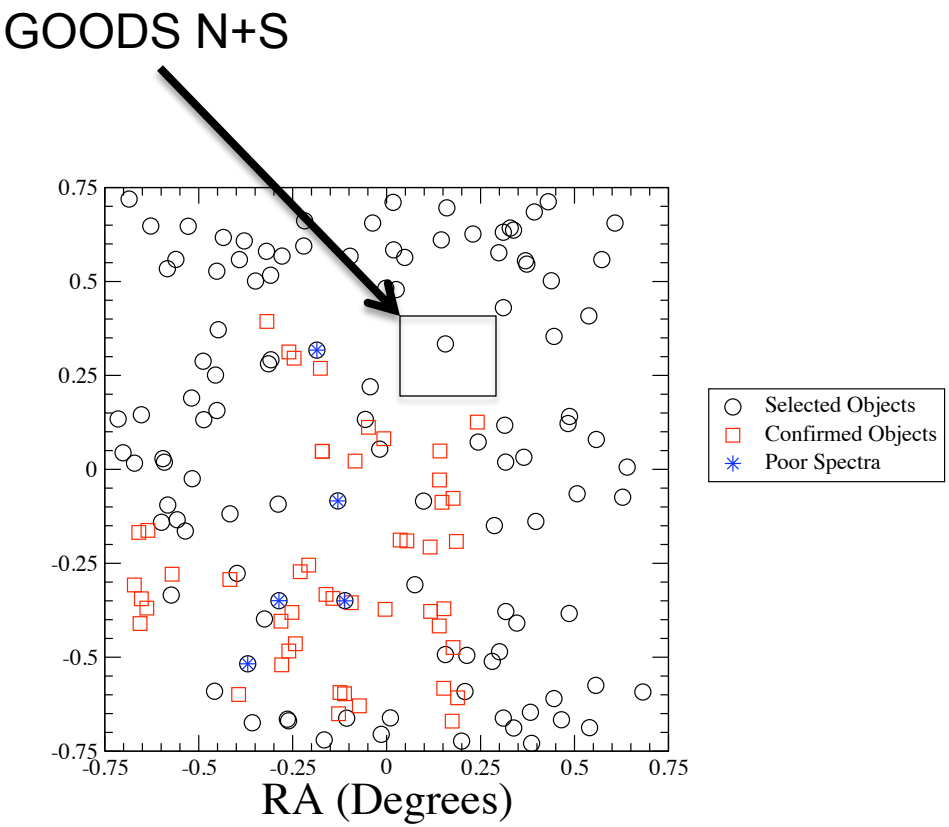
Z~5.7 LAEs





Z~5.7 LAEs

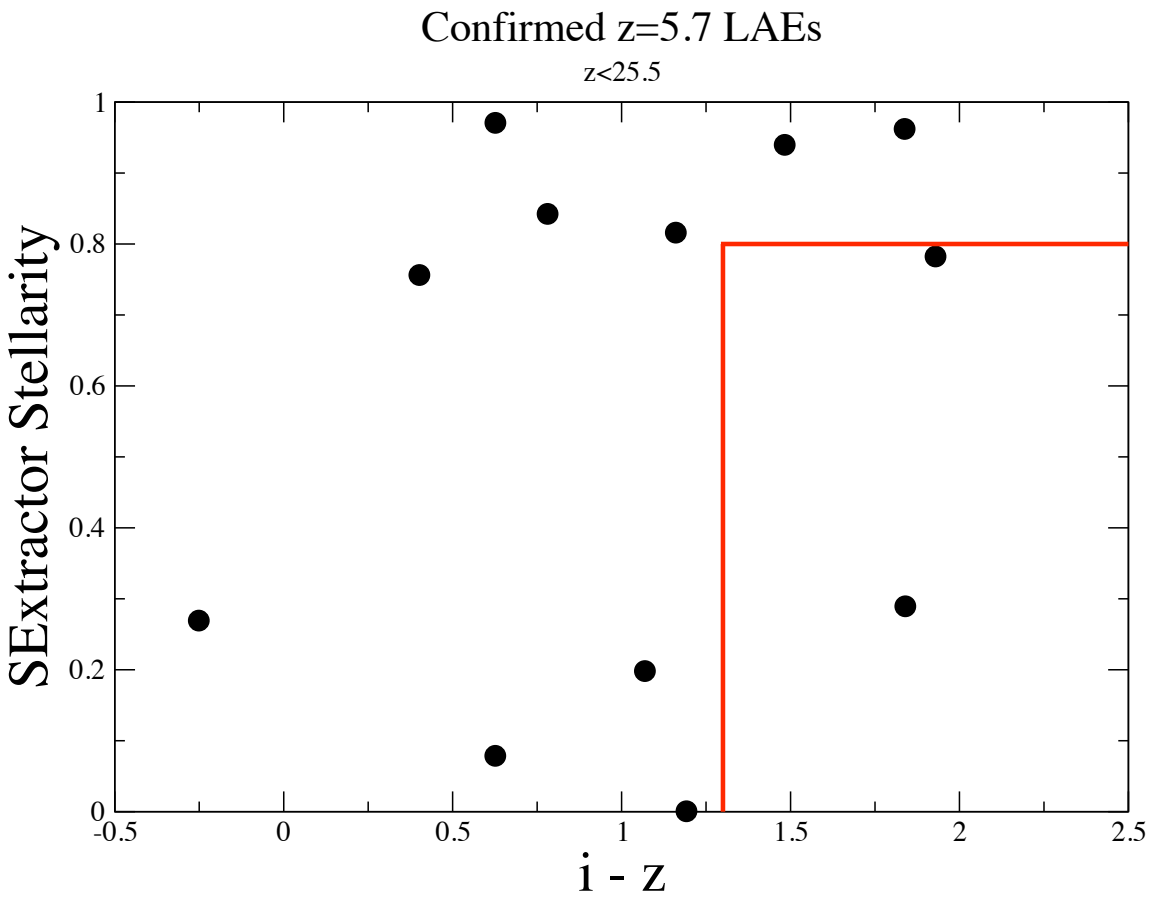




- 49 confirmed objects in COSMOS

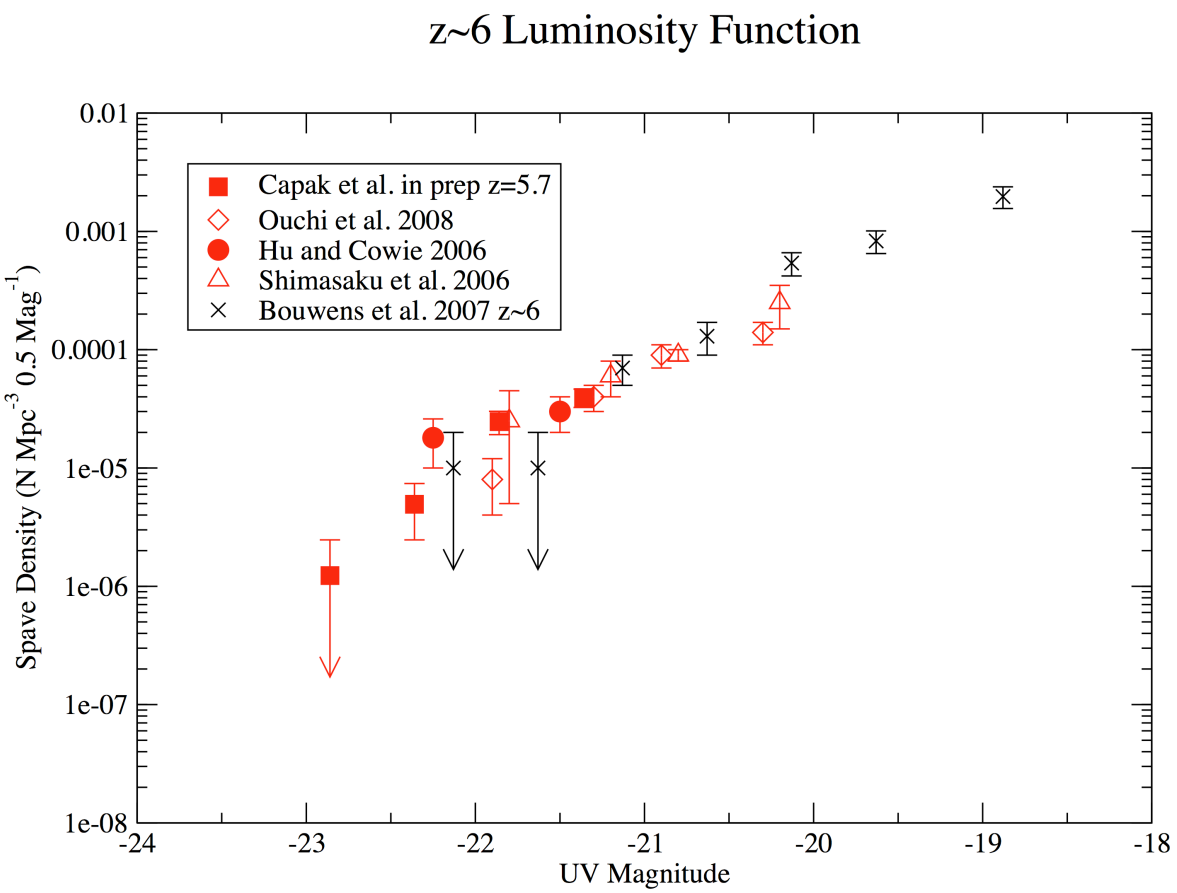
Z~5.7 LAEs

- 90% LAE fract at z~5.7 M_{UV}<-21
- 20% meet and I drop selection
  - 60% due to color
  - 20% due to size
- NOTE: low-z end of i-drop selection, volume is a larger effect



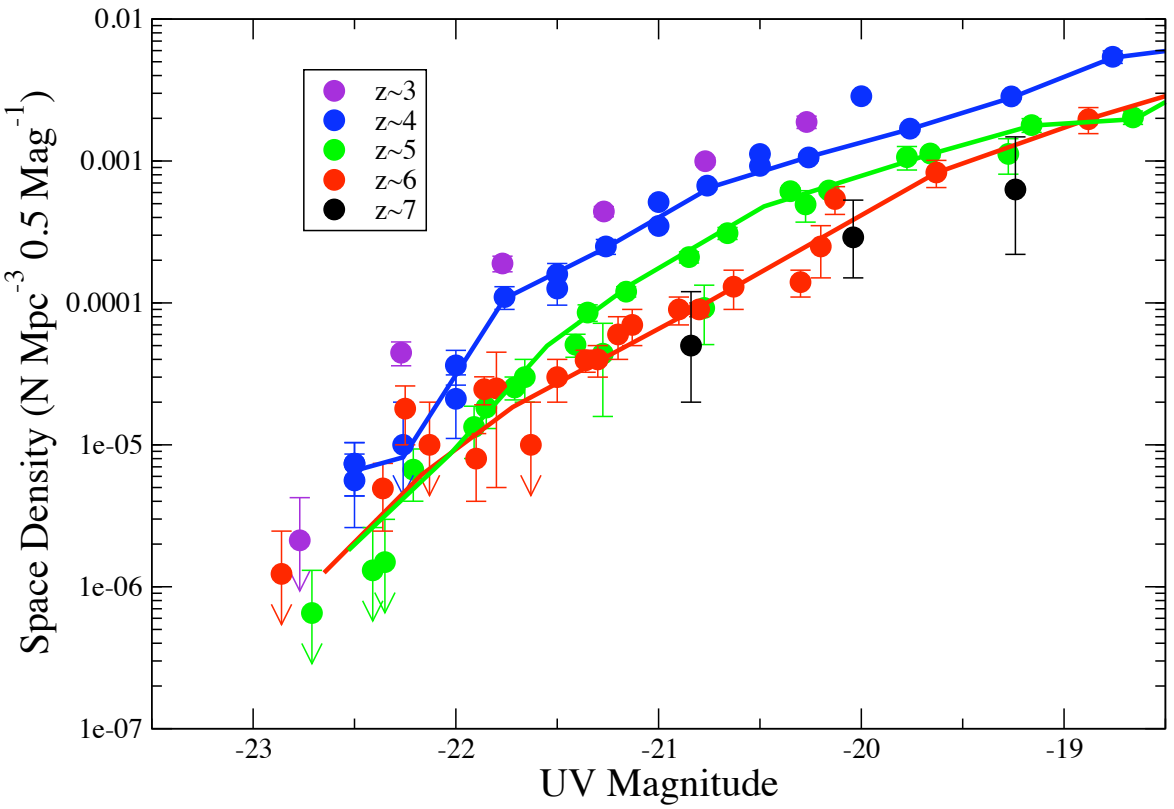
Luminosity Function Evolution At 4<z<6

- Red = z=5.7 LAE
- LF does not cut off at bright end
- Statistically consistent with LBG
- Lack of volume responsible for discrepancy



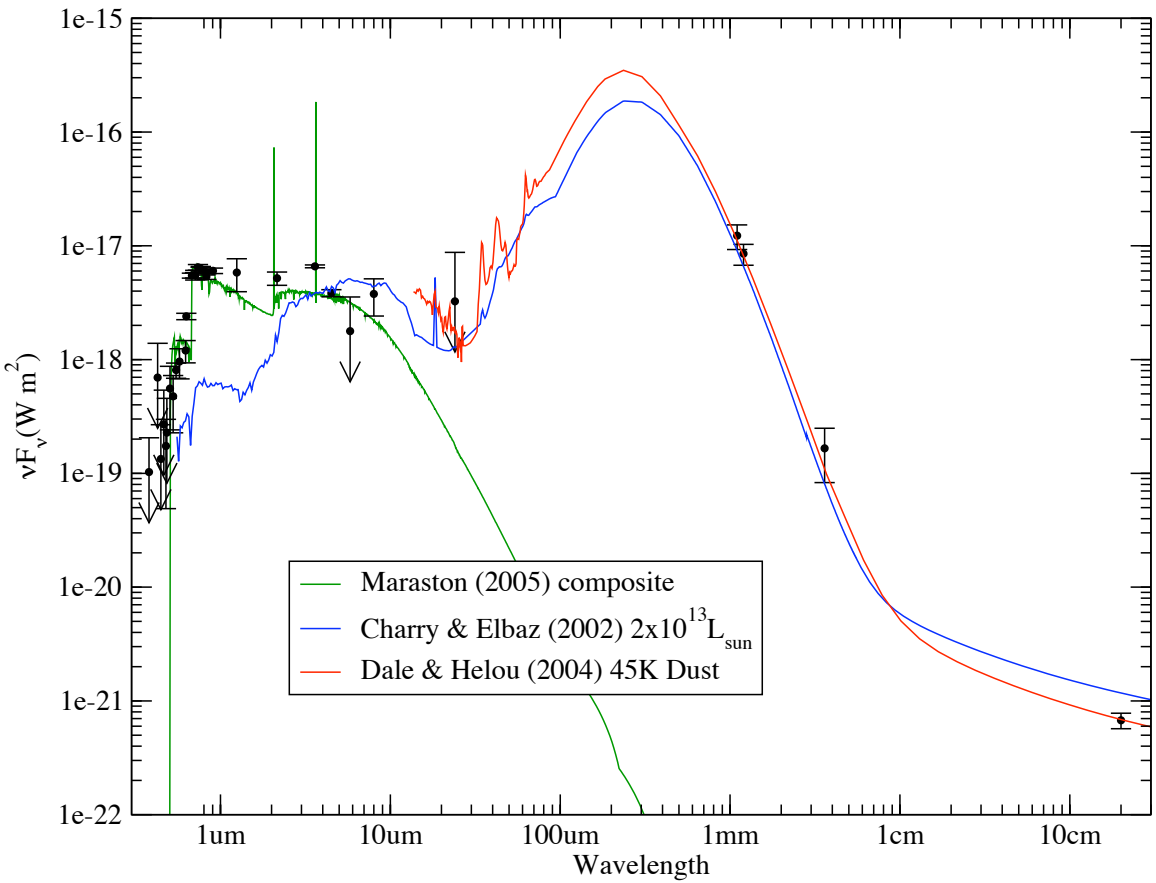
Luminosity Function Evolution At 4<z<6

- Evolution at knee and faint end
- Probably indicates feedback limit
- Intrinsic LF can be different



Extreme Objects

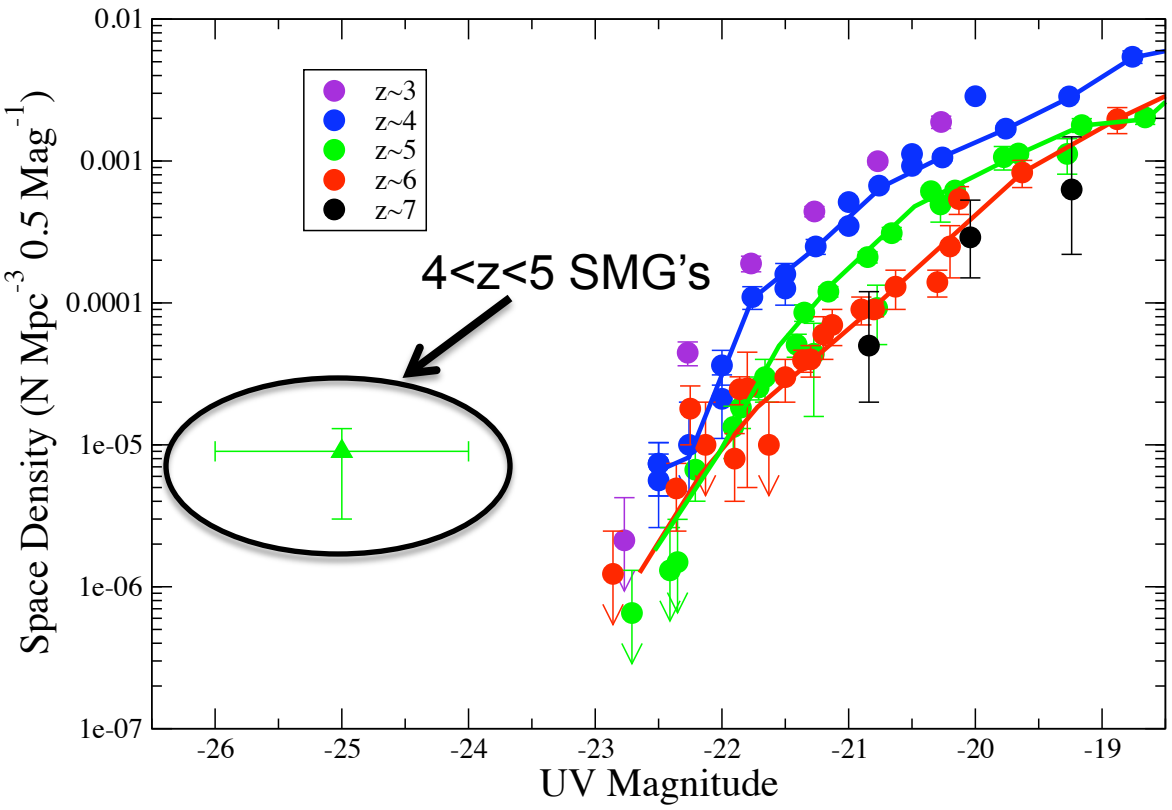
- Star formation of ~3000 $M_\odot$ per yr
- Will become a ~$10^{11} M_\odot$ galaxy at z~4
- 3 found at 4.5<z<5 in 0.3 square degrees surveyed to date



Capak et al. 2008; Schinnerer, Capak et al. 2008

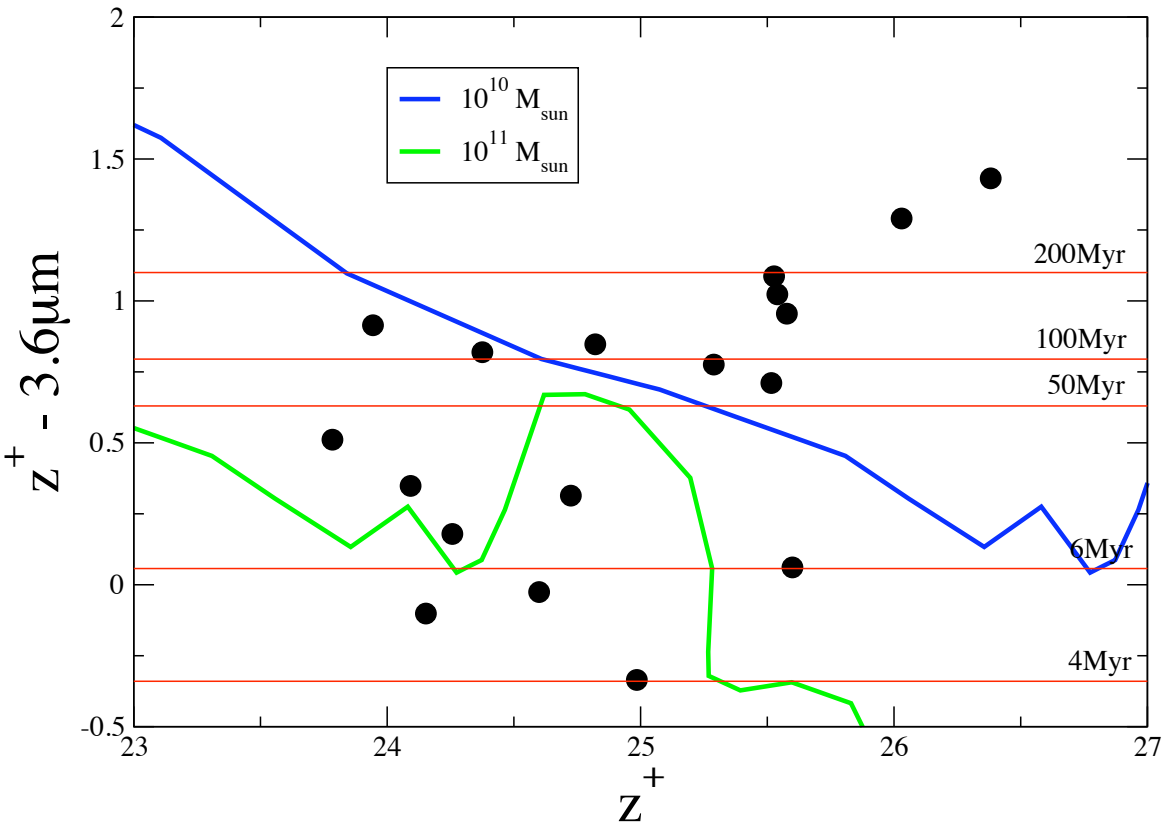
Extreme Objects

- Heavily obscured objects intrinsically brighter
- LF modeling must include feedback + obscuration



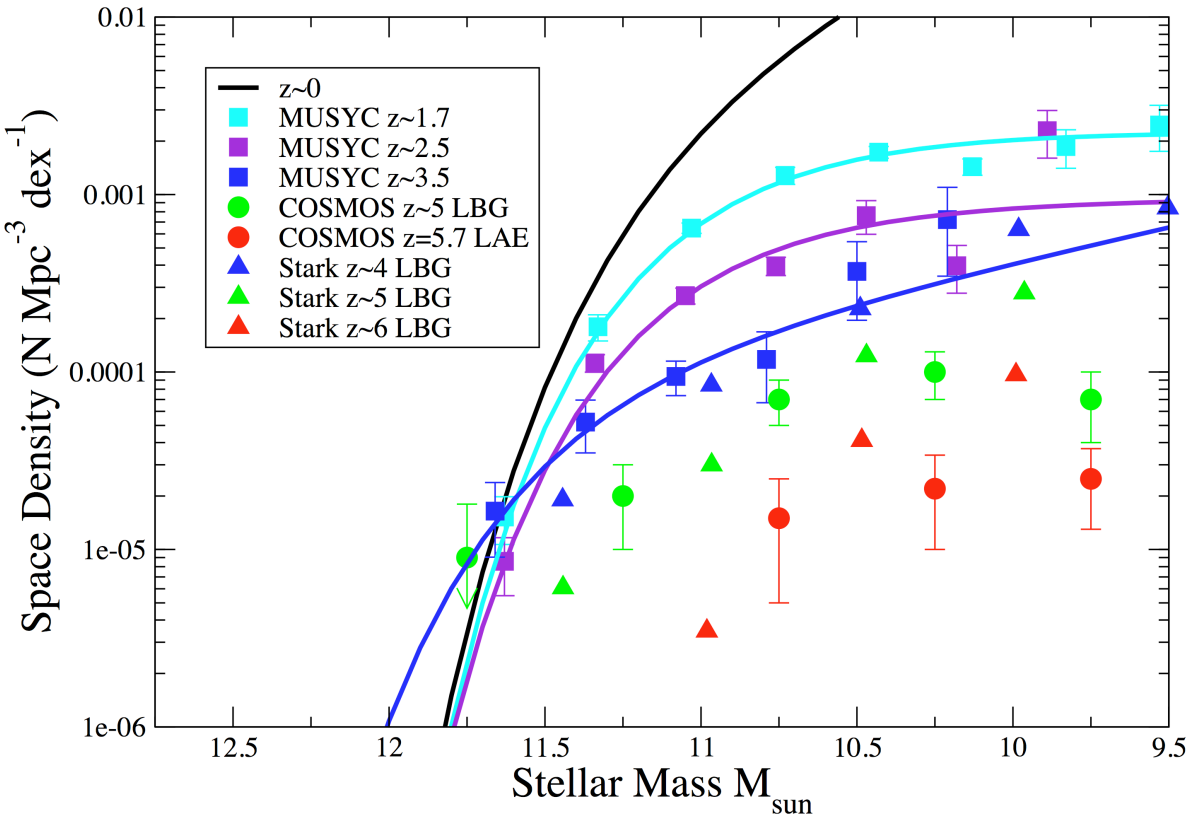
Mass Function Evolution At 4<z<6

- Large uncertainty in the SED fitting process, so need to be careful
- LAEs have ages from ~4-300Myr at z~5.7
- Masses from 10^9 to 10^{11} M_{sun}



Mass Function Evolution At 4<z<6

- Most massive galaxies appear to form first at z~5-6
- Massive starburst at high-z?



Capak et al. in prep; Marchesini et al. 2008

Conclusions

- We have a large sample of spectroscopically confirmed $4<z<6$ galaxies
  - Can begin to understand galaxy population
- LF is evolving at the knee and faint end
  - But we need to worry about the intrinsic LF
- Massive galaxies appear to assemble at $z\sim5$-6