Sloan Digital Sky Survey

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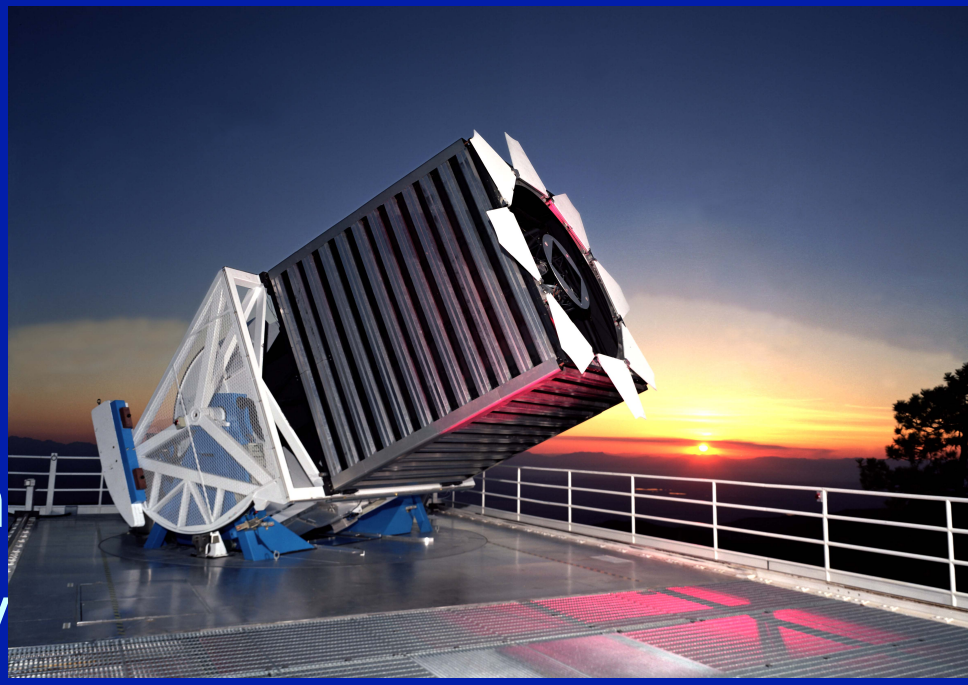
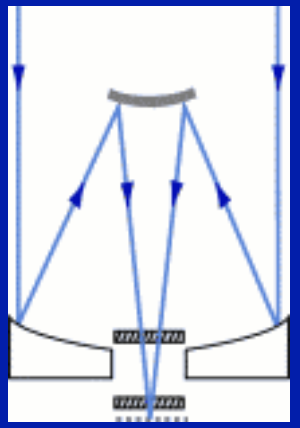
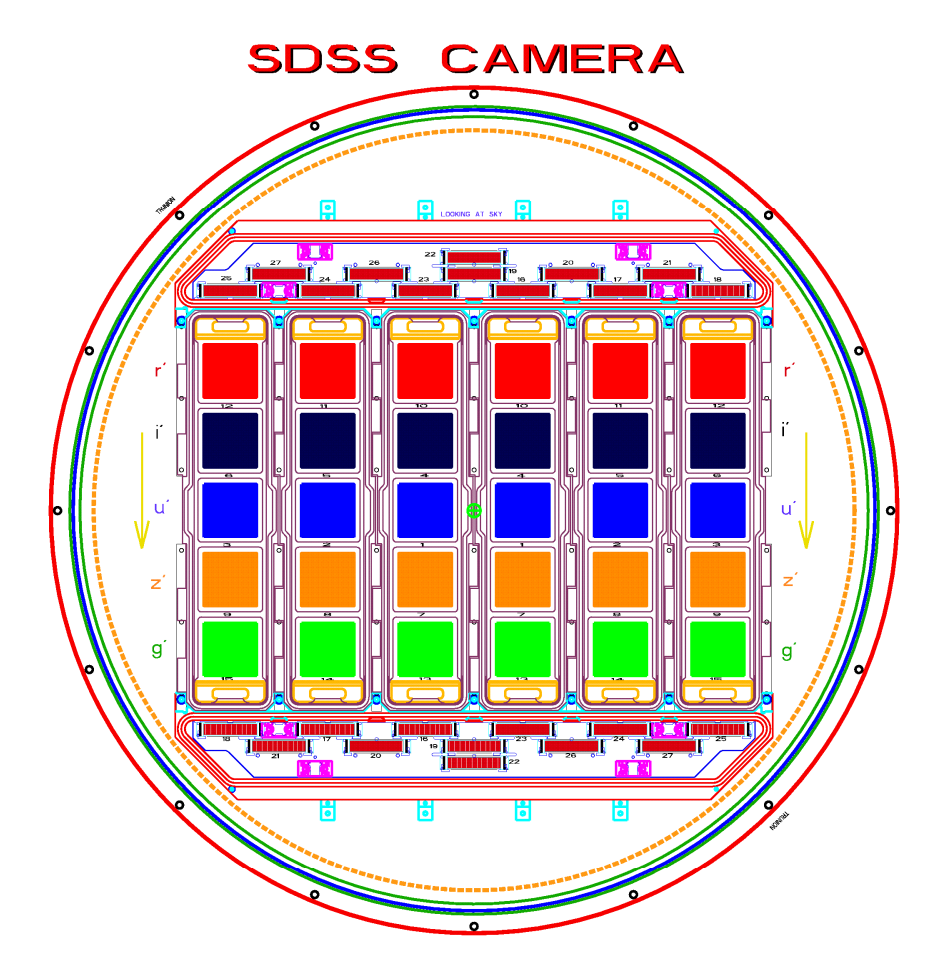
The Telescope

- 2.5-m f/5 reflector
- 3 degree field-of-view
- Camera and spectrograph
- Apache Point Observatory New Mexico

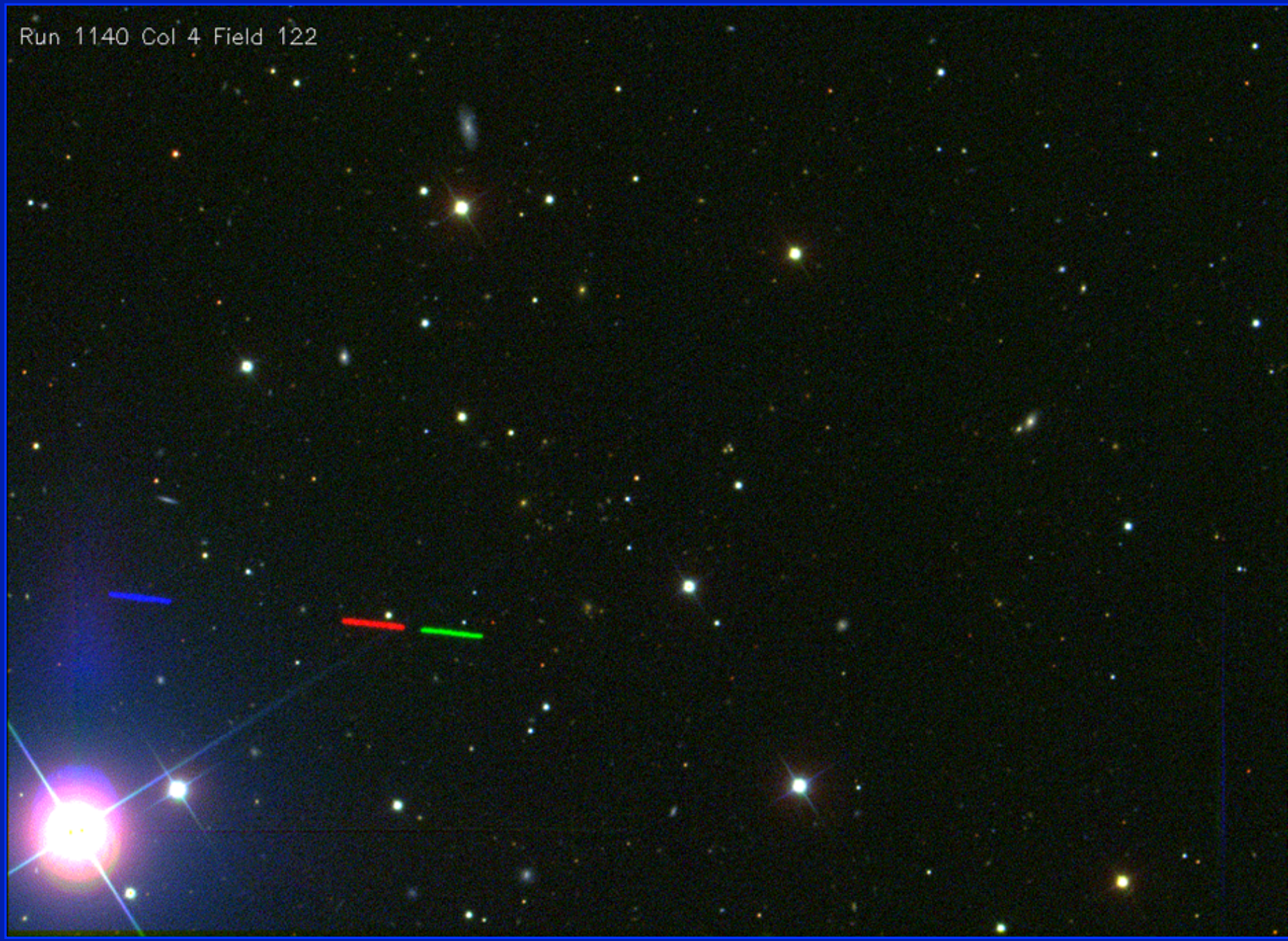


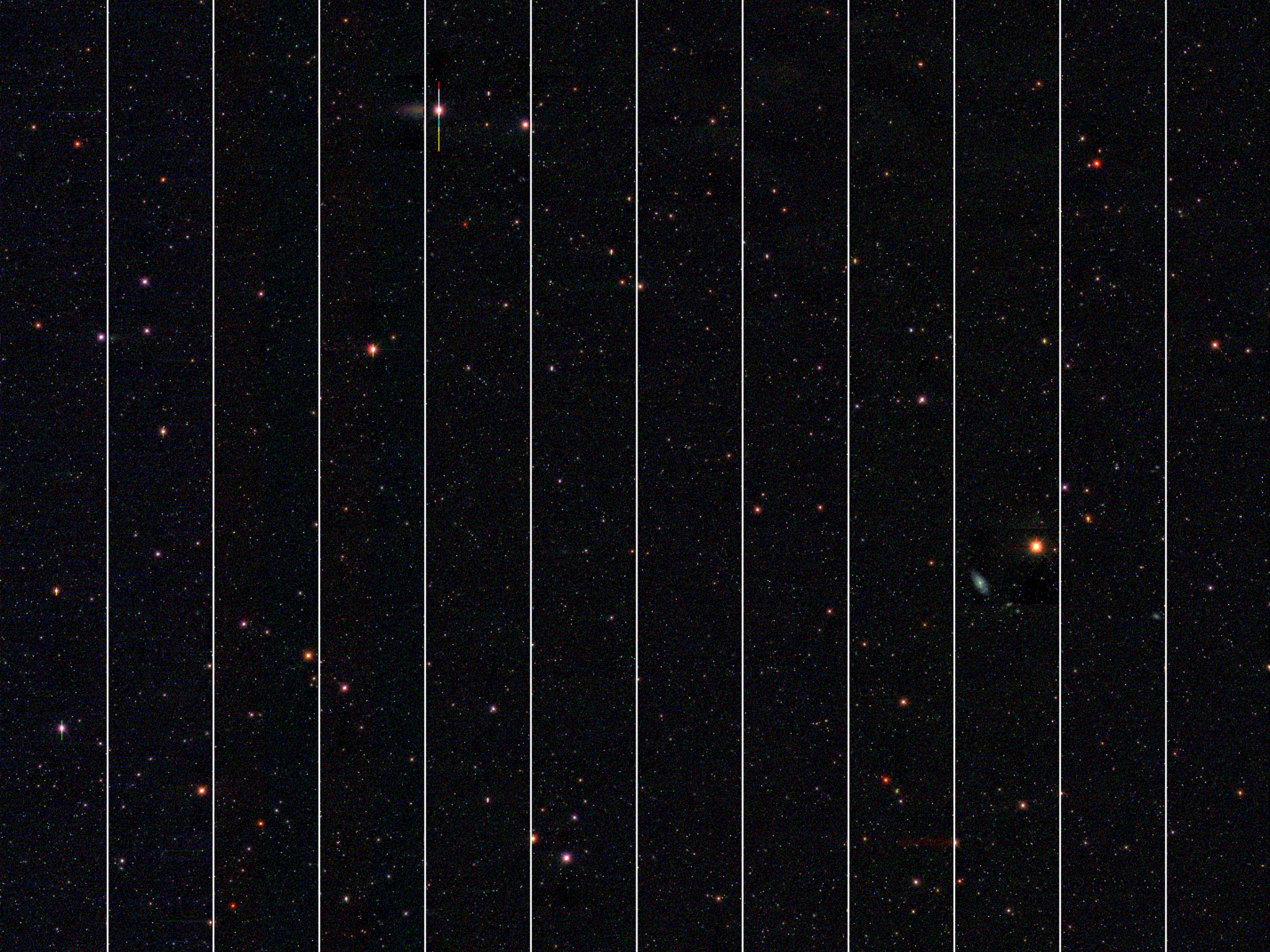


The Camera



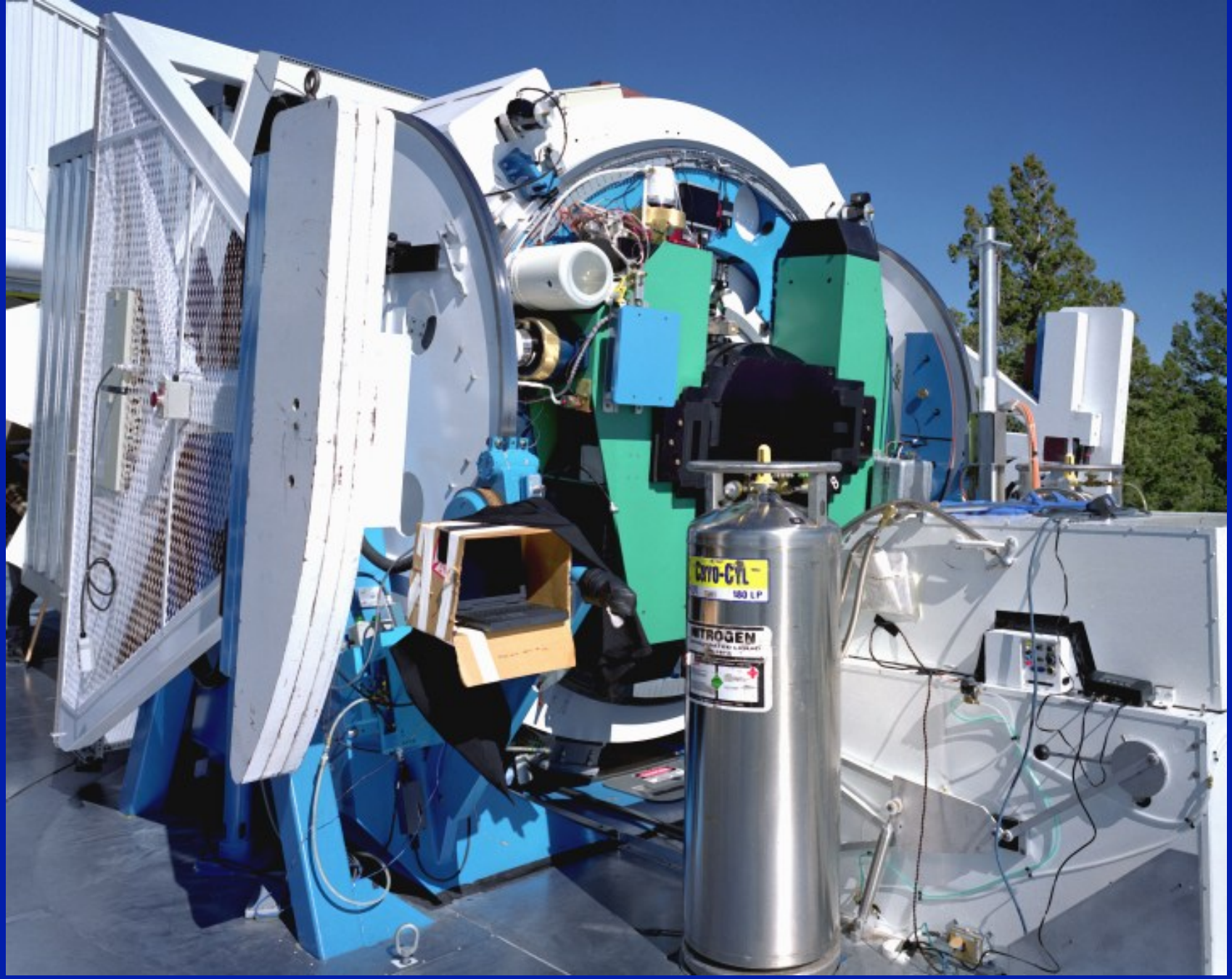
- Drift Scanning
  - 30 CCDs
  - 2048 x 2048 pixels
  - Arranged in 6 columns
- Five rows for 5 filters: u, g, r, i, z
- 54-second exposure in each filter
- +/- 0.02 mag
- +/- 60 milli-arcsec


Run 1140 Col 4 Field 122

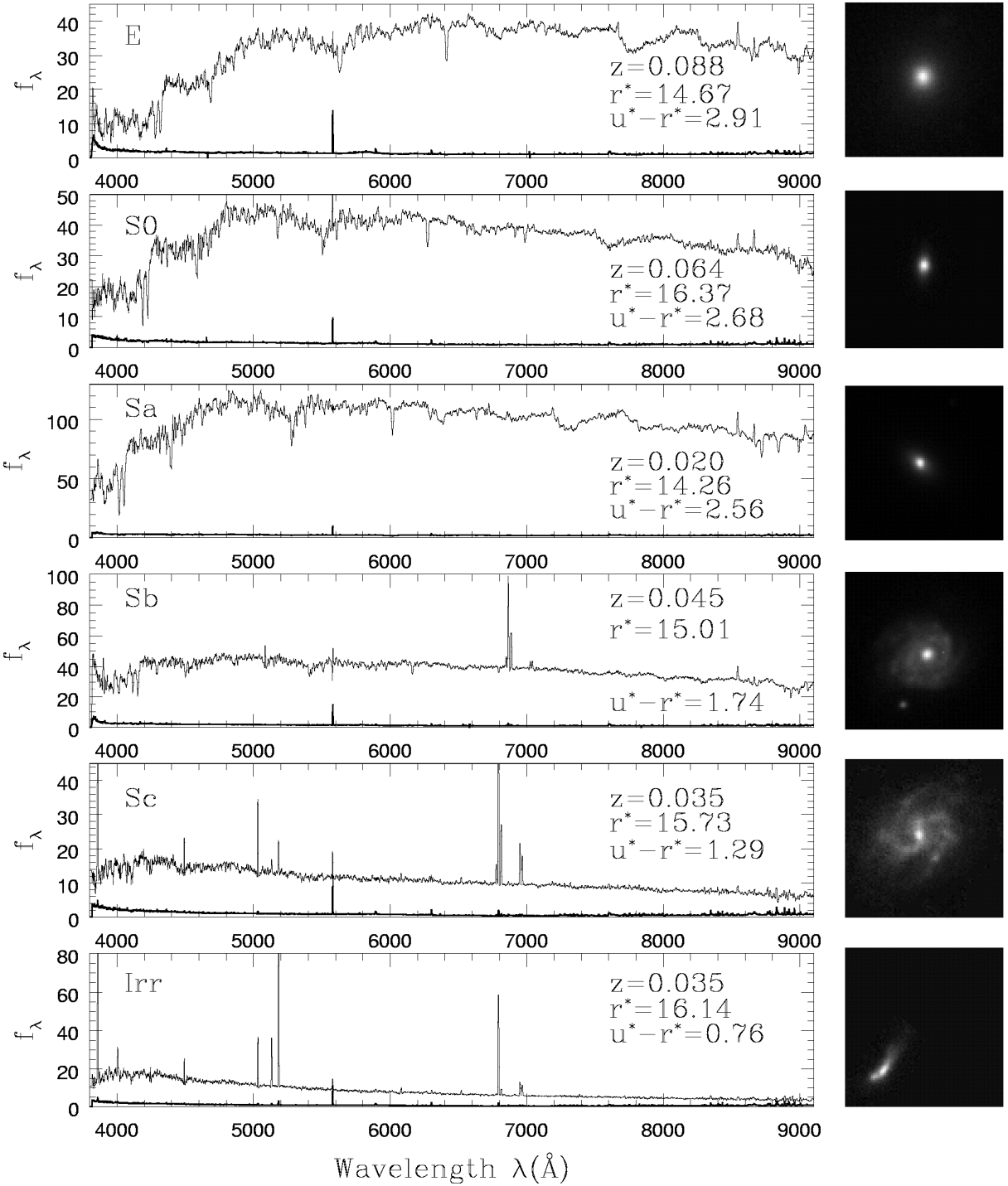


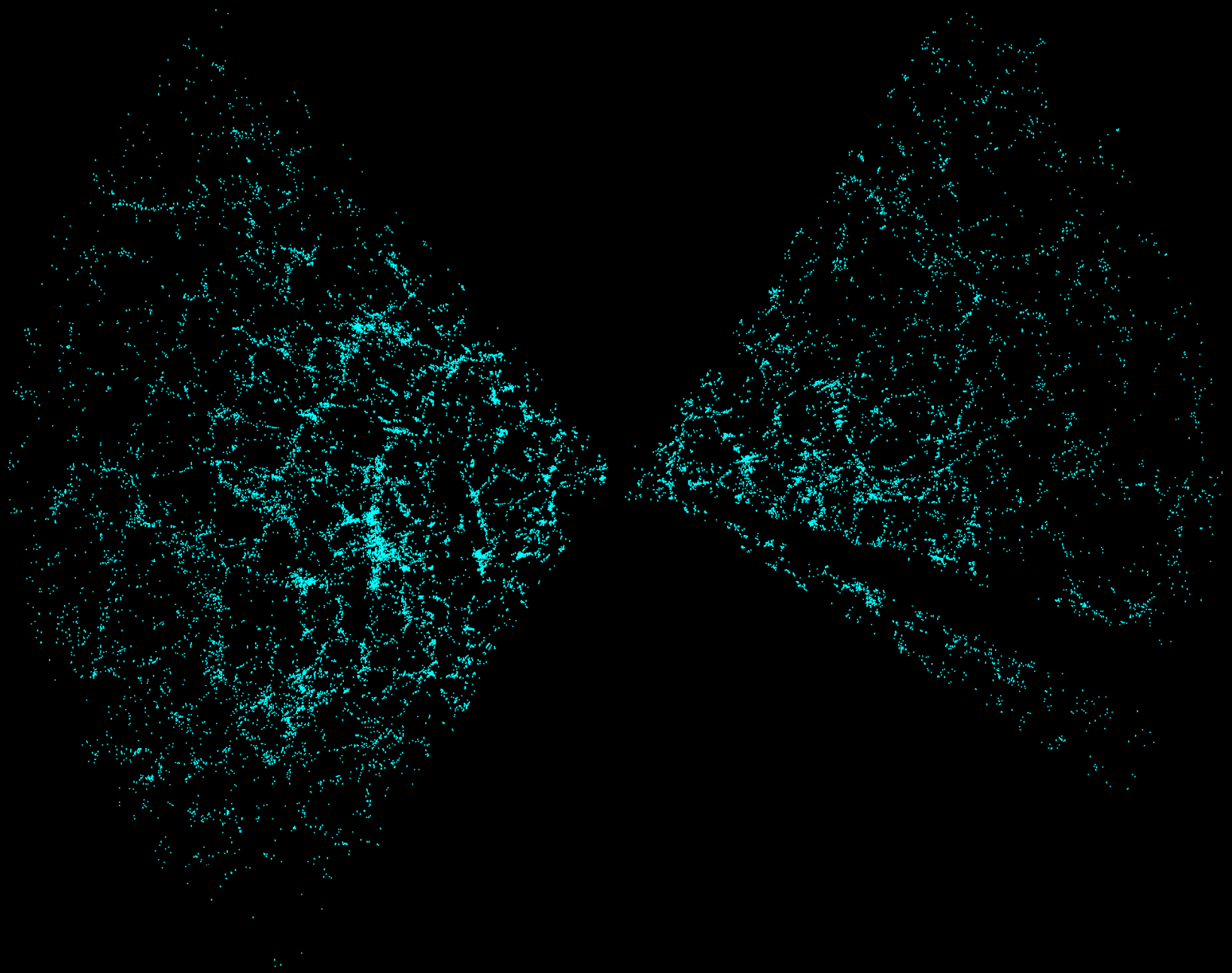
The Spectrographs

- Two fiber-fed spectrographs
- Each records 320 spectra simultaneously
- 60-minute exposures
- Redshifts, spectral types, physical characteristics
- +/- 30 km sec^{-1}

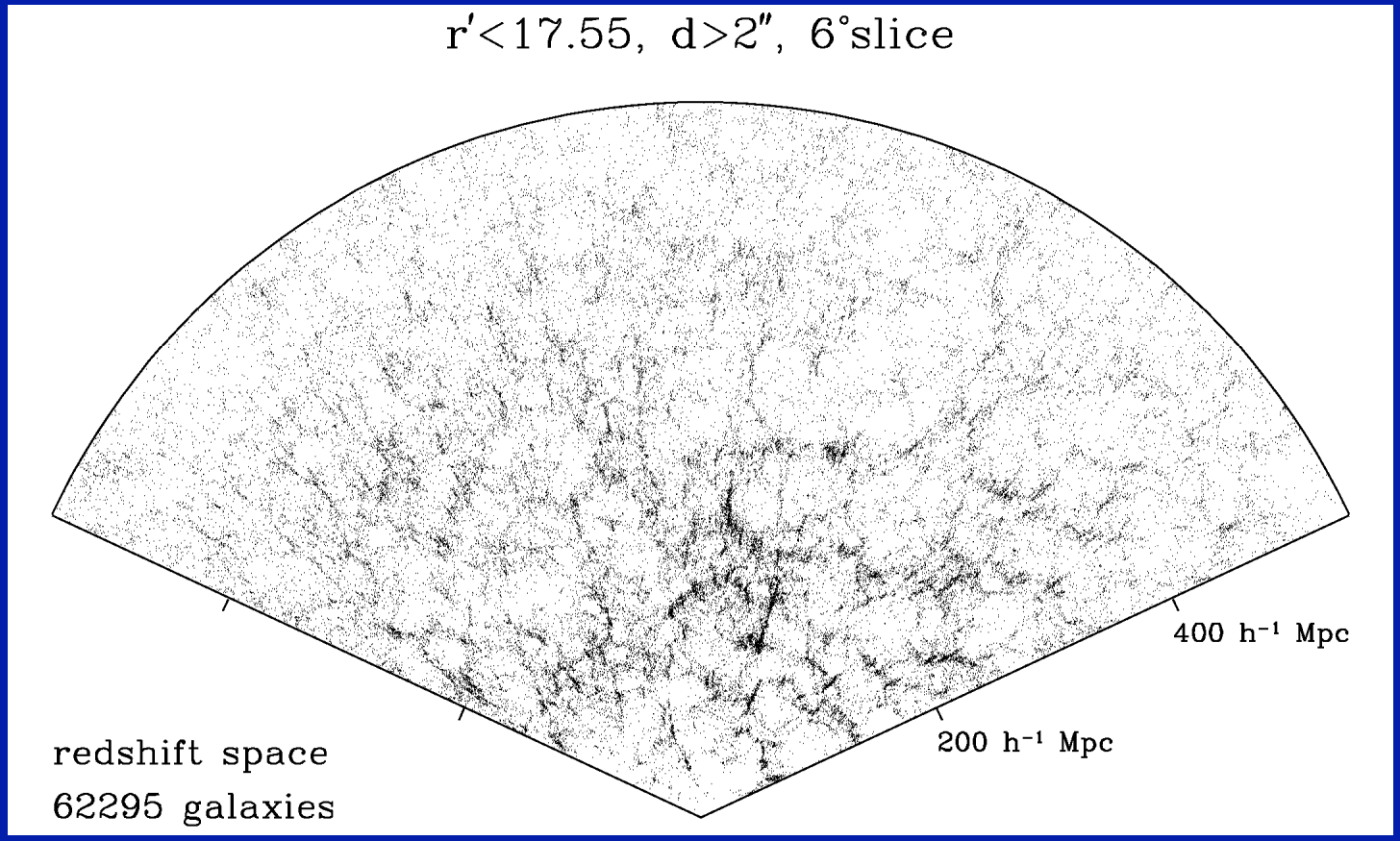


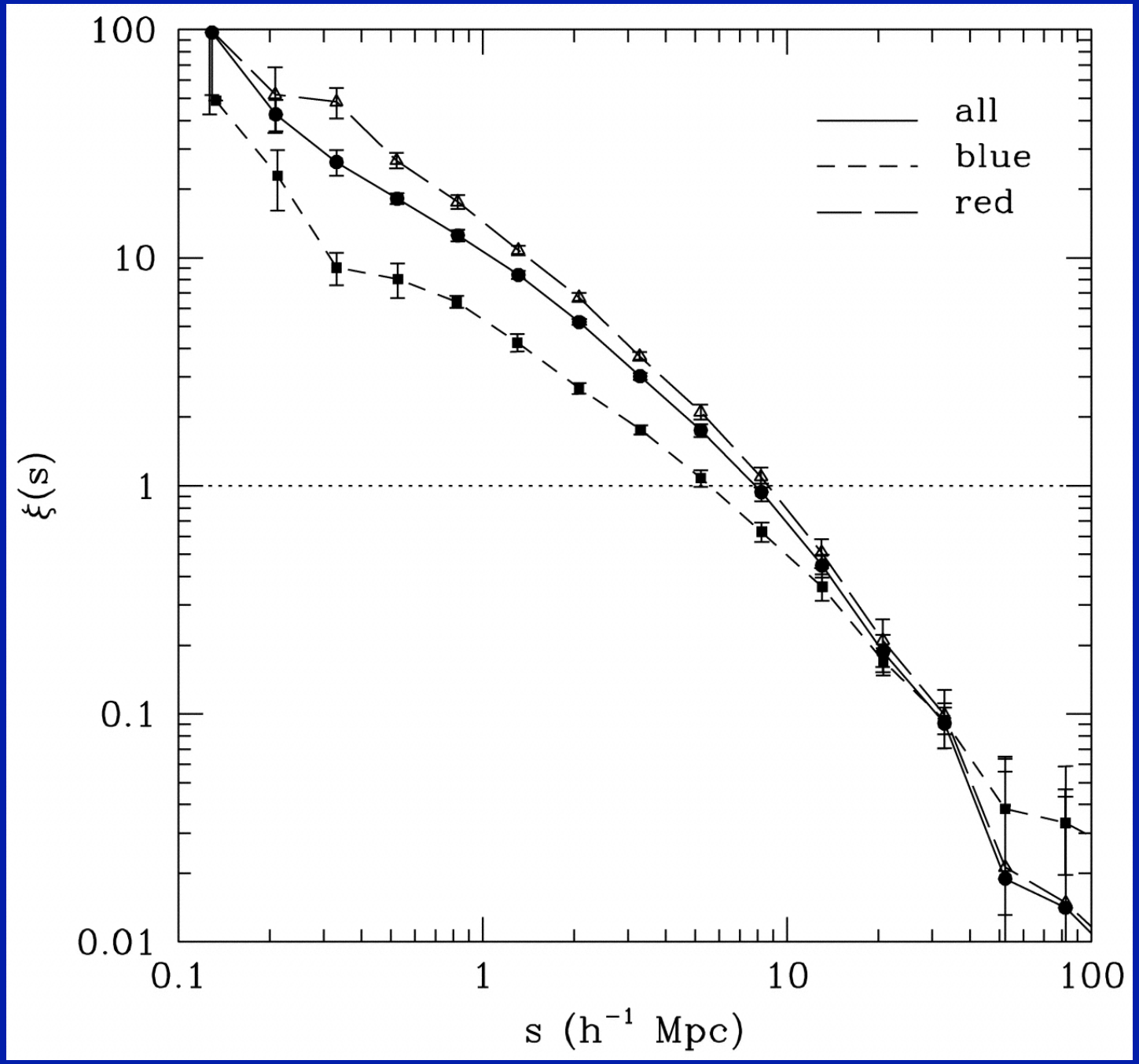
The telescope bottom, showing the spectrographs (green boxes).


E
z=0.088
r*=14.67
u*−r*=2.91
S0
z=0.064
r*=16.37
u*−r*=2.68
Sa
z=0.020
r*=14.26
u*−r*=2.56
Sb
z=0.045
r*=15.01
u*−r*=1.74
Sc
z=0.035
r*=15.73
u*−r*=1.29
Irr
z=0.035
r*=16.14
u*−r*=0.76
f_λ
Wavelength λ(Å)



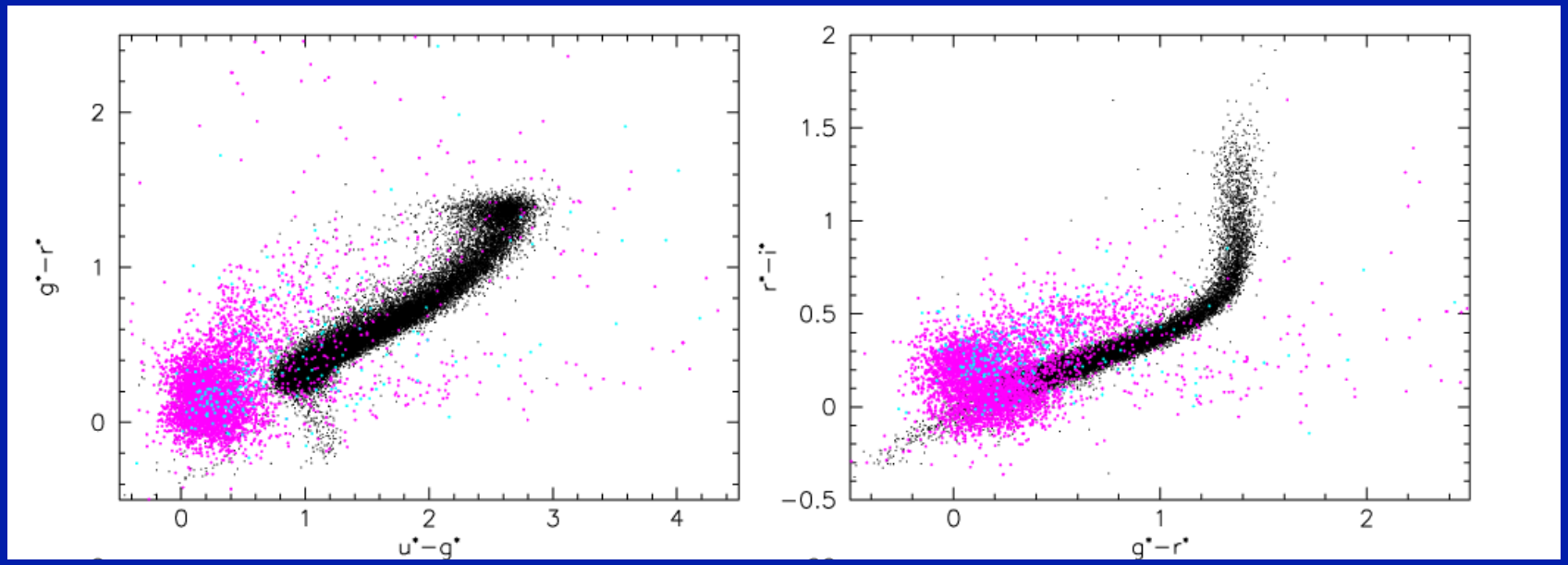
RA
0
10
20
30
40
50
330
340
350
r (Mpc/h)
200
400
600
800
1000
z
0.1
0.2
0.3
0.4
140
150
160
170
180
190
200
210
220
230


r′<17.55, d>2″, 6°slice
400 h⁻¹ Mpc
200 h⁻¹ Mpc
redshift space
62295 galaxies


100
10
1
0.1
0.01
0.1
1
10
100
ξ(s)
s (h^{-1} Mpc)
all
blue
red

Selecting Quasars by Colors

Color-Color Diagrams for Quasars

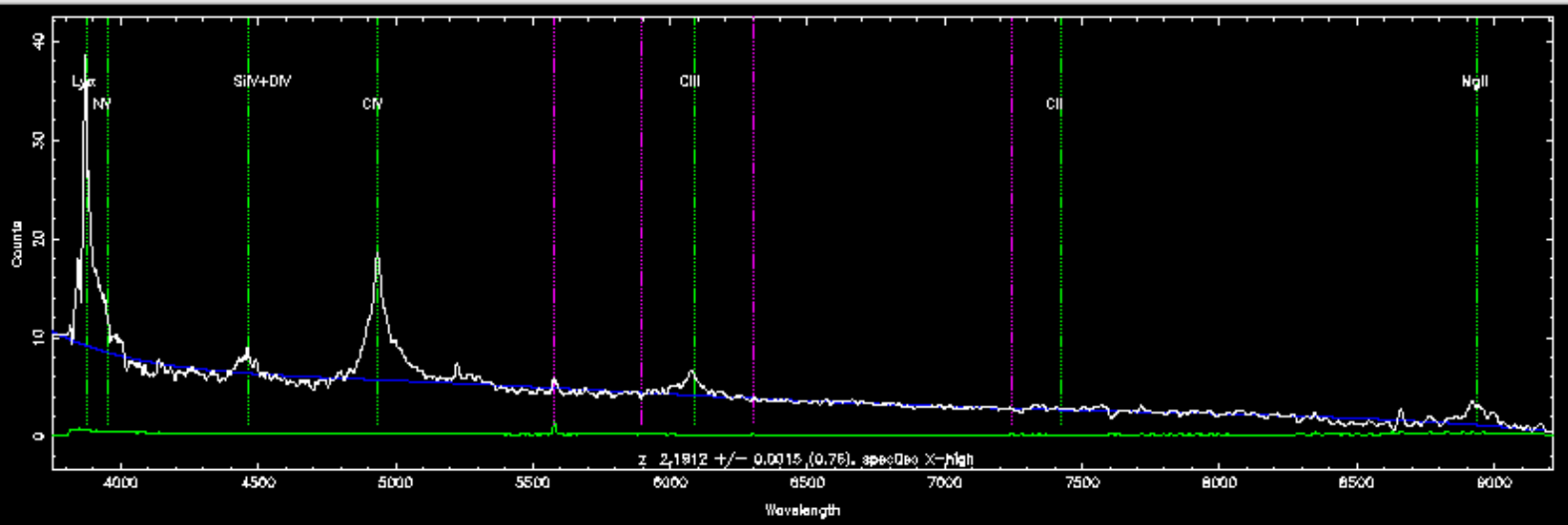


Key: * **quasars**

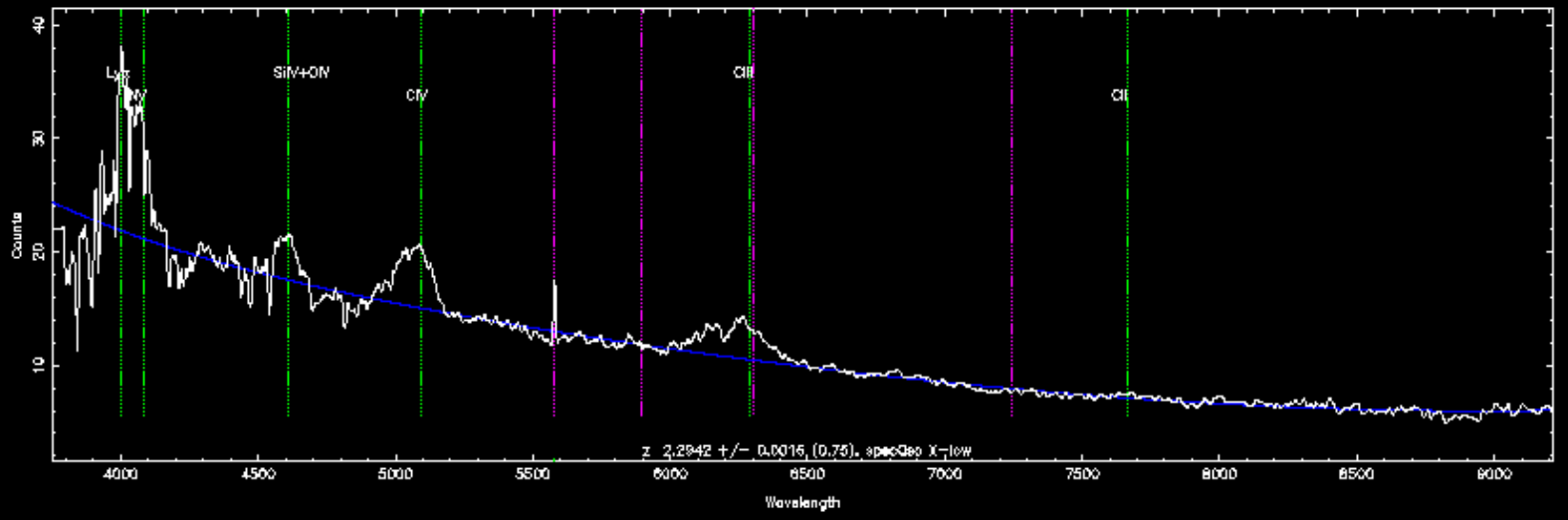
* **BAL quasars**

* **main sequence stars**

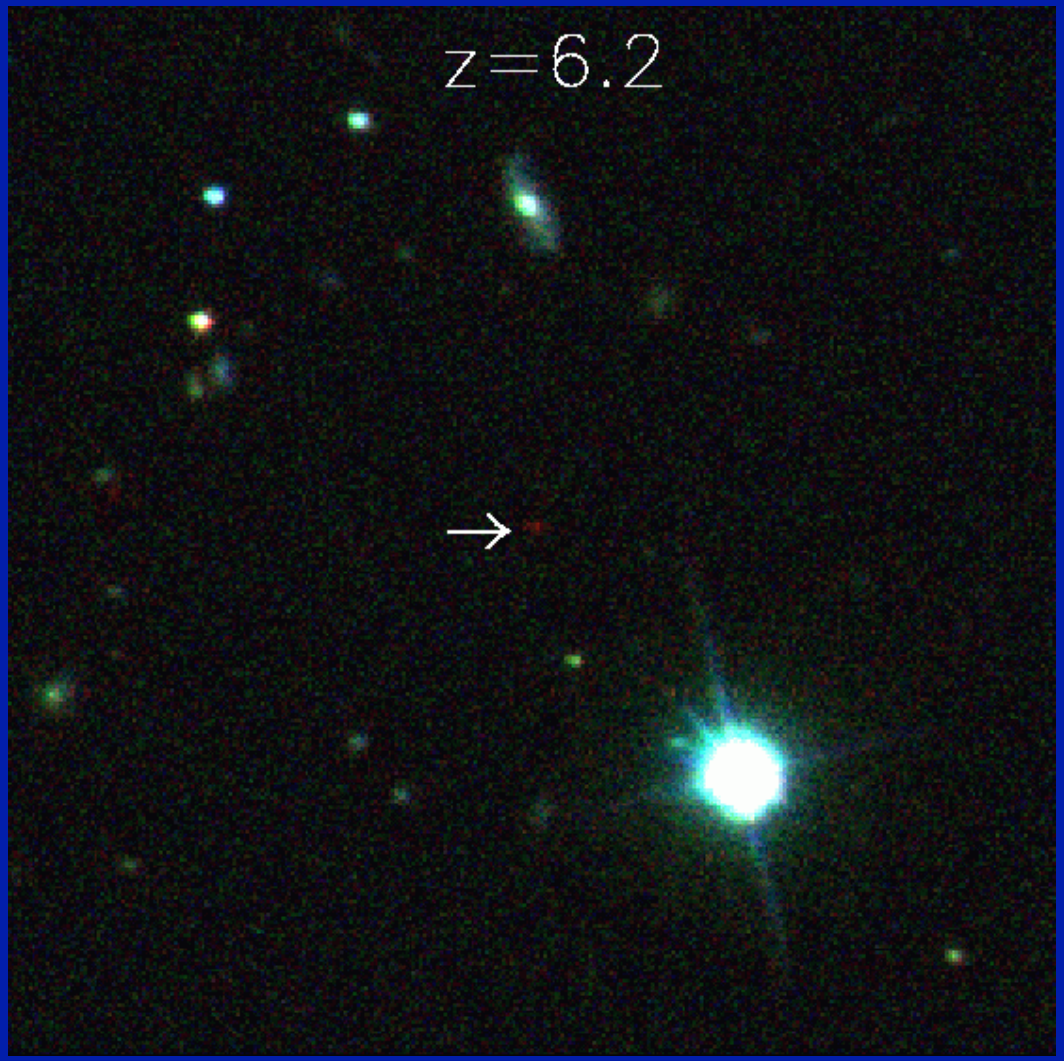
2.2


Lyα
NV
SiIV+OIV
CIV
CIII
CII
NgII
Counts
z 2.1912 +/- 0.0015 (0.76), specOso X-high
Wavelength

2.3


Lyα
NV
SiIV+OIV
CIV
CIII
CII
Counts
z 2.2942 +/- 0.0016 (0.75), specOso X-low
Wavelength

RA
0
10
20
30
40
50
60
330
340
350
r (Mpc/h)
1000
2000
3000
4000
5000
z
1
2
3
4
5
6
140
150
160
170
180
190
200
210
220
230


z=6.2

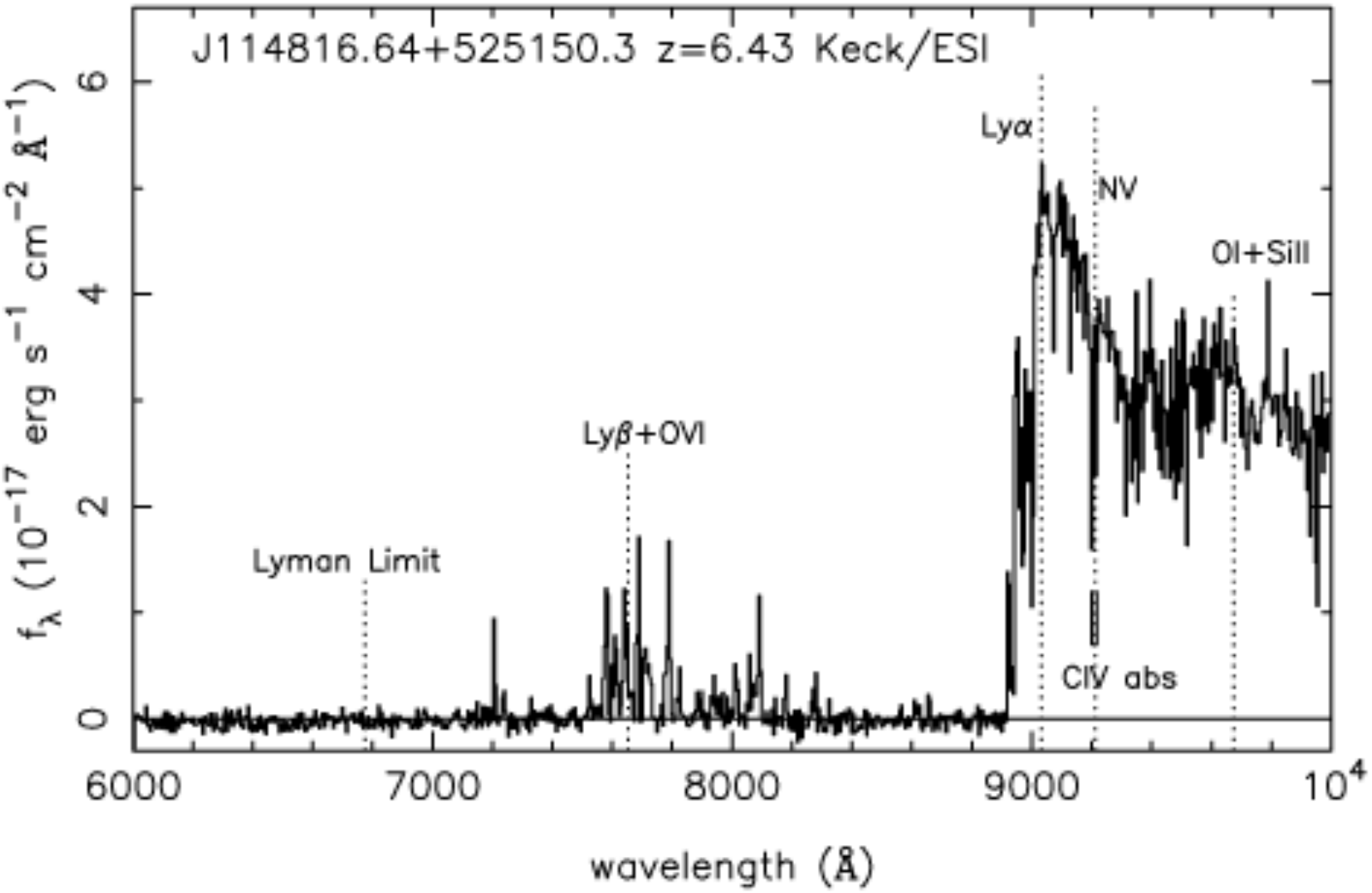
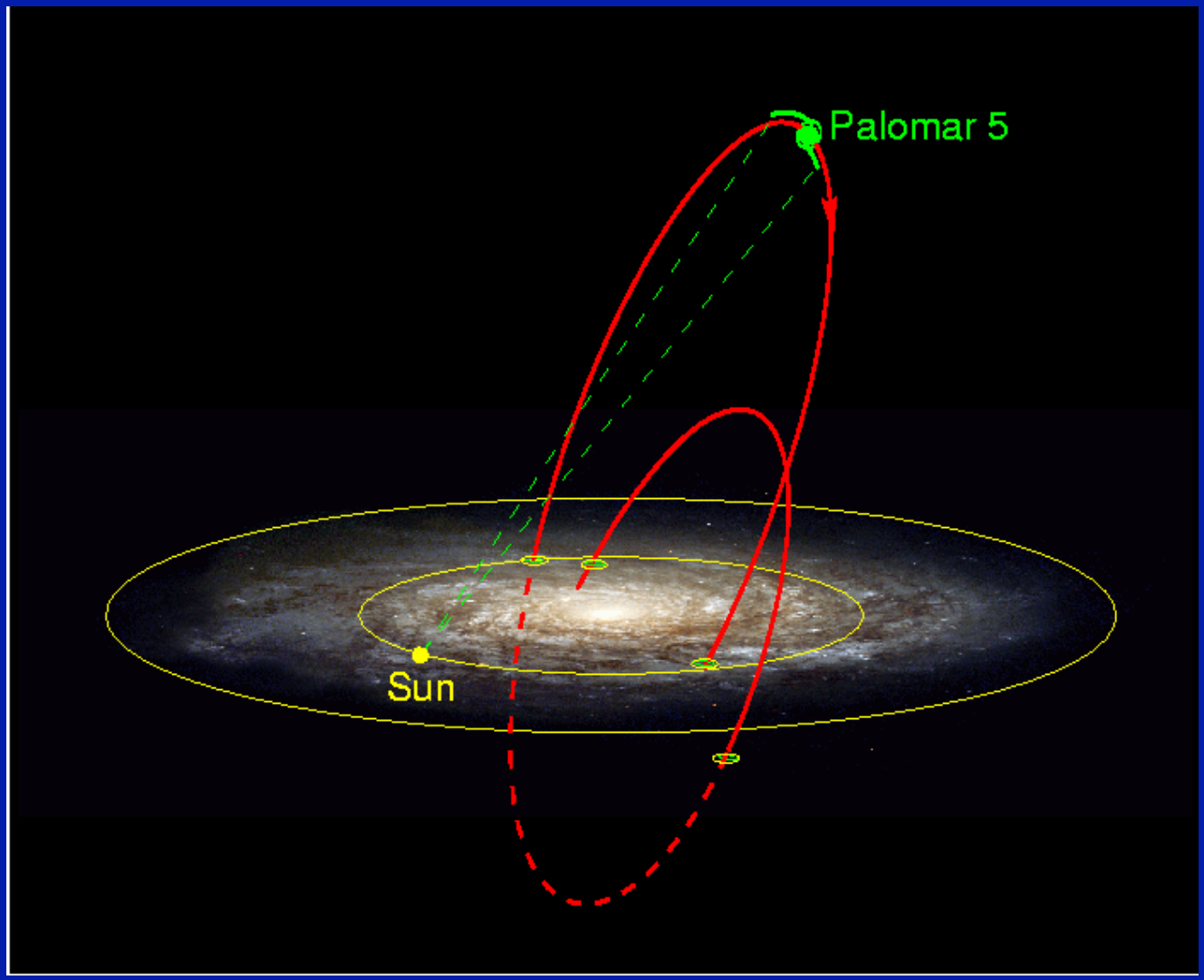
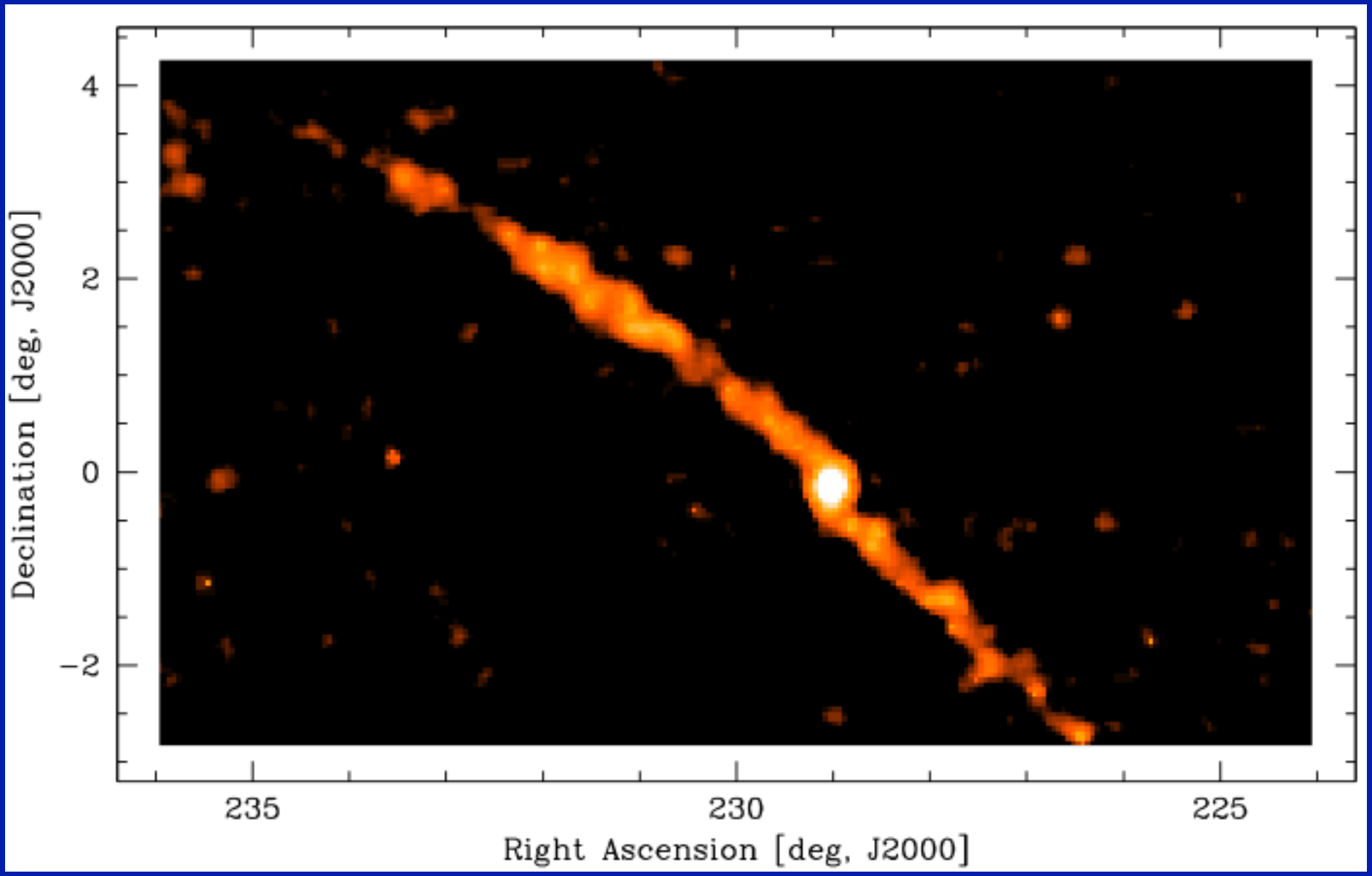


Fig. 6.— A Keck/ESI spectrum of J1148+5251. It is a 3 hour exposure under very marginal conditions (extinction > 1 magnitude). The spectrum is binned to 2Å/pixel, and is flux-calibrated to match the SDSS z photometry. Note a strong CIV doublet absorber at $\sim$ 9200Å ($z = 4.95$). Also note a complete Gunn-Peterson trough on the blue side of the Lyα emission where no flux is detected (see Fan et al. 2002b).


Palomar 5
Sun


4
2
0
−2
Declination [deg, J2000]
235
230
225
Right Ascension [deg, J2000]