

The South Galactic Cap U-band Sky Survey (SCUSS) Progress Report

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SanXia Univeristy

Outline

- Brief introductions
- Scientific goals
- Instruments and observations
- Results and comparisons
- Uband survey and China-VO

Participants

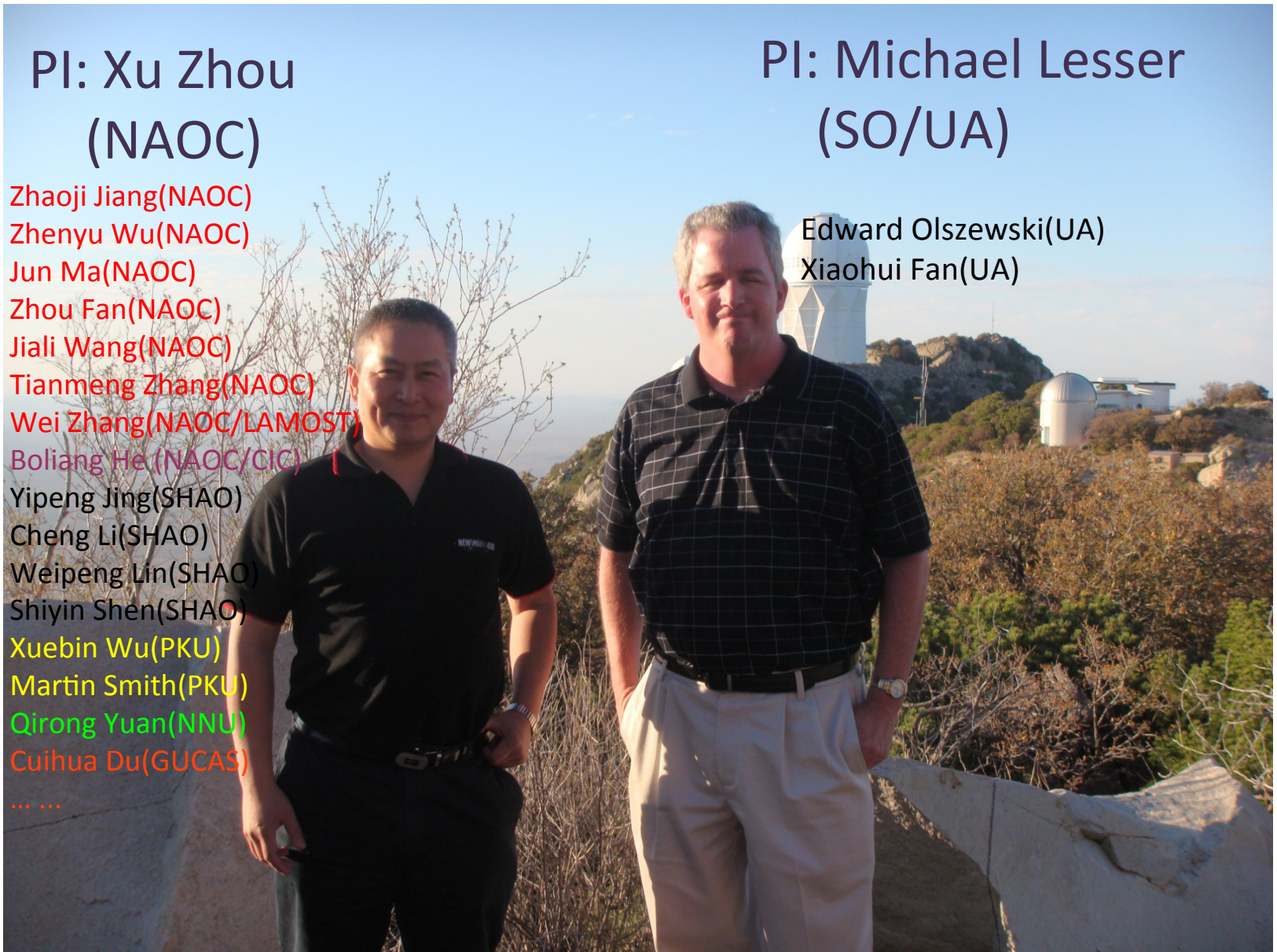
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Zhenyu Wu(NAOC)
Jun Ma(NAOC)
Zhou Fan(NAOC)
Jiali Wang(NAOC)
Tianmeng Zhang(NAOC)
Wei Zhang(NAOC/LAMOST)
Boliang He (NAOC/CIC)
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Weipeng Lin(SHAO)
Shiyin Shen(SHAO)
Xuebin Wu(PKU)
Martin Smith(PKU)
Qirong Yuan(NNU)
Cuihua Du(GUCAS)

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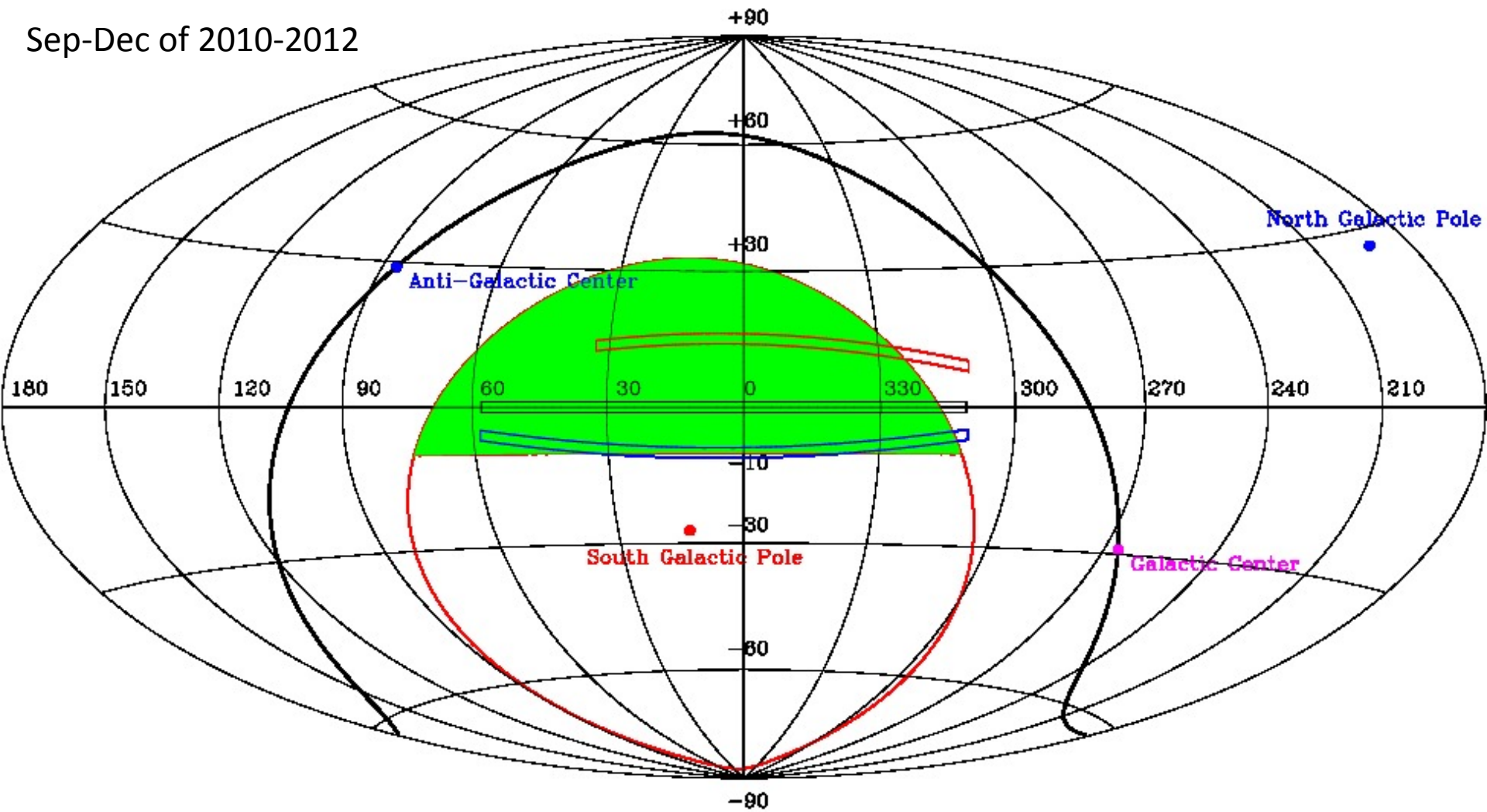
PI: Michael Lesser
(SO/UA)

Edward Olszewski(UA)
Xiaohui Fan(UA)



The u -band Sky MAP

Sep-Dec of 2010-2012

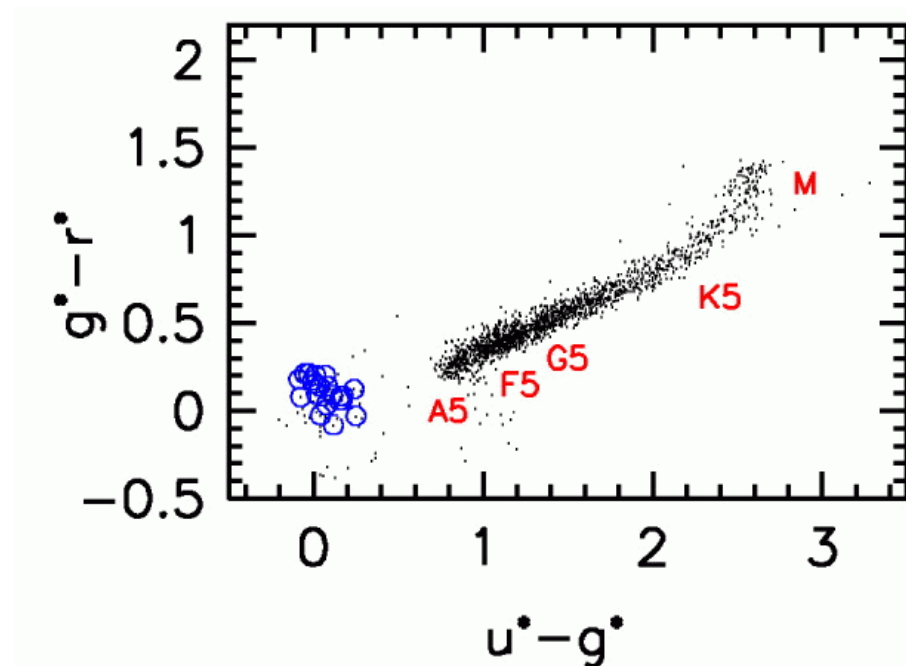
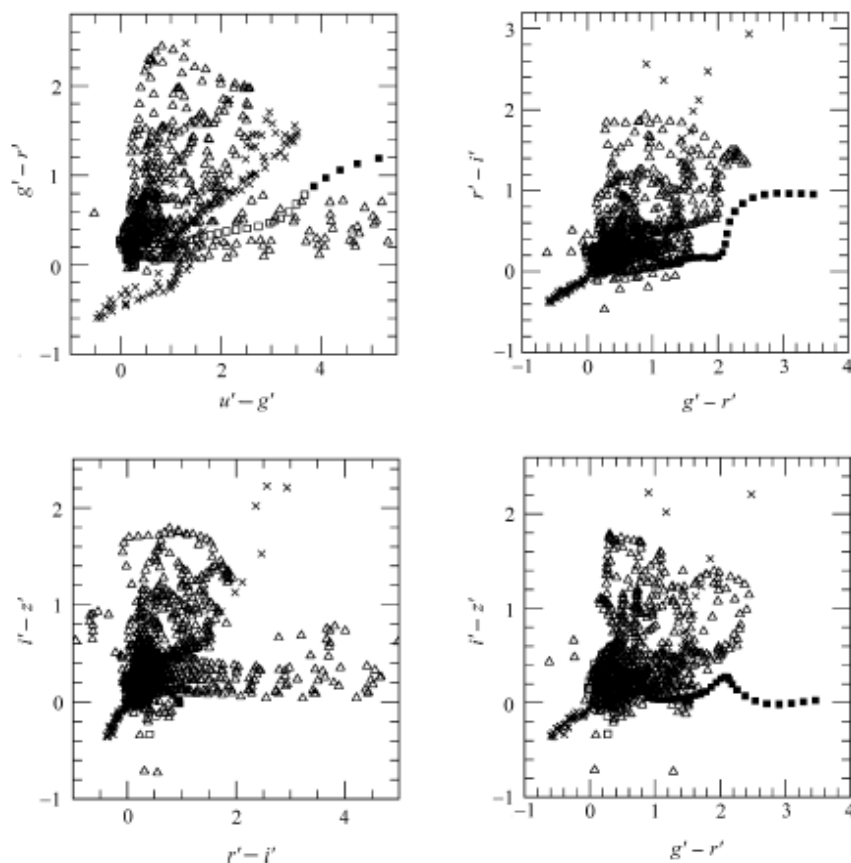


THE U-BAND SKY SURVEY ($b < -30^\circ$, $\text{Dec} > -10^\circ$)

Scientific Goals

1. Supplying the input catalogue for LAMOST (Guoshoujing);
2. Classifications of the stars, galaxies, AGN and quasars in the south Galactic cap region with the color-color diagram;
3. Detecting the red shift $z < 3$ quasar candidates combining the photometry in other bands;
4. Improving the accuracy of measuring the red shift of the galaxies with PhotoZ combining the photometry in other bands;
5. Searching for the starburst galaxies candidates;
6. Estimating the metallicity of the stellar populations in the galaxies;
7. Identifying the type of the stars in the color-color diagram combining the photometry in other bands, which can help us the control the completeness of the star type for the LAMOST observations;
8. For the flux calibration of the LAMOST spectra.

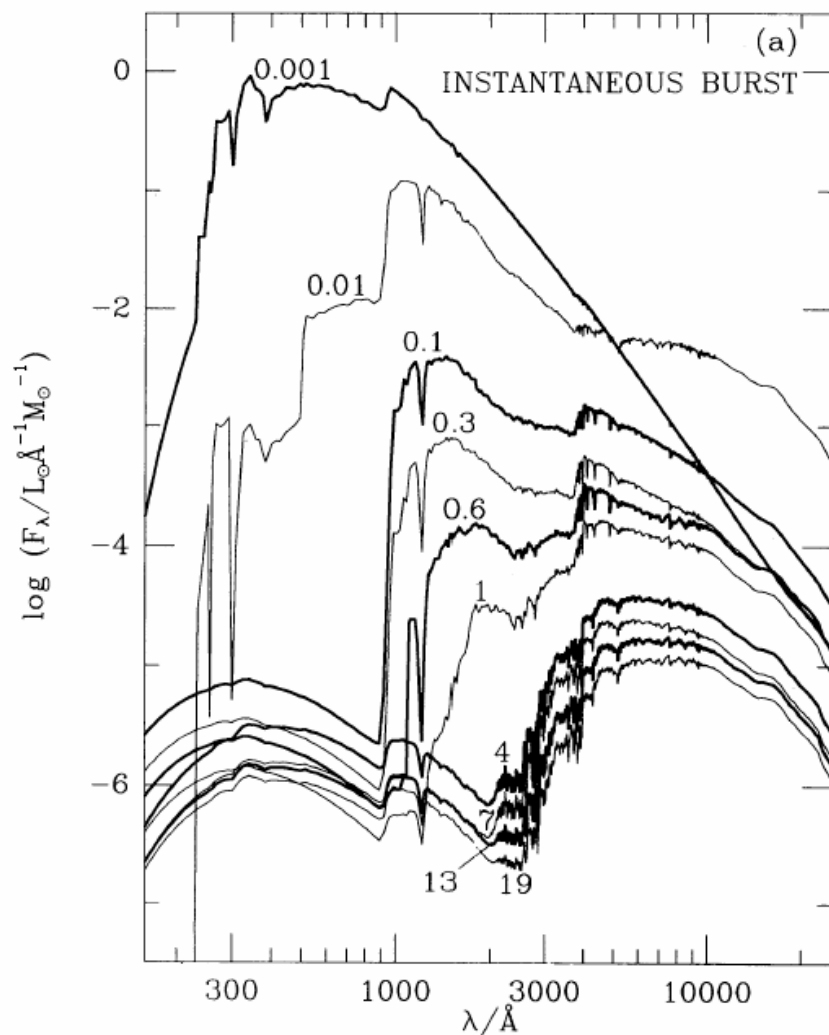
Color-color Diagram



- 图 1：SDSS 测光中的恒星 ($\times$)，星系 ($\triangle$) 和类星体 (其中红移 $z < 3.5$ 的源用 $\square$ 表示，红移 $z \geq 3.5$ 的源用 $\blacksquare$ 表示) 的双色图。

- 图 2：不同类型的恒星在双色图上的位置是不同的

Age Estimation



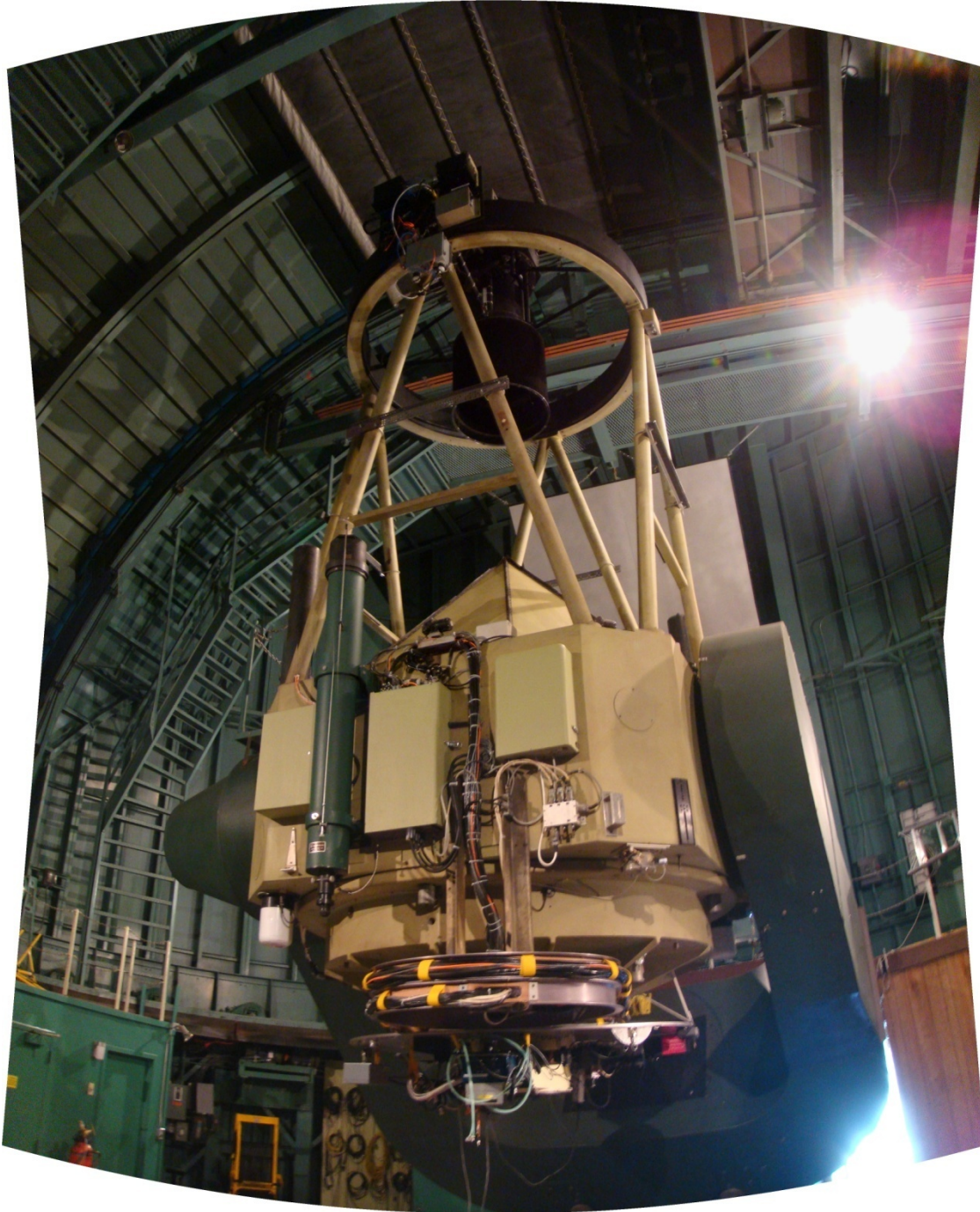
◆ 图 1：BC03 模型中太阳金属丰度下星族的谱能量分布随年龄的变化。



The 90-inch Bok Telescope

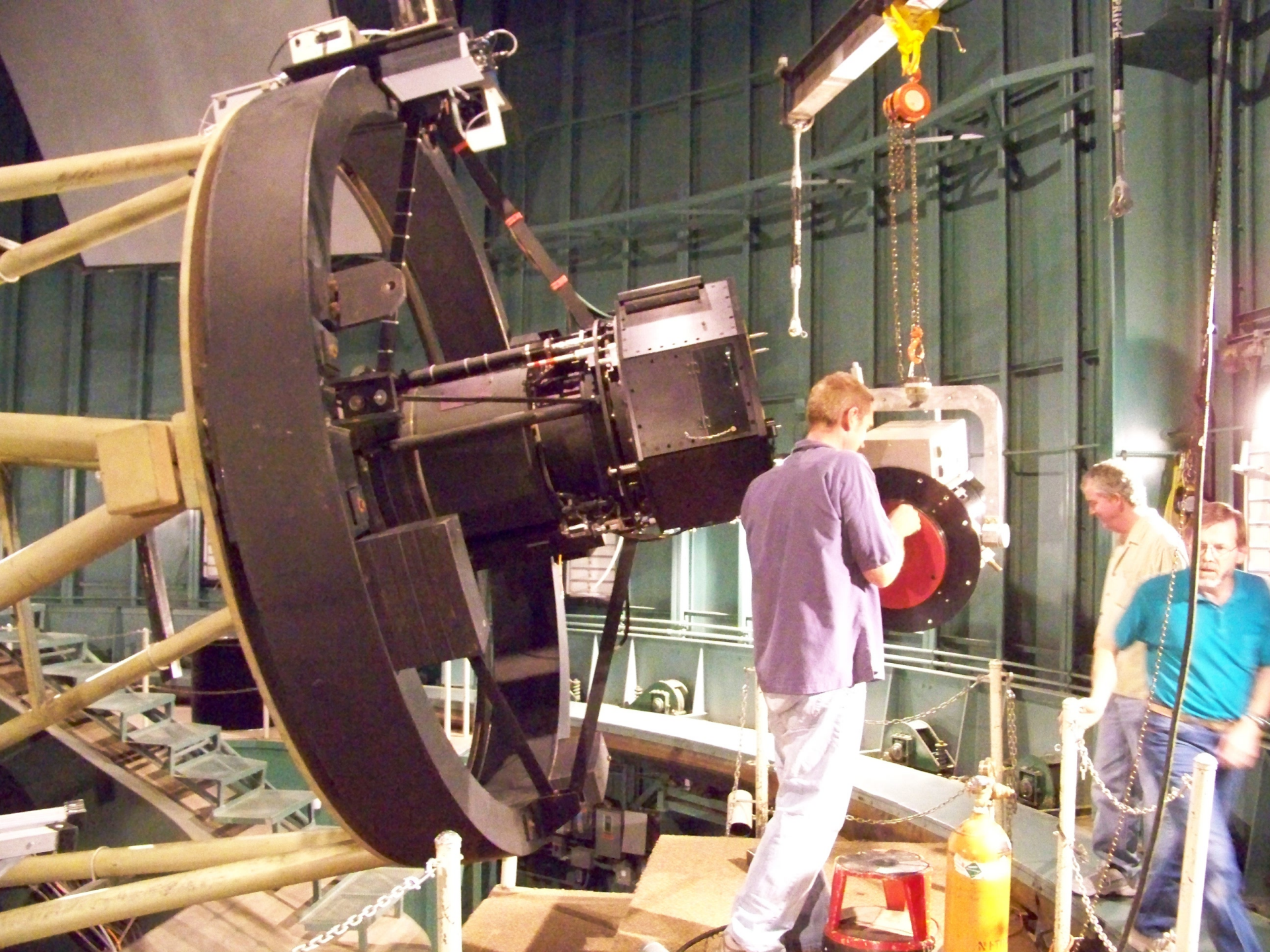


- **Organization:** Steward Observatory.
- **Location:** Kitt Peak, Arizona, USA
- **Wavelength:** optical, infrared
- **Diameter:** 2.3m (90 inches)

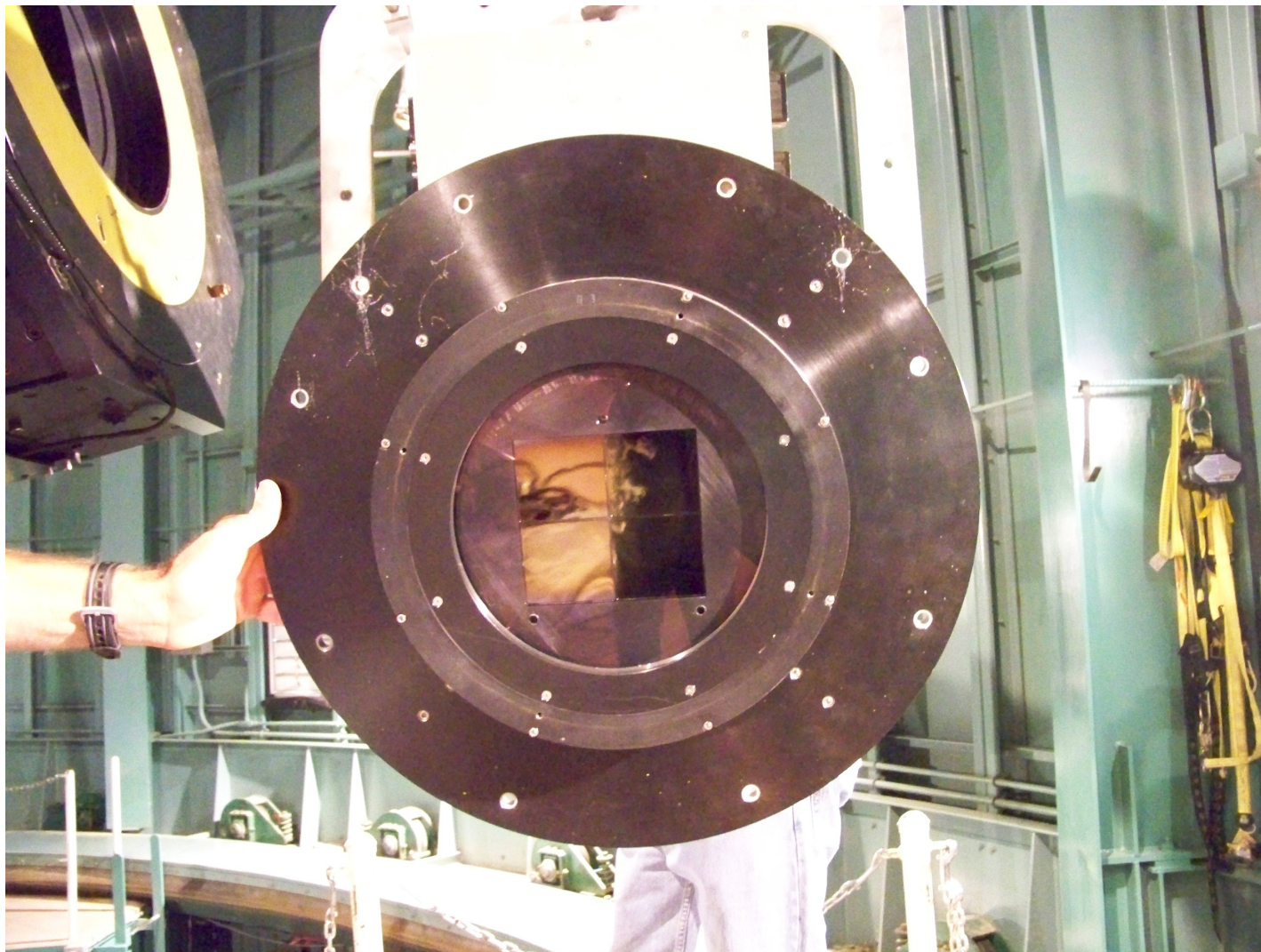


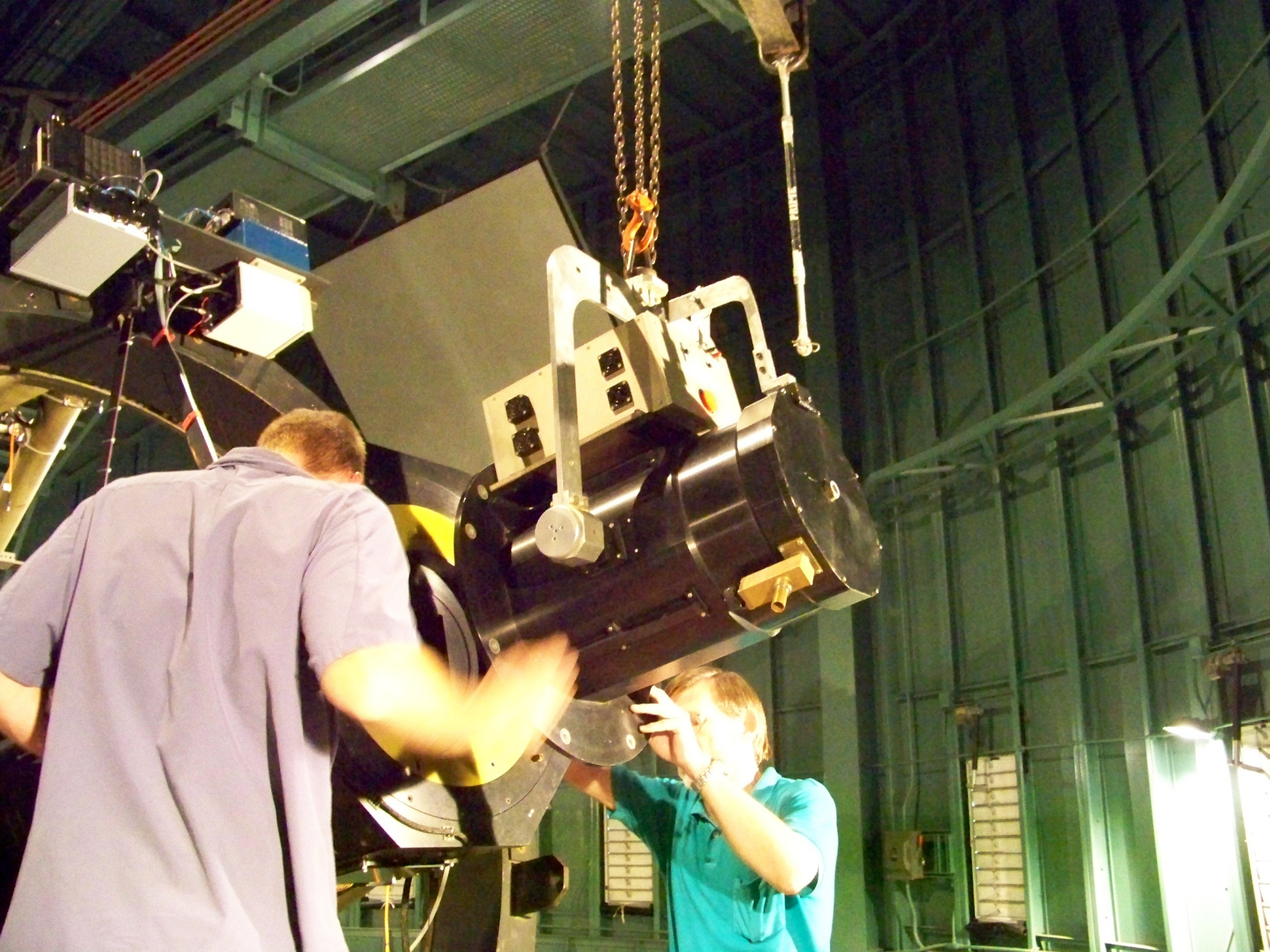
Telescope

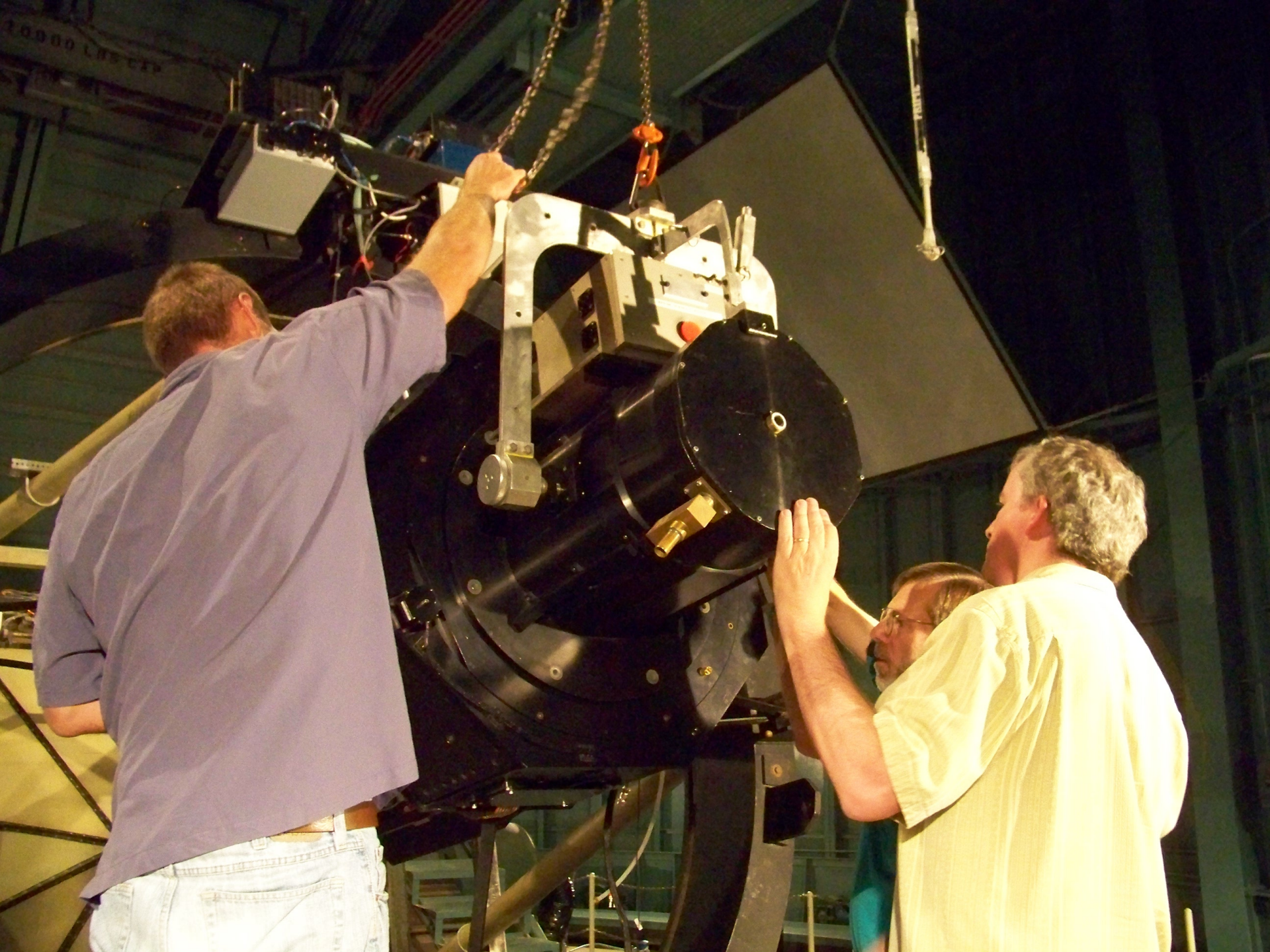
The Bok 90 inch (2.3 meter) Reflector Telescope



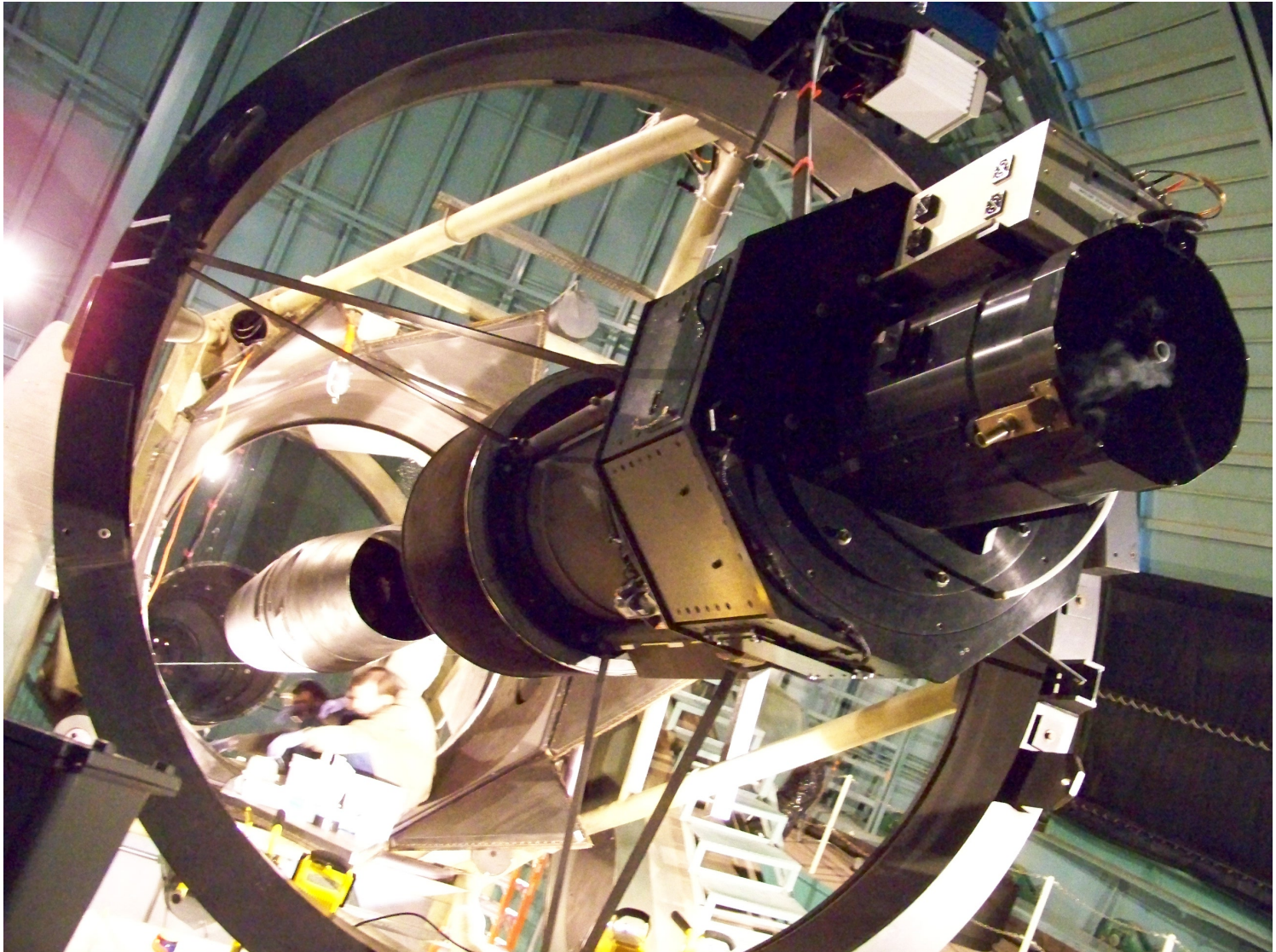
New CCD Mosaic

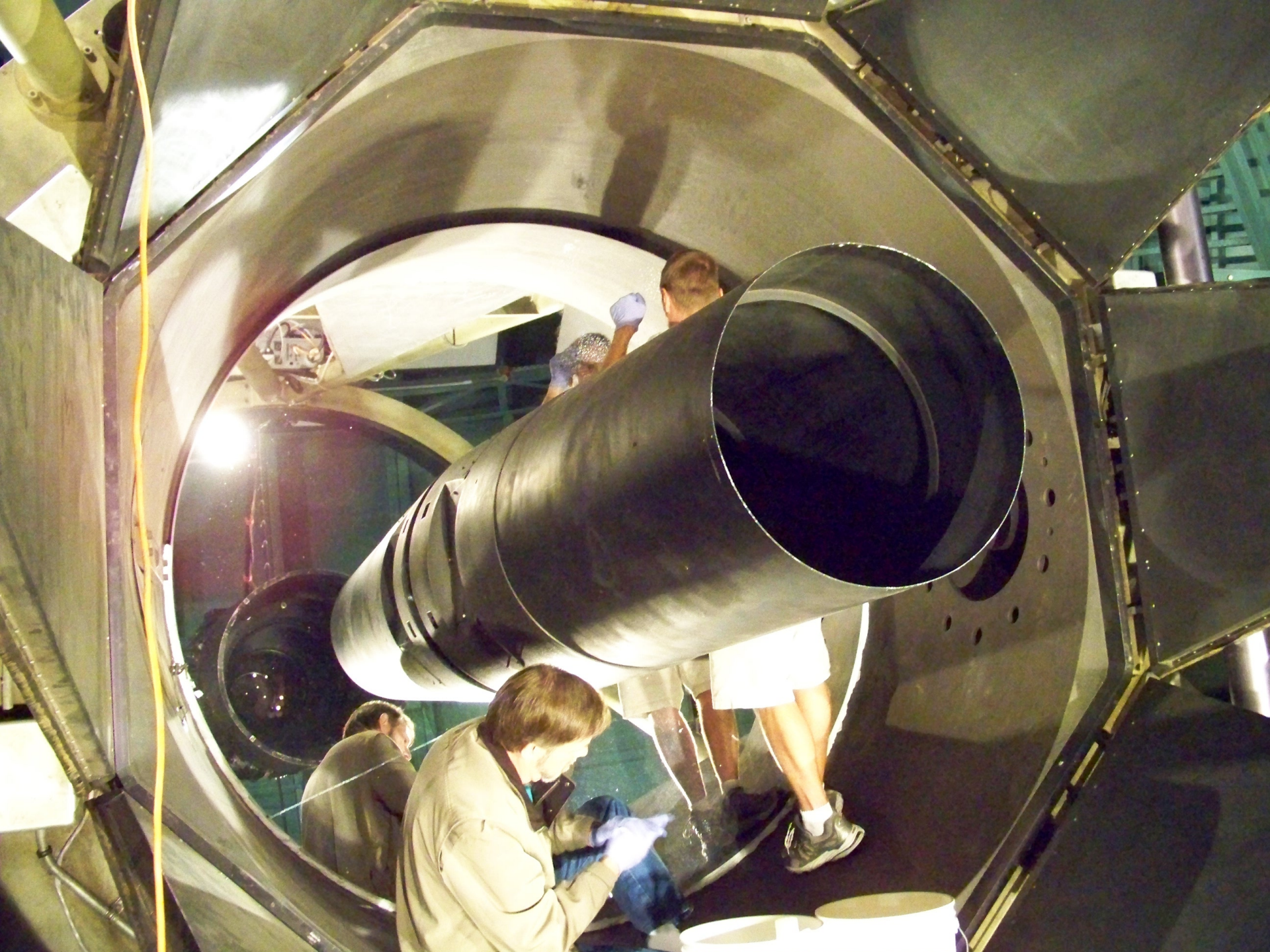




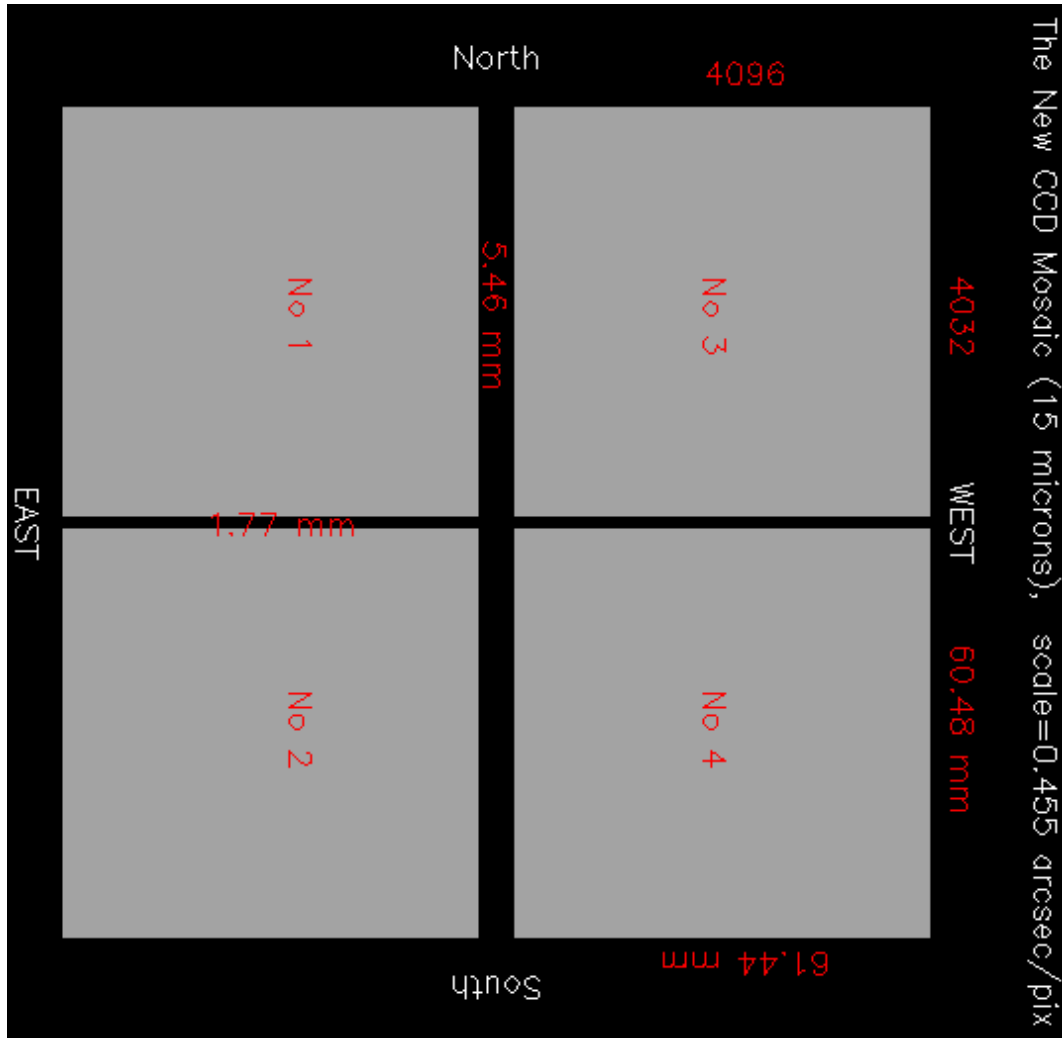


90Prime

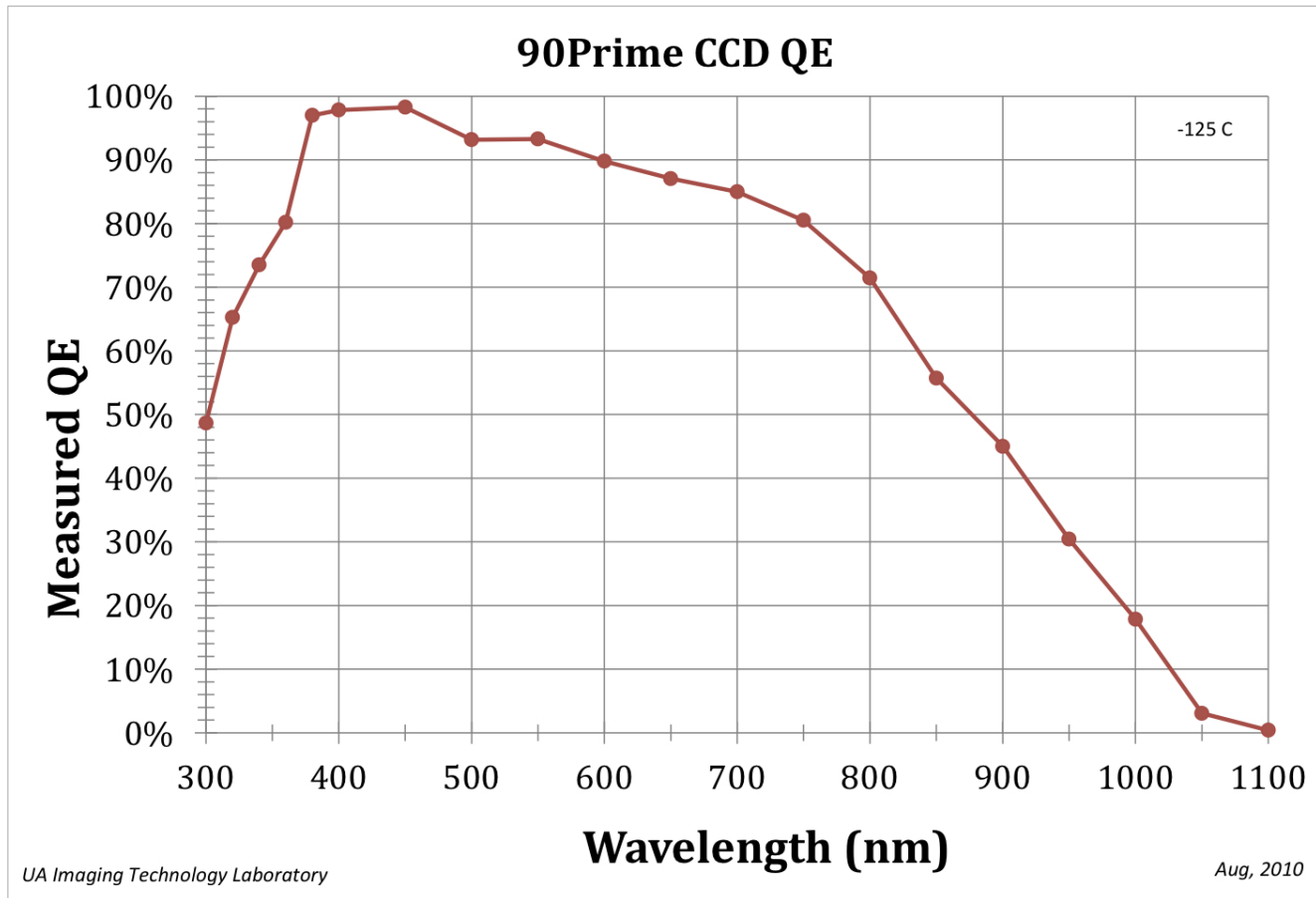




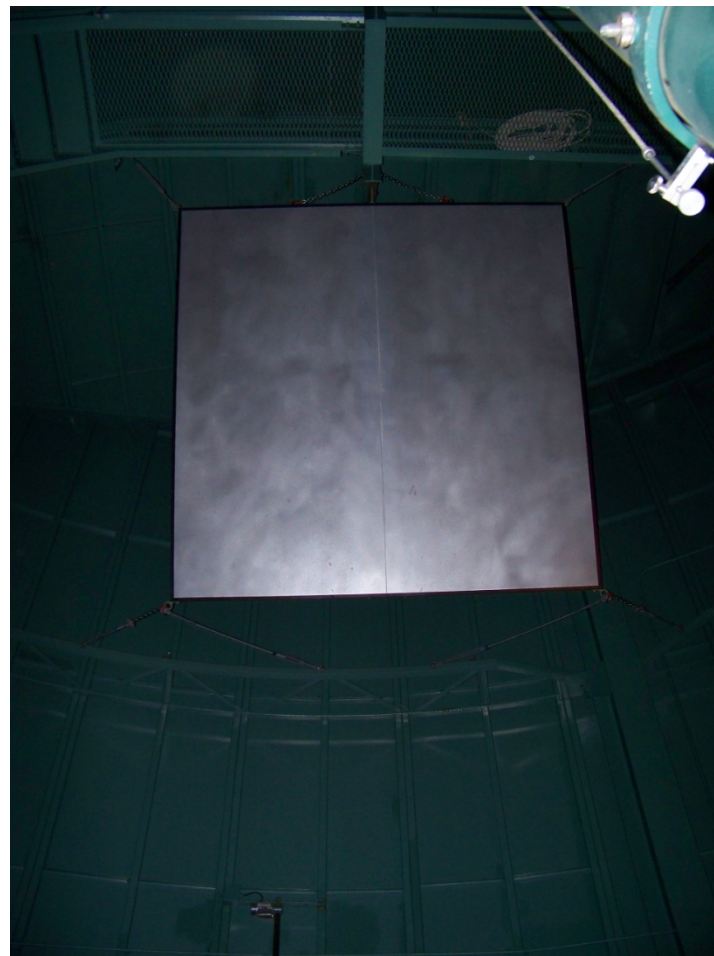
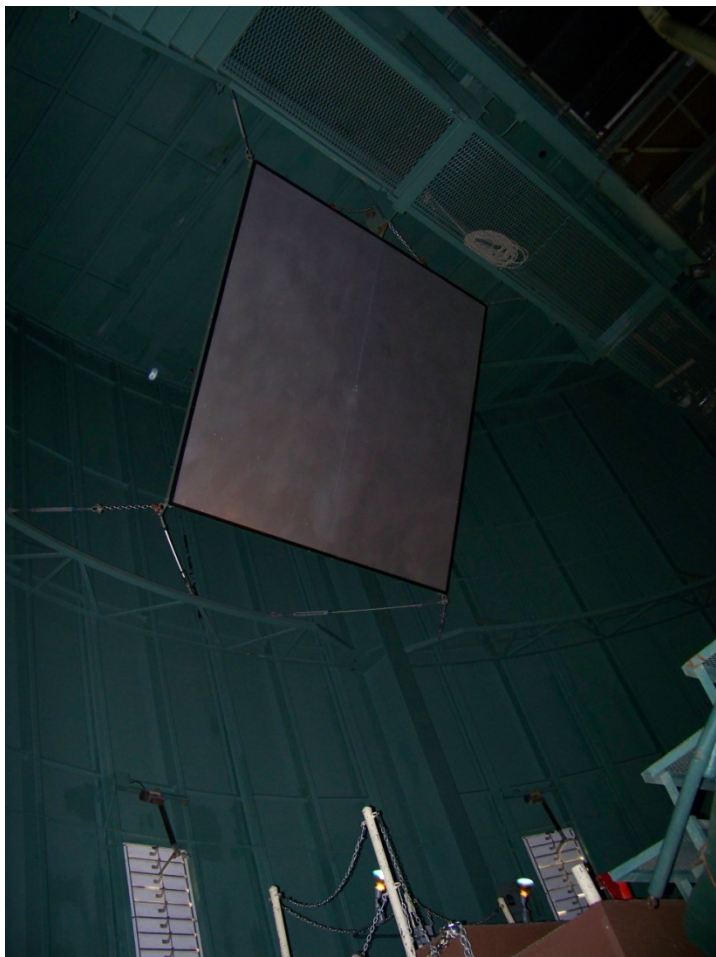
CCD configuration



CCD Quantum Efficiency

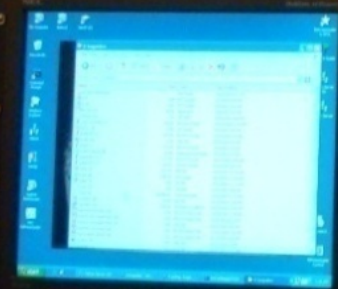


Flat Fielding Screen





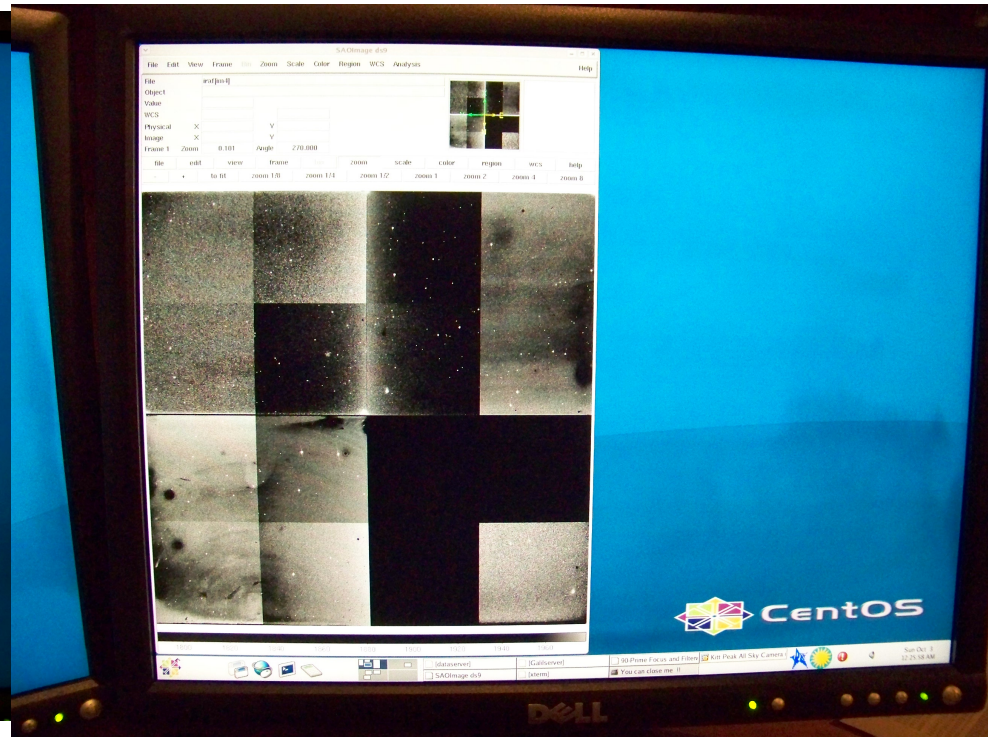
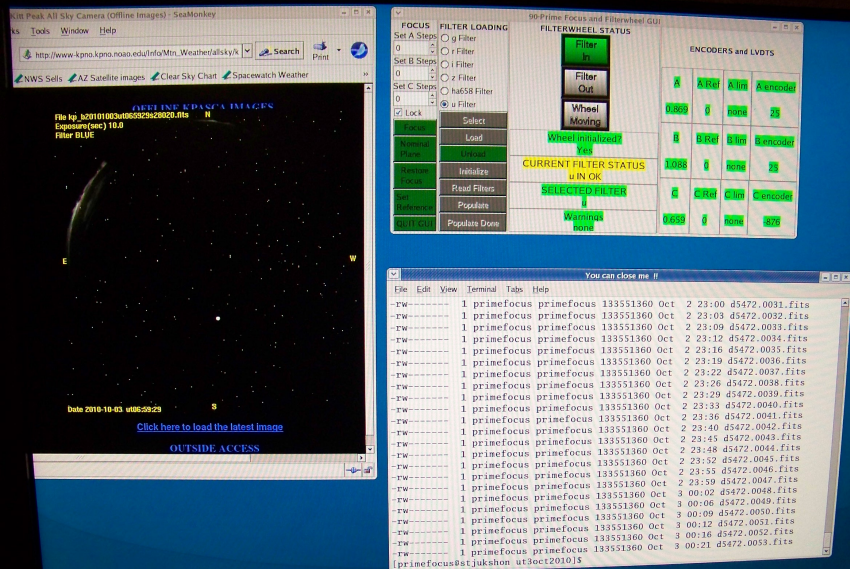
NO SMOKING



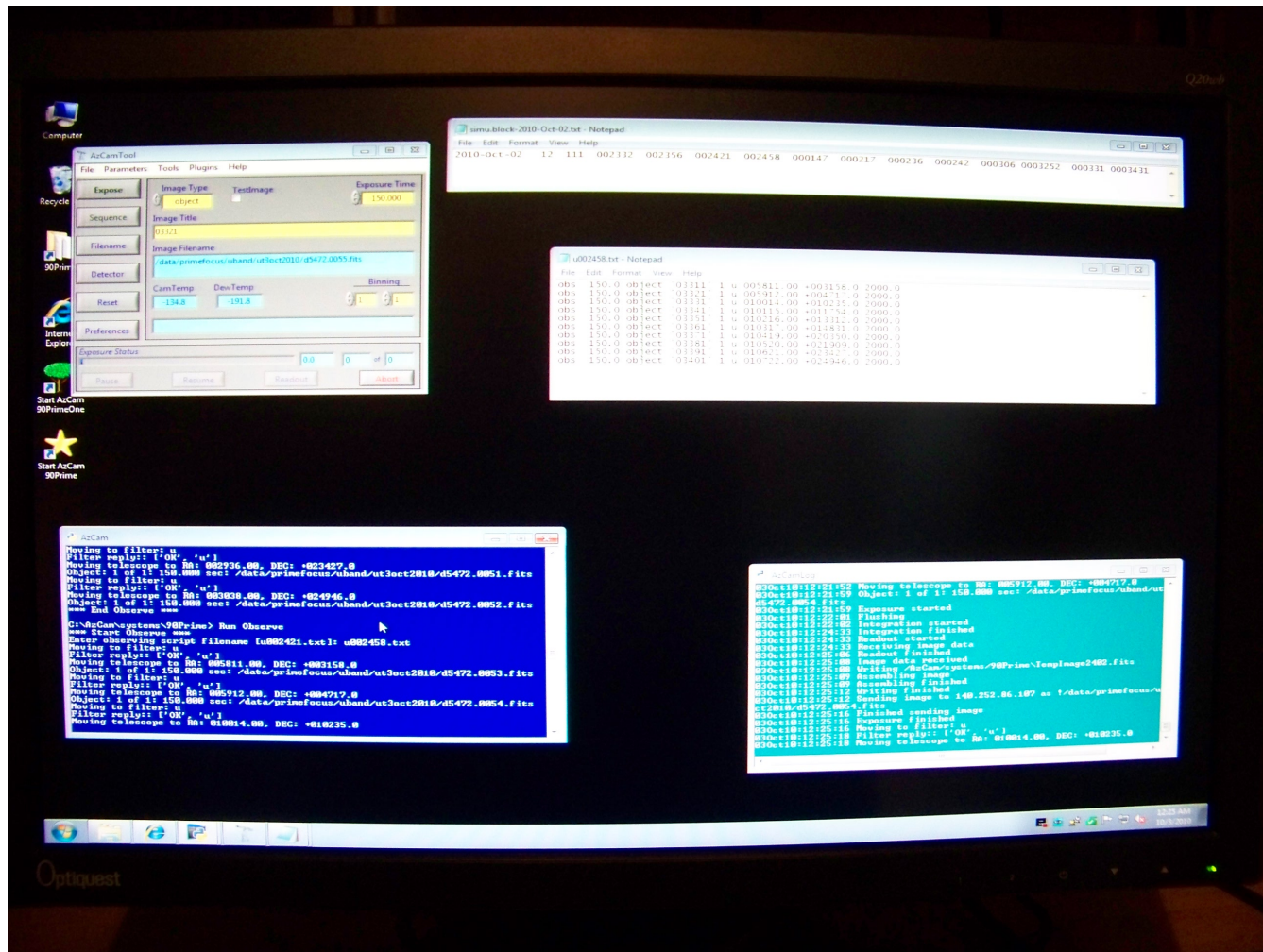




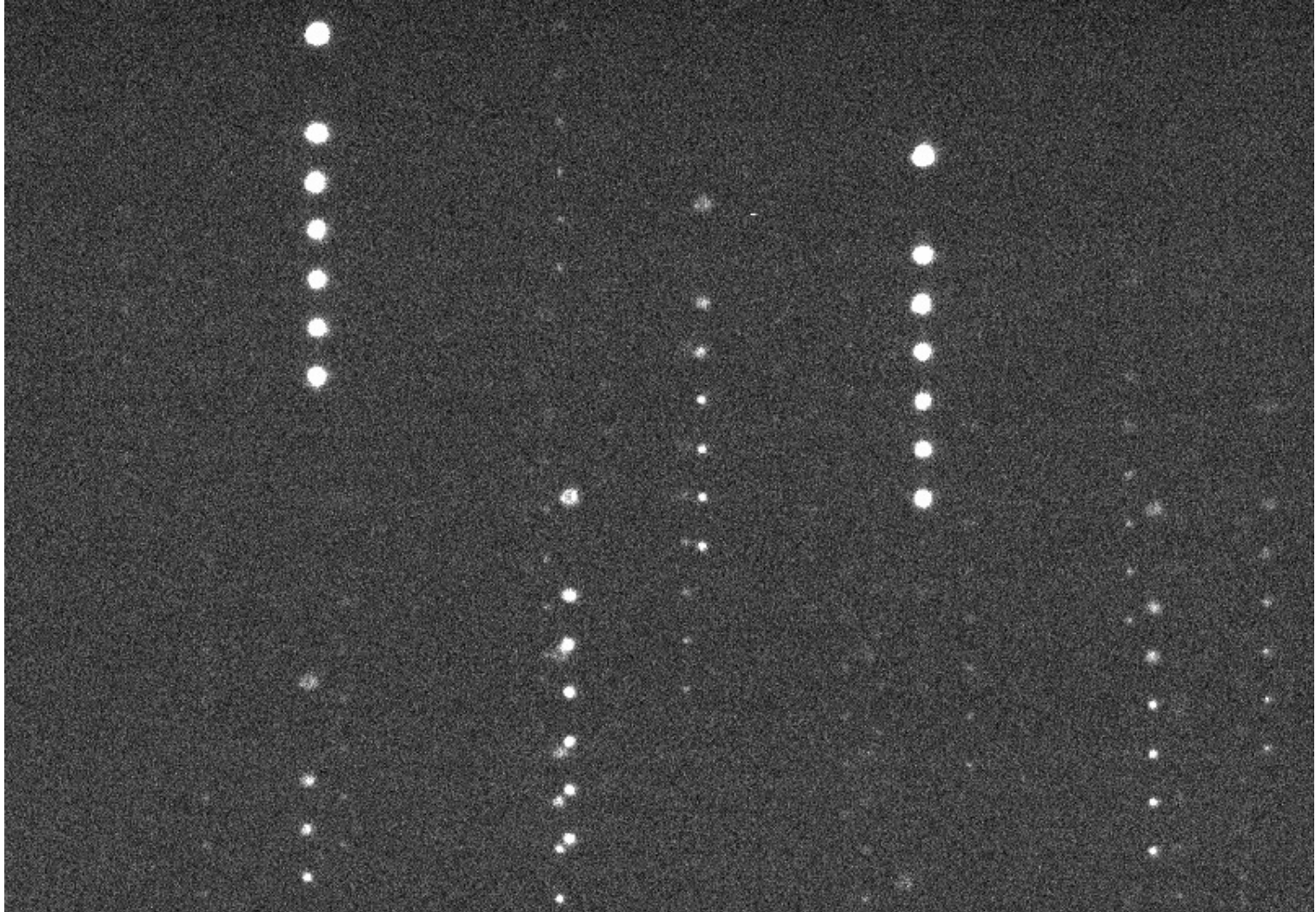
Linux PC



AzCam PC



windows PC preparation

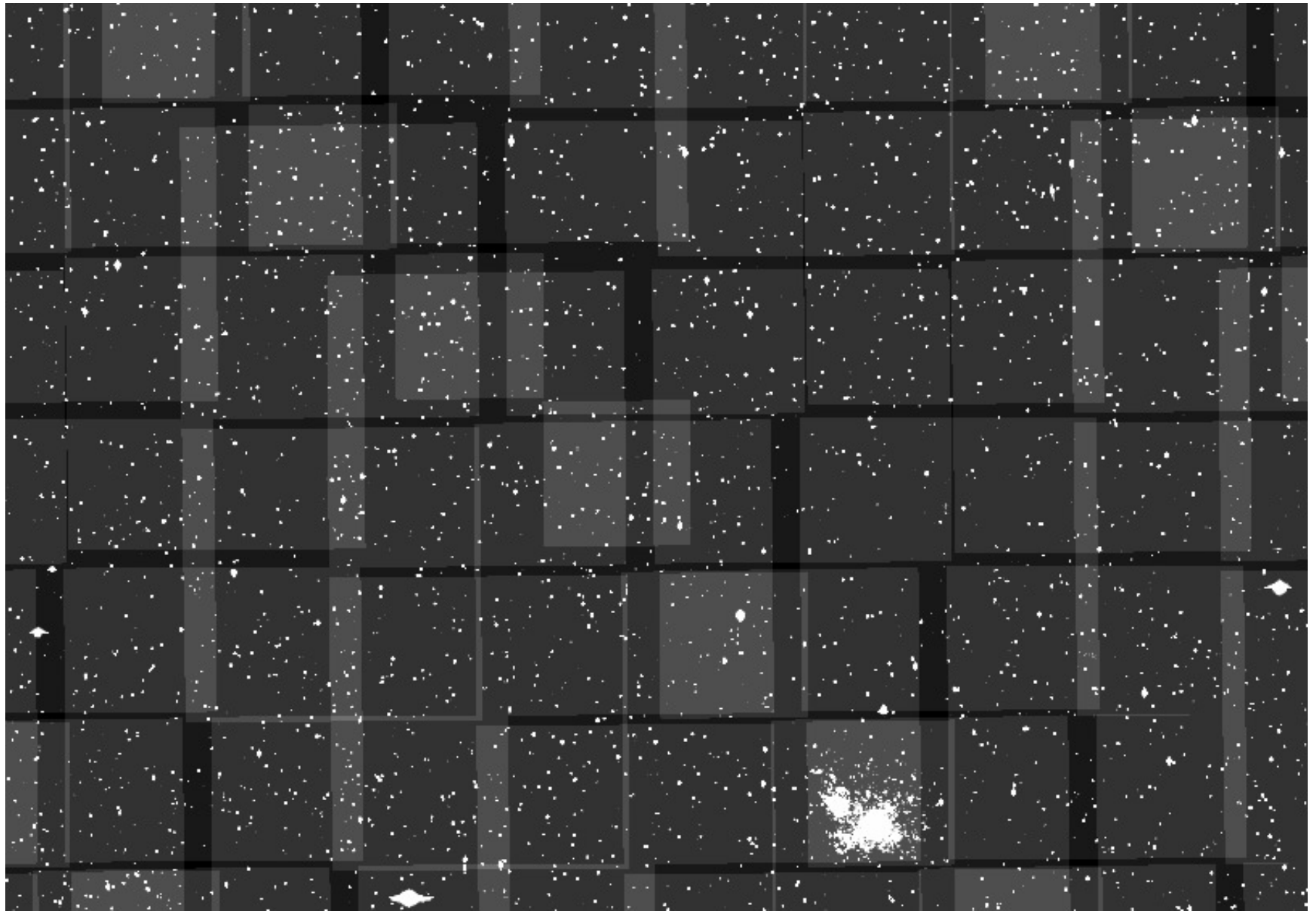


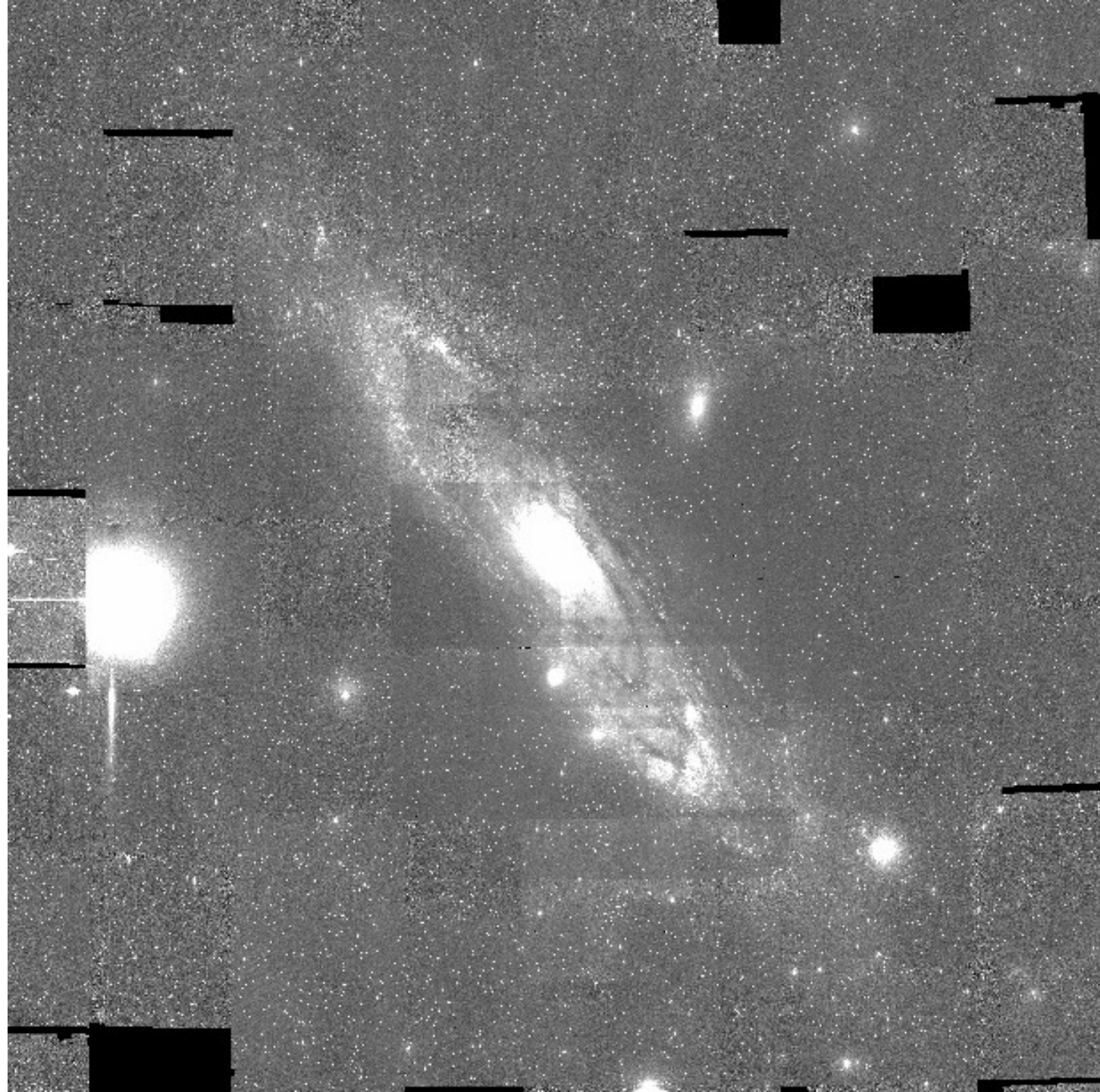
$$\text{correction}=(n-1)*\text{step}$$

Observation Scripts

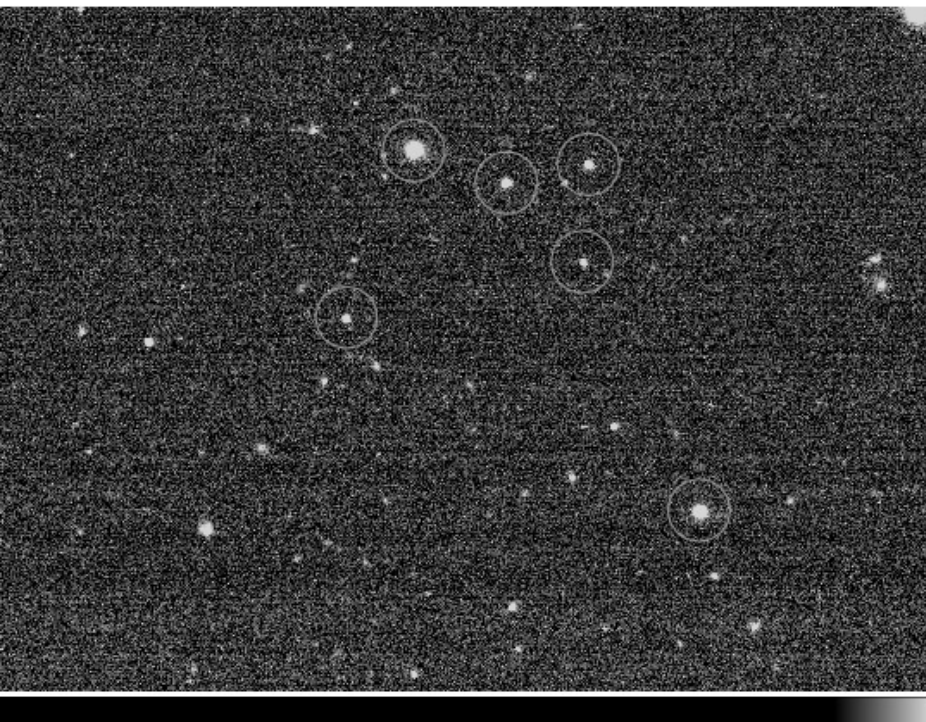
- obs 150.0 object '04511' 1 u 021141.00 +003158.0 2000.0
- obs 150.0 object '04521' 1 u 021242.00 +004717.0 2000.0
- obs 150.0 object '04531' 1 u 021343.00 +010235.0 2000.0
- obs 150.0 object '04541' 1 u 021444.00 +011754.0 2000.0
- obs 150.0 object '04551' 1 u 021546.00 +013312.0 2000.0
- obs 150.0 object '04561' 1 u 021647.00 +014831.0 2000.0
- obs 150.0 object '04571' 1 u 021748.00 +020350.0 2000.0
- obs 150.0 object '04581' 1 u 021849.00 +021909.0 2000.0
- obs 150.0 object '04591' 1 u 021951.00 +023427.0 2000.0
- obs 150.0 object '04601' 1 u 022052.00 +024946.0 2000.0

The Stacked Image

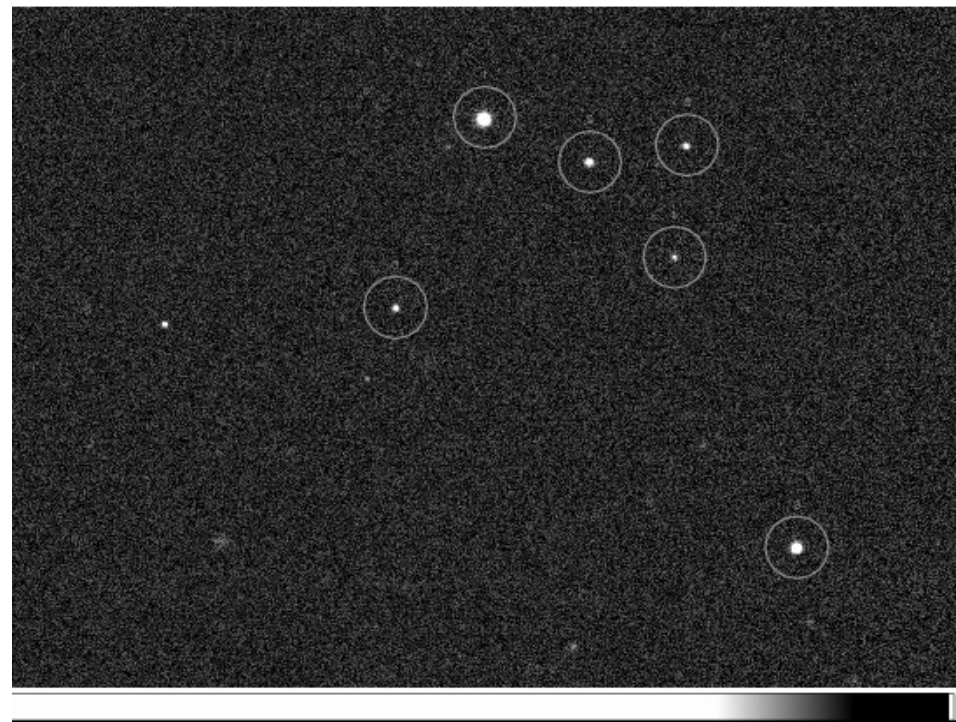




Comparison of Bok 300s exposure and SDSS in u band

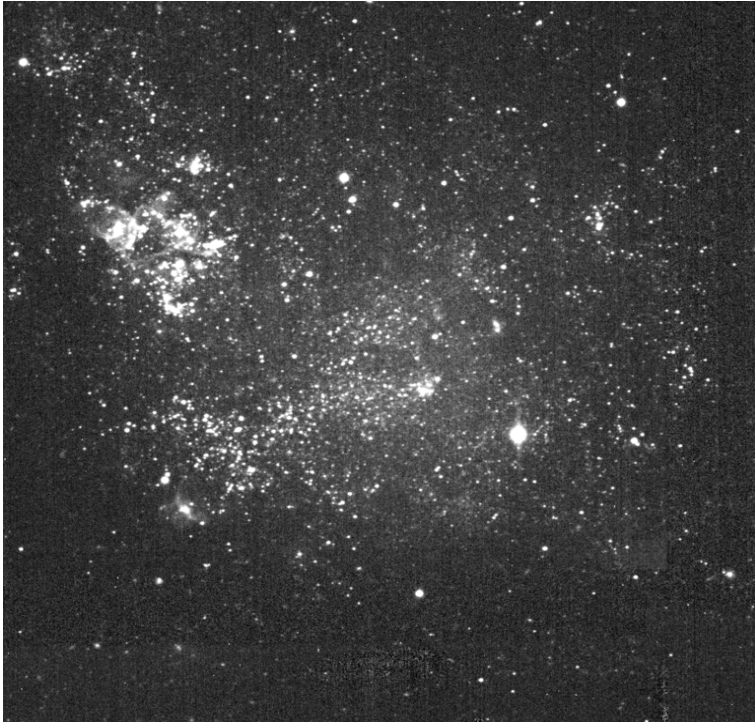


Bok 300 s

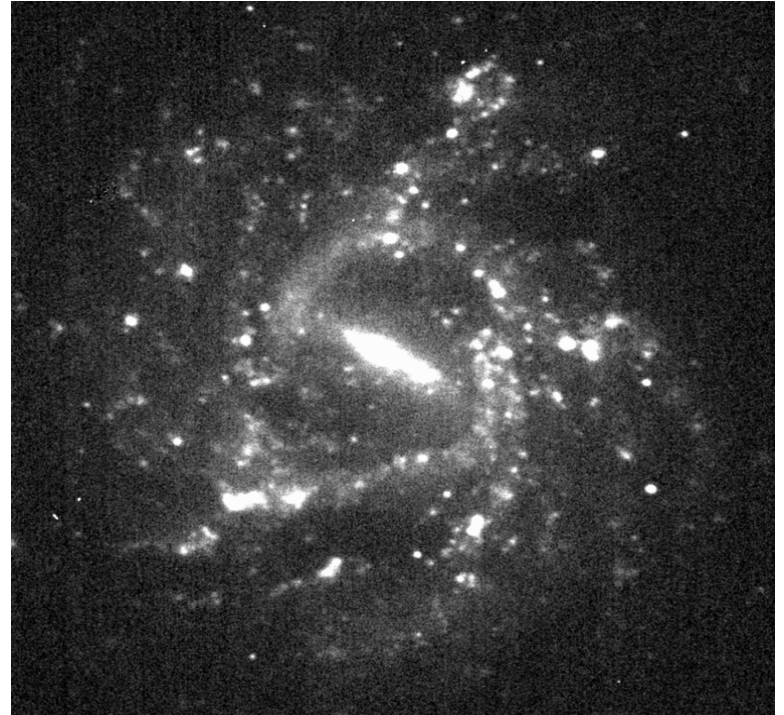


SDSS 53 s

Our Survey V.S. SDSS

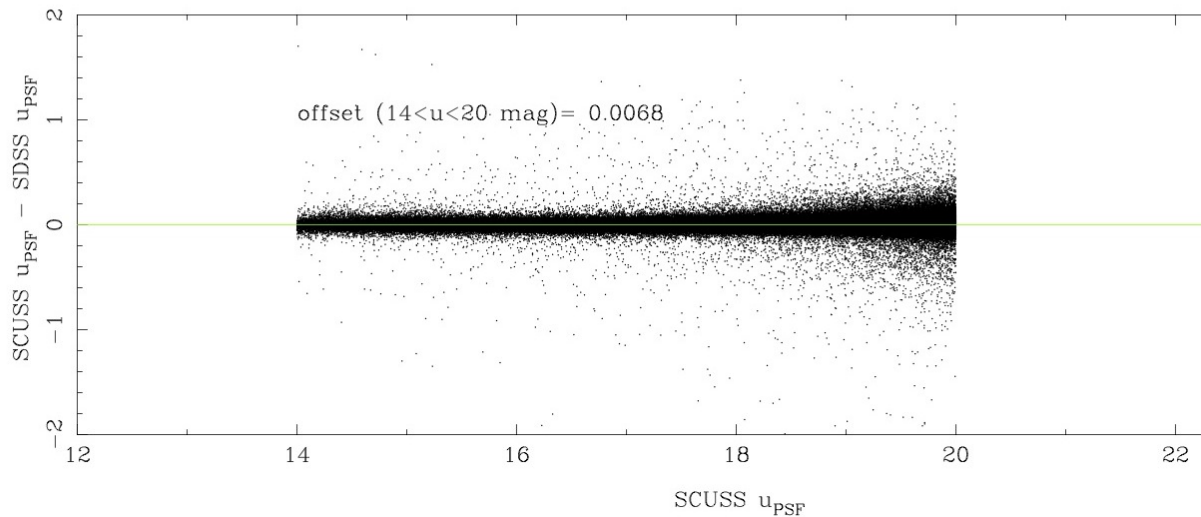
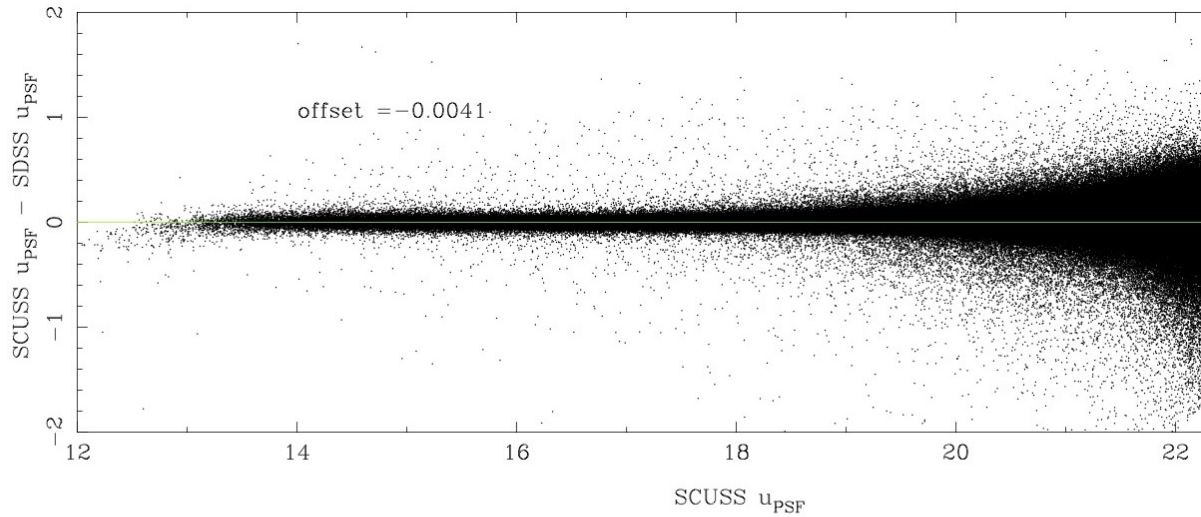


IC 1613

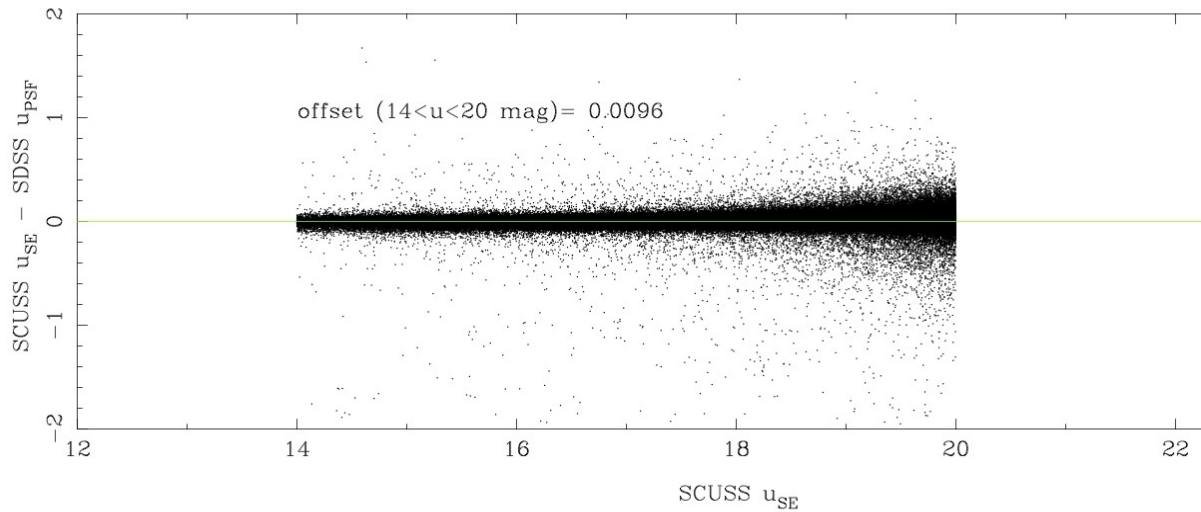
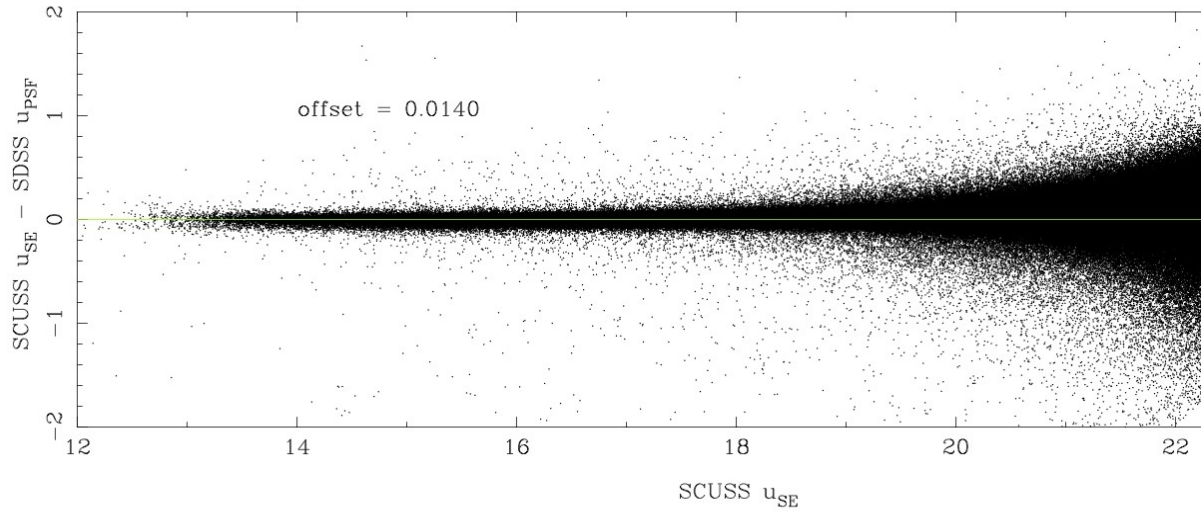


NGC 1073

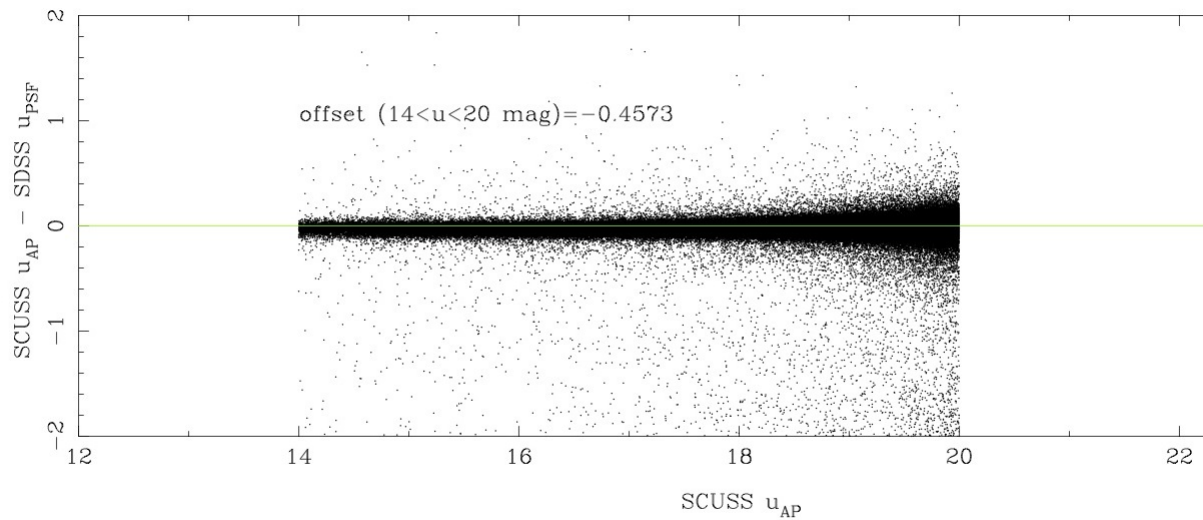
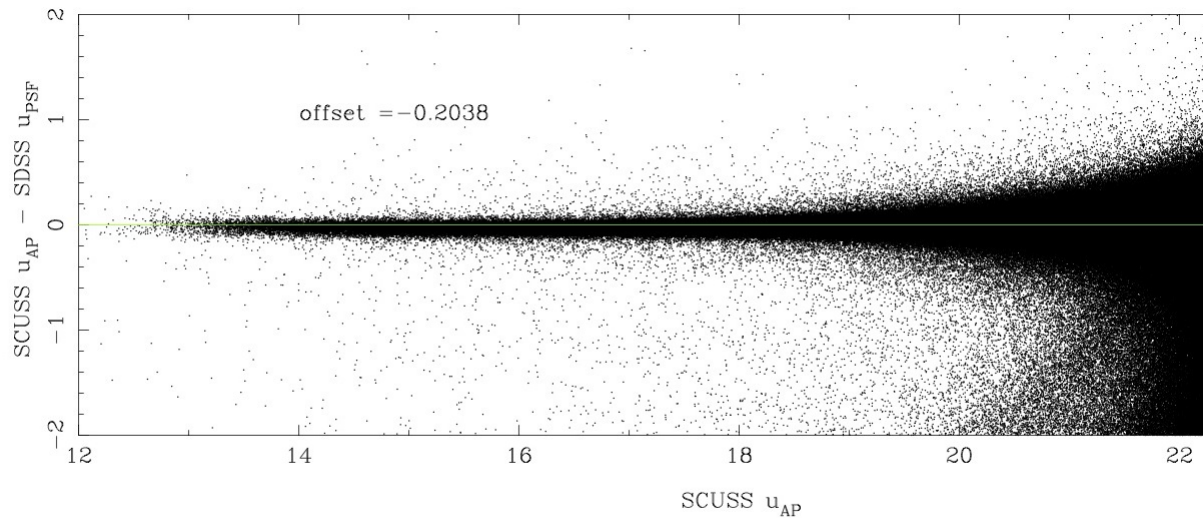
Comparisons of Magnitude



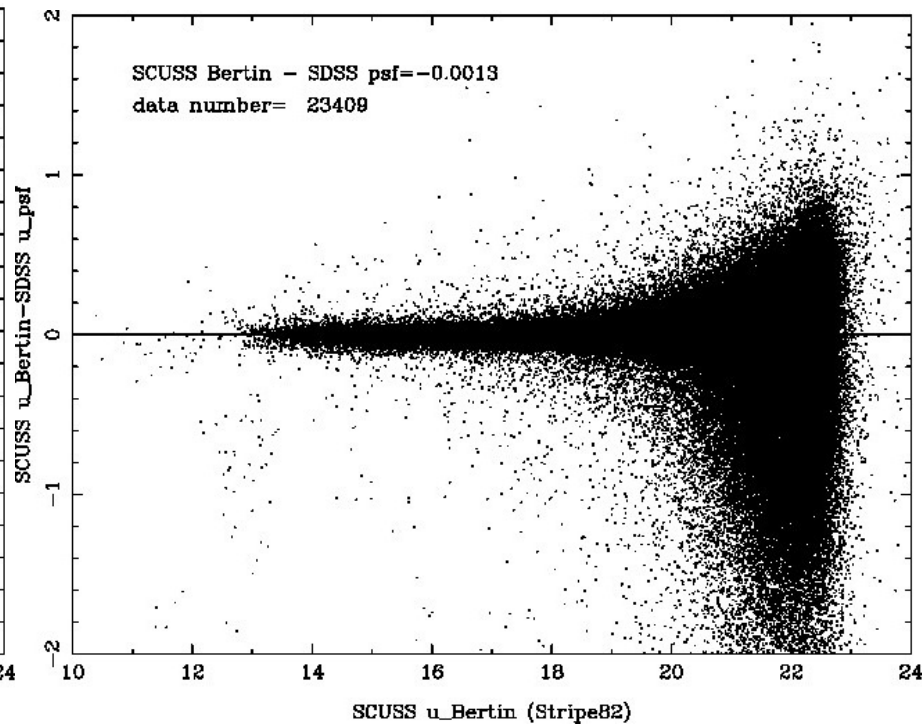
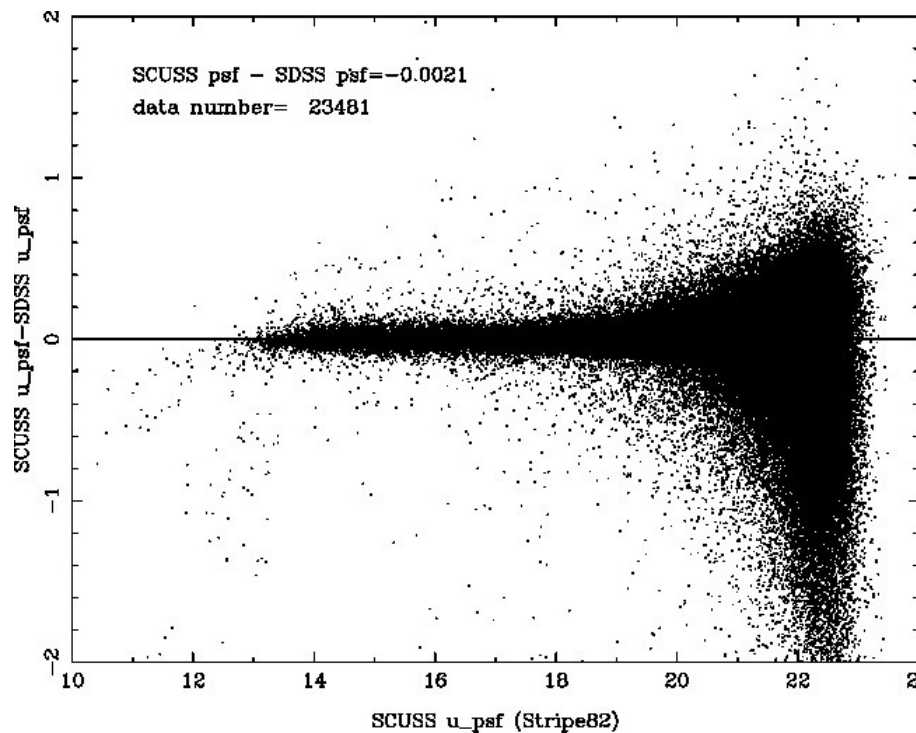
Comparisons of Magnitude



Comparisons of Magnitude

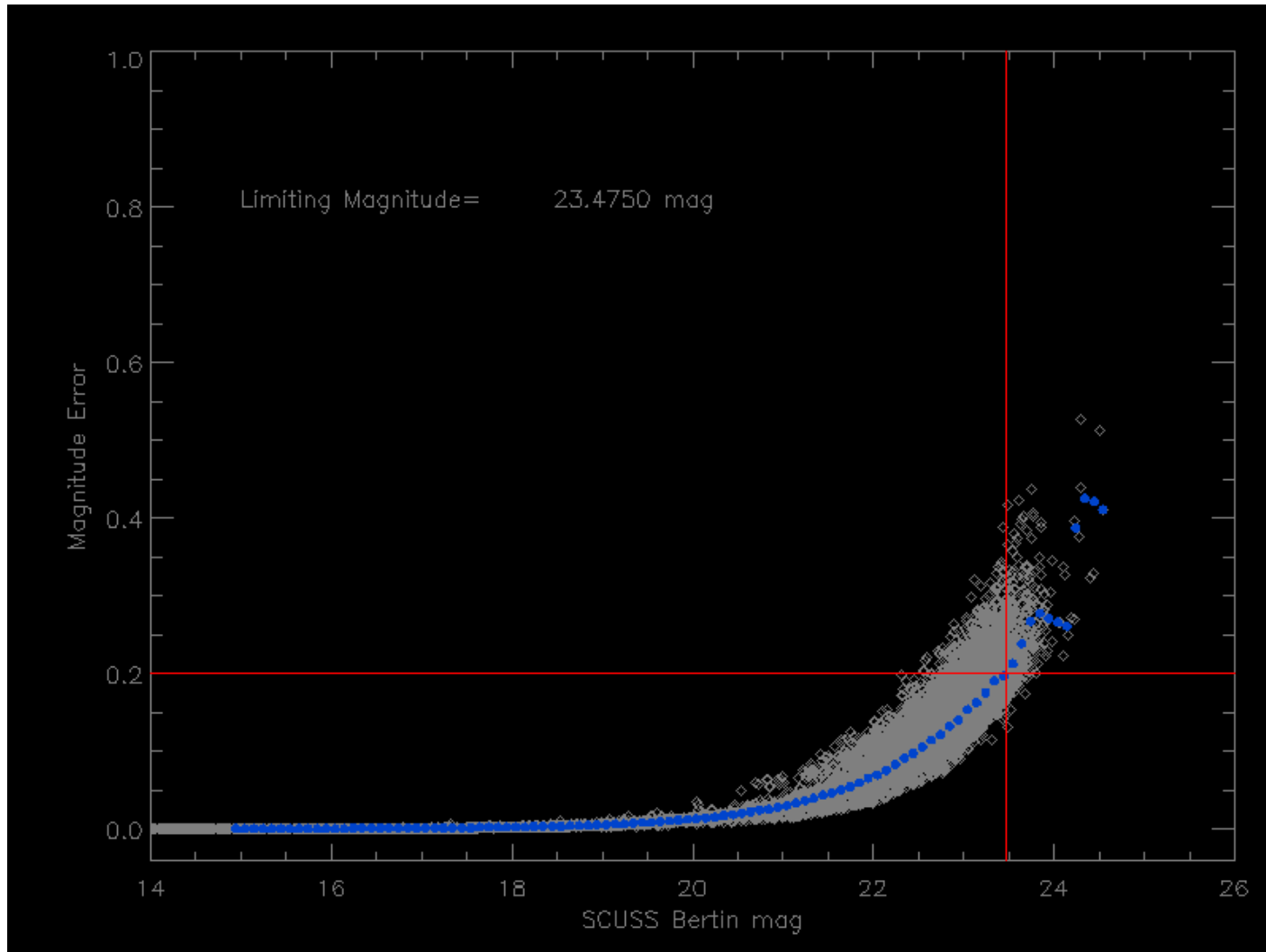


Comparisons of Magnitude for Stripe82

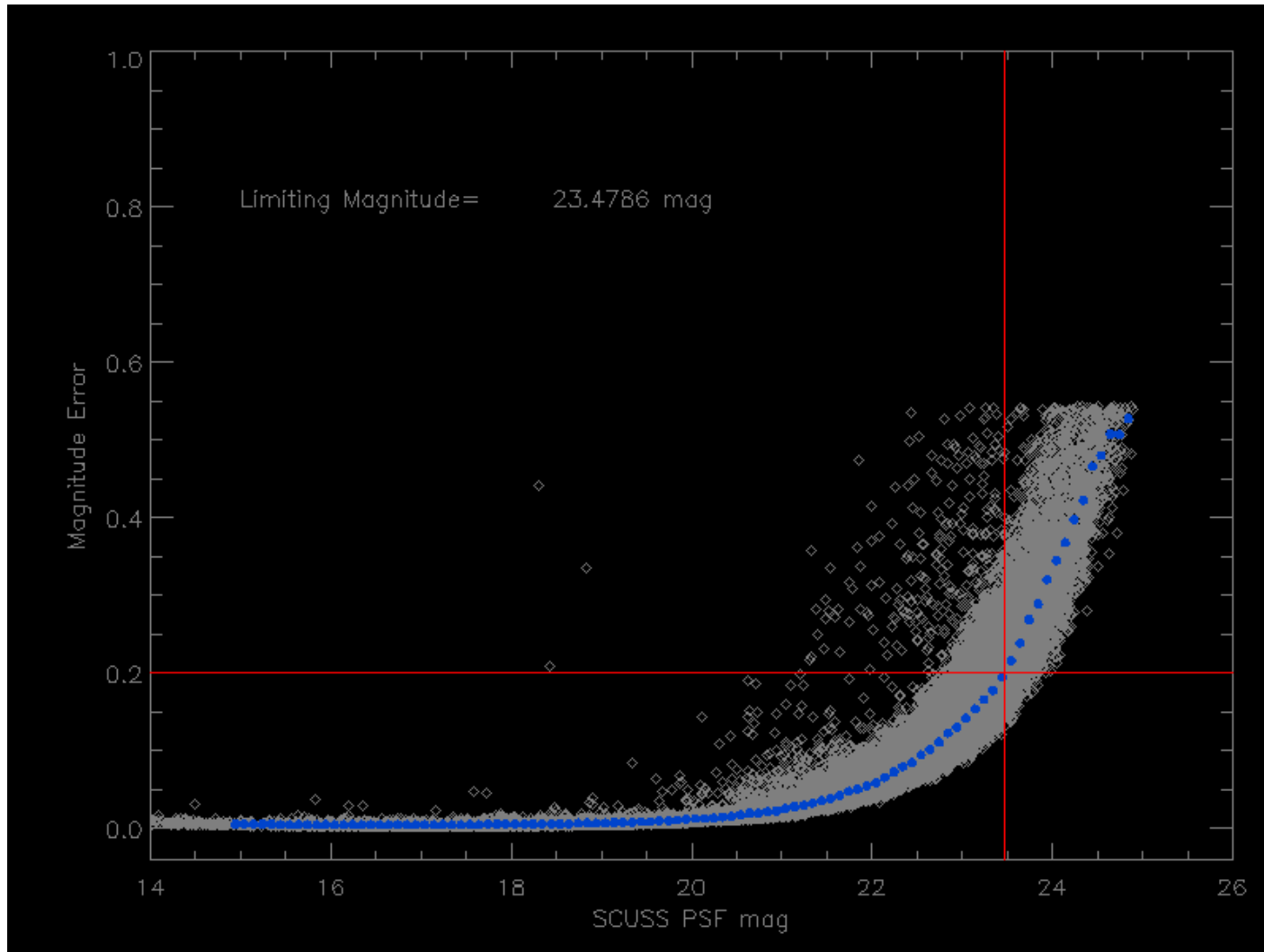


- criteria:
- 1: Bertin_g/s > 0.5 .and. DAO_sharpness > -10 .and. DAO_sharpness < 1
 - 2: Bertin_class = 0
 - 3: Bertin_mag < 18 .and. SDSS_PSF_mag < 18
 - 4: Bertin_mag_err < 0.5 .and. SDSS_PSF_mag_err < 0.5

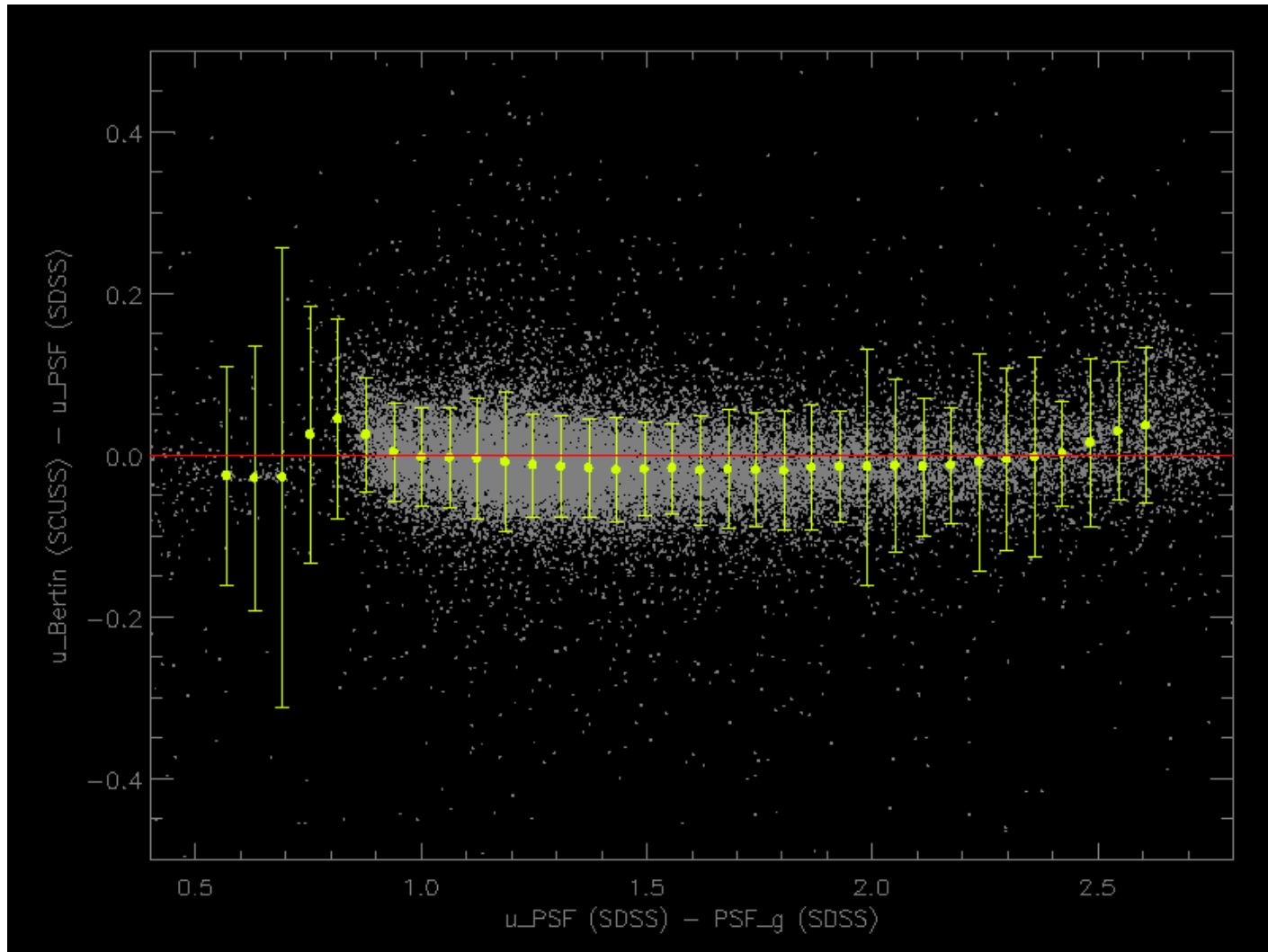
Limiting Magnitudes (S/N=5)



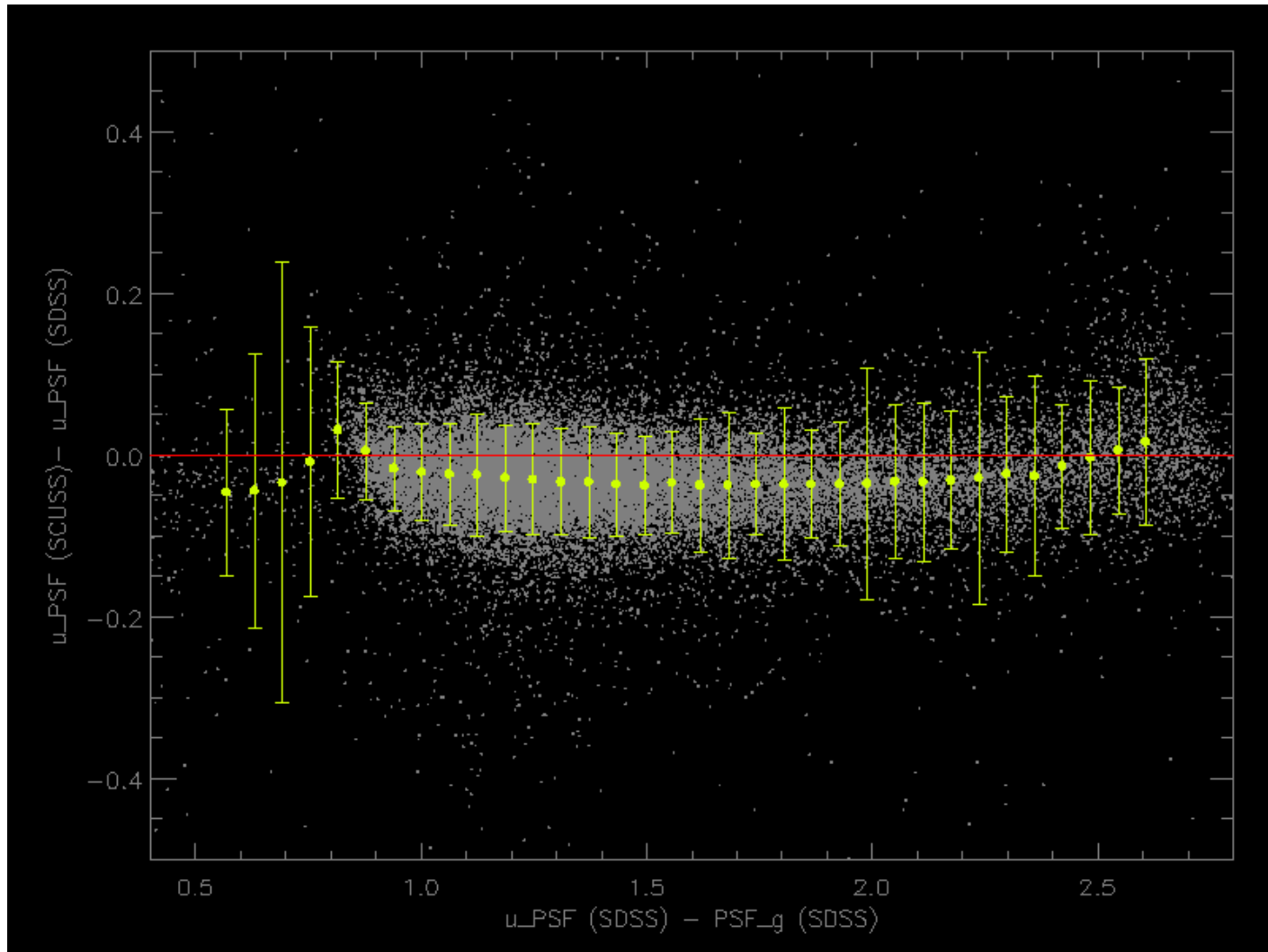
Limiting Magnitudes (S/N=5)



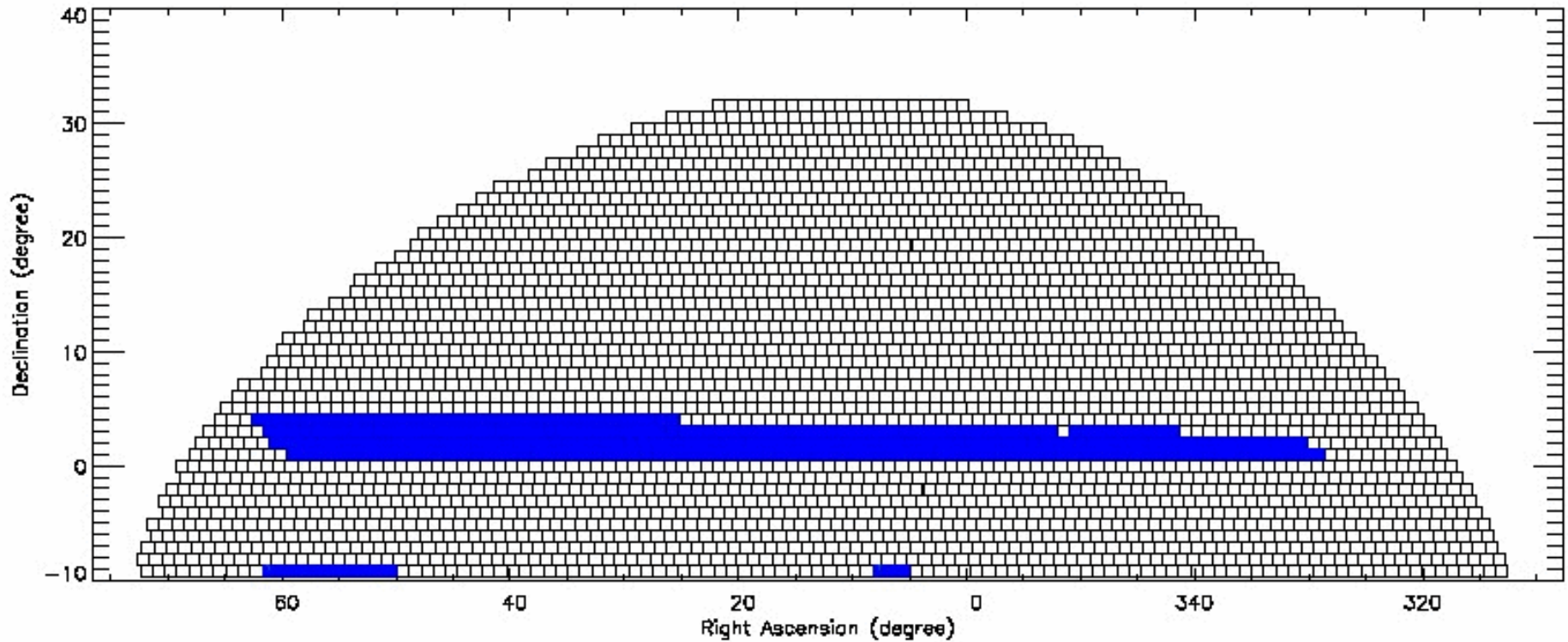
Limiting Magnitudes (S/N=5)



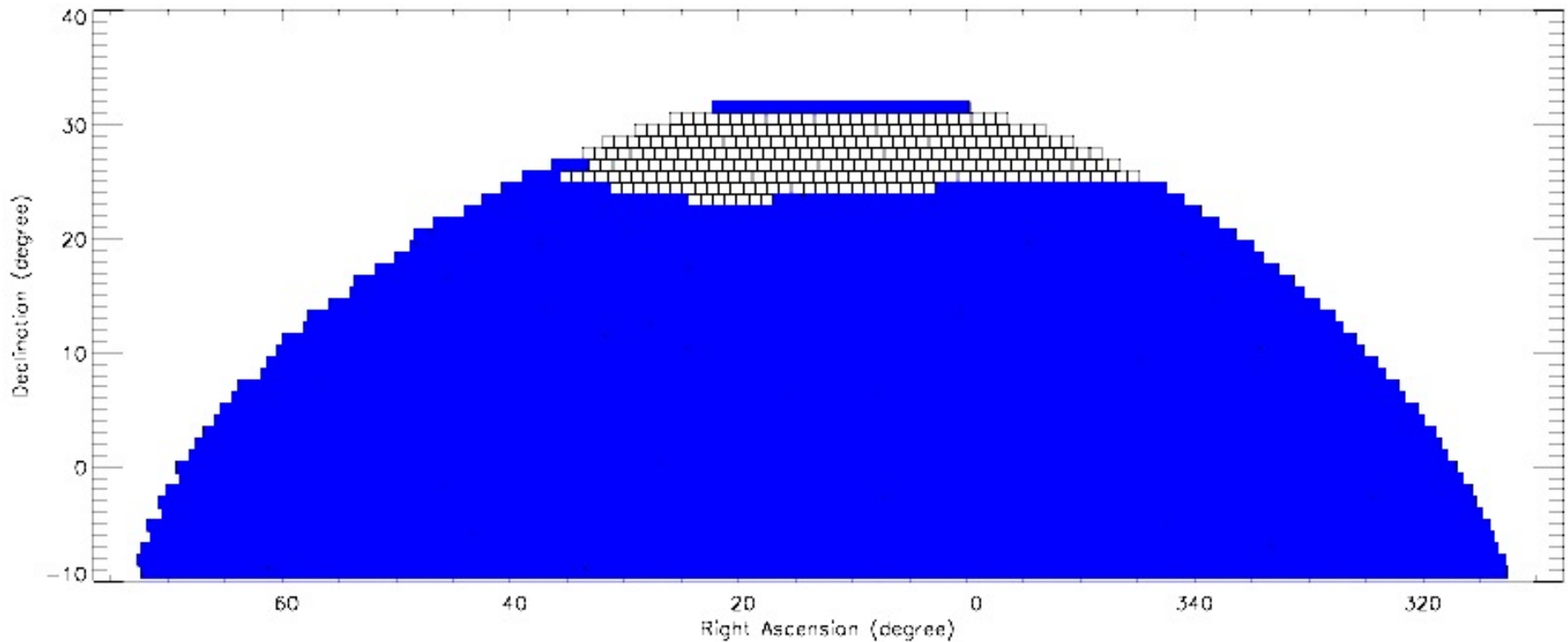
Limiting Magnitudes (S/N=5)



The Suvery Coverage So Far ...

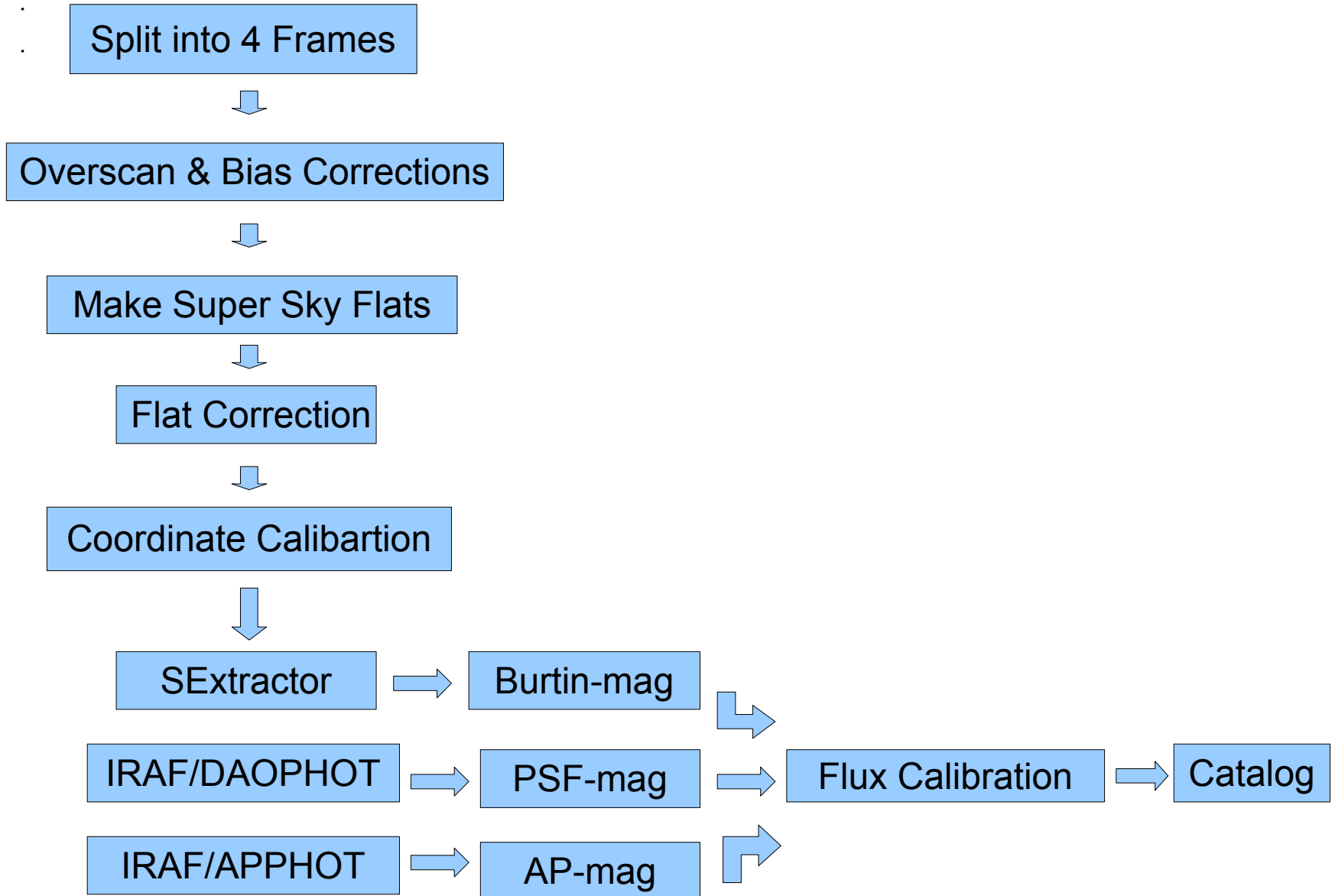


The Suvery Coverage So Far ...



90% of the total footprint has been done!

Data Reduction Pipeline



Our Final Catalogue

Mark, RA, DEC, RA(degree), DEC(degree)

DAO_psf_mag, DAO_psf_mag error, Aperture mag, mag_err, Bertin_mag, Bertin_mag error

n_observed times, CCD observed, DAO_sharpness, Bertin_g/s, a_axis, ellipticity, theta, Bertin_class

SDSS ID

SDSS psf u, SDSS psf u error, SDSS model u, SDSS model u error, u_ext

SDSS psf g, SDSS psf g error, SDSS model g, SDSS model g error, g_ext

SDSS psf r, SDSS psf r error, SDSS model r, SDSS model r error, r_ext

SDSS psf i, SDSS psf i error, SDSS model i, SDSS model i error, i_ext

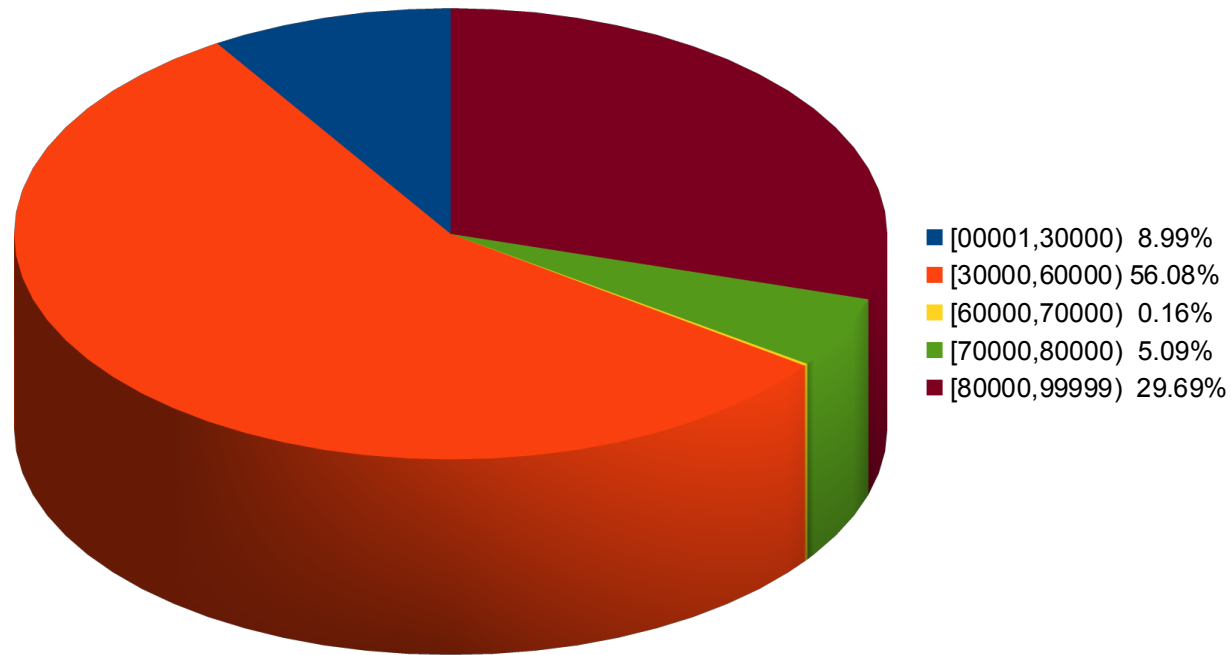
SDSS psf z, SDSS psf z error, SDSS model z, SDSS model z error, z_ext

distance of SCUSS source and SDSS source

下面为星表中的一行：

```
30859 03:30:06.745 07:42:53.78 1093.25 706.20 1092.70 706.25 214.95 21.953 0.062 -0.26 214.52 21.954 0.072 0.70 2.44 0.28 -47.5 0
2 330 0.23 215.08 4.15 22.754 0.087 22.458 0.086 22.203 0.083 22.046 0.086 22.160 0.124 22.531 0.219 22.967 0.439 22.784 0.478 21.833
0.267 19.945 0.065 19.607 0.063 19.560 0.095 03:30:06.742 07:42:53.55 1237673328684368085 s 21.387 0.135 21.447 0.145 1.473 20.488
0.026 20.467 0.022 1.084 19.937 0.023 19.947 0.021 0.786 19.740 0.031 19.737 0.027 0.596 19.569 0.070 19.590 0.070 0.423
```

Proportion of the Source Type



Total number >21,500,000

7,409,587(34.5%) have no SDSS matches!

1-30000: observed >2 and detections > 1 sigma;

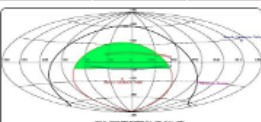
30001-60000: observed =2 and detections >1.4 sigma;

60001-70000: not enough observations, lower signal-to-noise ratio;

70000-80000: observed =1, source detection > 1.4 sigma;

80001-99999: not detected by us and the photometry is based on the SDSS positions.

Data Searching Web



- ▶ 数据集首页
- ▶ 关于数据
- ▶ 检索
- ▶ 元数据

The South Galactic Cap U-band Sky Survey Catalog

Update: 2011-9-5 22:17:07

The South Galactic Cap U-band Sky Survey is an international cooperative project between National Astronomical Observatories, Chinese Academy of Sciences and Steward Observatory, University of Arizona, USA. We plan to perform a sky survey of about 3700 square degree field of the south Galactic cap in U-band (3550 Å) with the 90 inch (2.3 m) Bok telescope, which belongs to the Steward Observatory, University of Arizona and it is located on the Kitt Peak. The telescope equipped with four 4K × 4K CCD mosaic (64-magapixel) and the field of view is 1.0316 deg × 1.0770 deg. The exposure time is 5 minutes and the limiting magnitude will reach about 23 mag (signal-to-noise = 5).

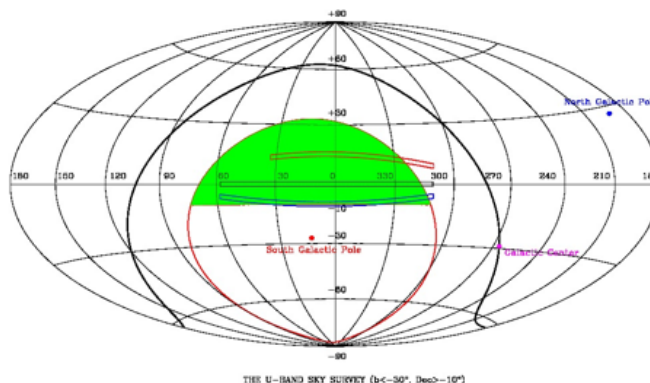
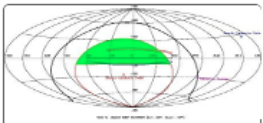


Fig.1 The green area is our U-band Sky Survey region. The black solid line is the Galactic plane and the three stripes are SDSS dr7 observations.

The project started in the summer of 2009 and the observations are being carried out from September 2010 to December 2012. The main aim is to supply a U-band catalog for LAMOST of China. SDSS III will supply the photometry in g (4100 Å), r (5500 Å), i (6940 Å), z (8470 Å) in the South Galactic cap. Combined with the photometry with these bands and our u-band, we can get the Spectral Energy Distributions (SEDs) of the sources in the south Galactic cap from 3550 Å to 8470 Å.

Data Searching Web



- ▶ 数据集首页
- ▶ 关于数据
- ▶ 检索
- ▶ 元数据

首页 :: 数据 :: 南银冠U波段巡天星表

catalogbv1

Catalog, include SDSS DR8(Rows: 8402860)

输出选项

格式 数量

基本检索

天体 半径
天体坐标 格式为deg或hh:mm:ss dd:mm:ss
例如: 254.00002 -87.43165 或 16:56:00.004 -87:25:53.94

Search

Reset All

完整检索

Show Sort	Column	Constraint	UCD	Description
☒ ☐	objID		meta.id;meta.main	Unique SDSS identifier
☒	RAHMS	hh:mm:ss	meta.id;pos.eq.ra	Right Ascension of the object (ICRS), hh:mm:ss
☒	DEDMS	dd:mm:ss	meta.id;pos.eq.dec	Declination of the object (ICRS), dd:mm:ss
☒	RA	deg	meta.id;pos.eq.ra	Right Ascension of the object (ICRS), deg
☒	DE	deg	meta.id;pos.eq.dec	Declination of the object (ICRS), deg
☒	n			
☒	psf_mag	mag	phot.mag	PSF magnitude
☒	e_psf_mag	mag	stat.error;phot.mag	Mean error on PSF magnitude
☒	sharpness			Sharpness
☒	aperture_phot	mag	phot.mag	Aperture photometric magnitude
☒	e_aperture_phot	mag	stat.error;phot.mag	Mean error on Aperture photometric magnitude
☒	sex_mag	mag	phot.mag	SExtractor magnitude
☒	e_sex_mag	mag	stat.error;phot.mag	Mean error on SExtractor magnitude

A man with glasses and a striped shirt is sitting in a chair at a desk, smiling. The desk is cluttered with two large computer monitors, a keyboard, a mouse, and various papers. One monitor displays a web page with a blue header, and the other shows a galaxy image. A laptop is open on the right side of the desk. In the background, there are shelves with binders and three CRT monitors. A blue thought bubble with red text is positioned above the man's head.

Thank you and China-V0!

<http://batc.bao.ac.cn/Uband/>