



FLITECAM: Interim Commissioning Report

SUG, April 28, 2014

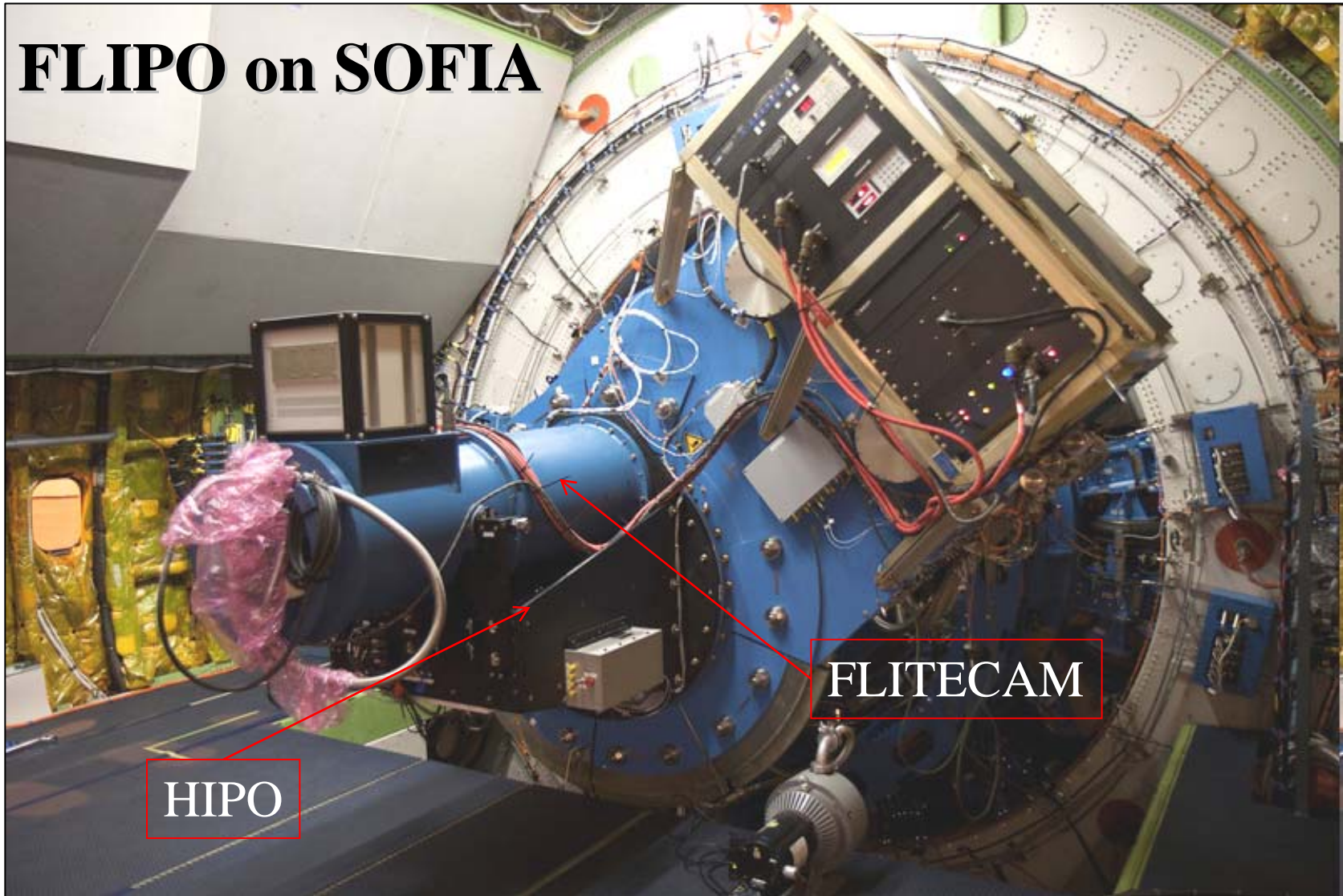
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University of California, Los Angeles

FLITECAM SUMMARY

- **FLITECAM is a camera & spectrometer for 1-5 microns.**
- **Detector:** 1 megapixel (1024x1024) InSb (ALADDIN III).
- **Image Scale:** ~0.475 arcsec per pixel; circular field ~8 arcmin.
- **Filters:** JHKLM broad-band, and selected narrow-bands (1%-4%).
- **Spectroscopy:** 3 direct-ruled KRS5 gratings; an aperture mask with a pair of long slits, either 1" or 2" in width and each 60" in length.
- **Resolving power:** $R \sim 1,800$ for the 1" slit.
- *FLITECAM can be stand-alone, or co-mounted with HIPO.*
- **First flight** - October 2011; **Second flight** - September 2013
- **During February 2014 FLITECAM was commissioned successfully in FLIPO mode, co-mounted with HIPO.**
- ✓ McLean, I. S. *et al.* 2006, Proc. SPIE, 6269, 168.
- ✓ Smith, E.C.D. & McLean, I. S. 2008, Ap. J., 676, 408.

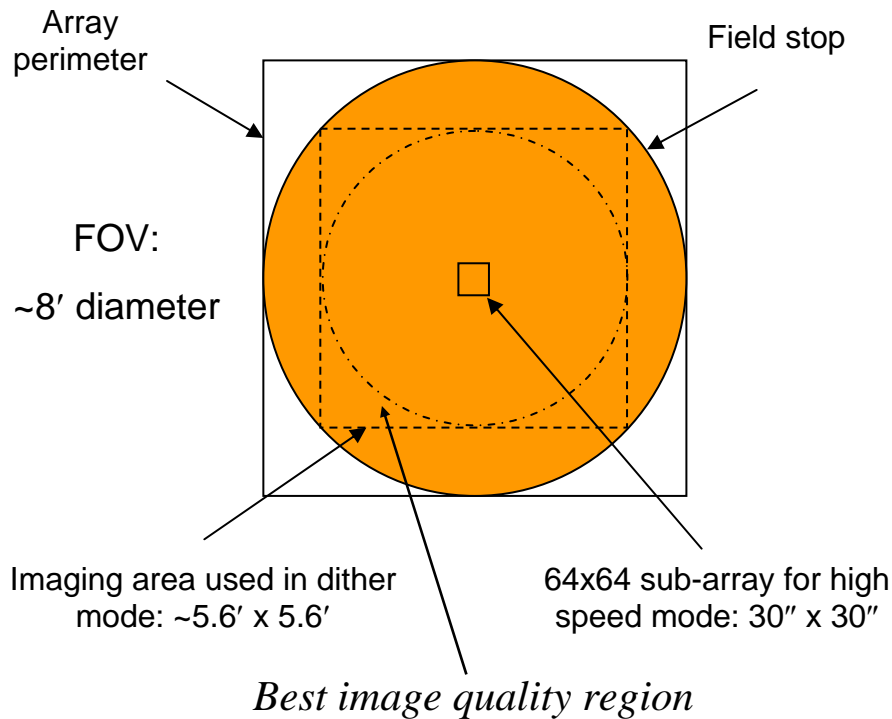
FLIPO on SOFIA



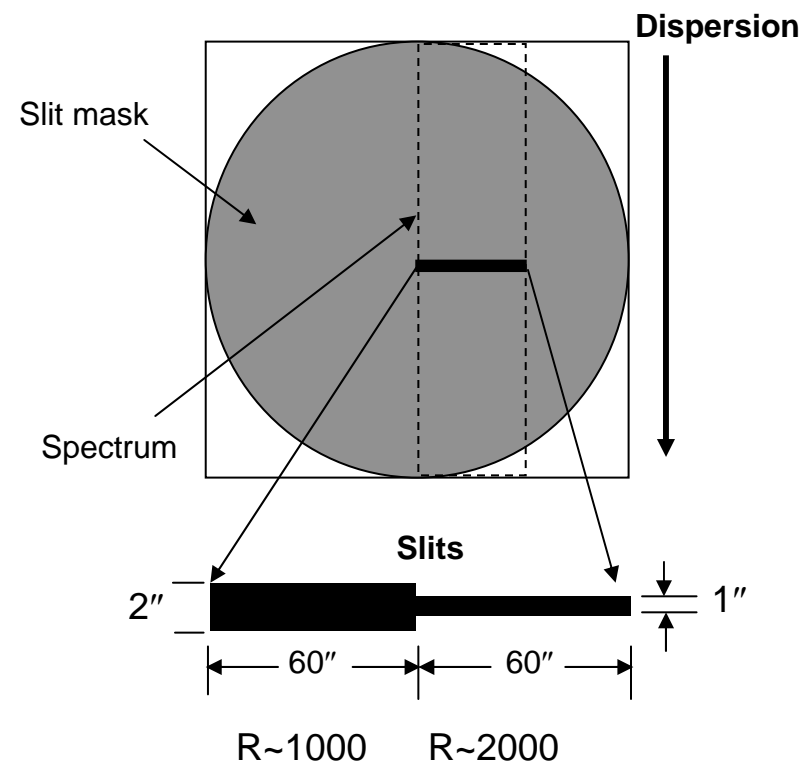
Layout for Imaging and Spectroscopy

InSb Detector Format: 1024 x 1024 pixels Pixel size on sky: 0.475" x 0.475"

IMAGING



SPECTROSCOPY



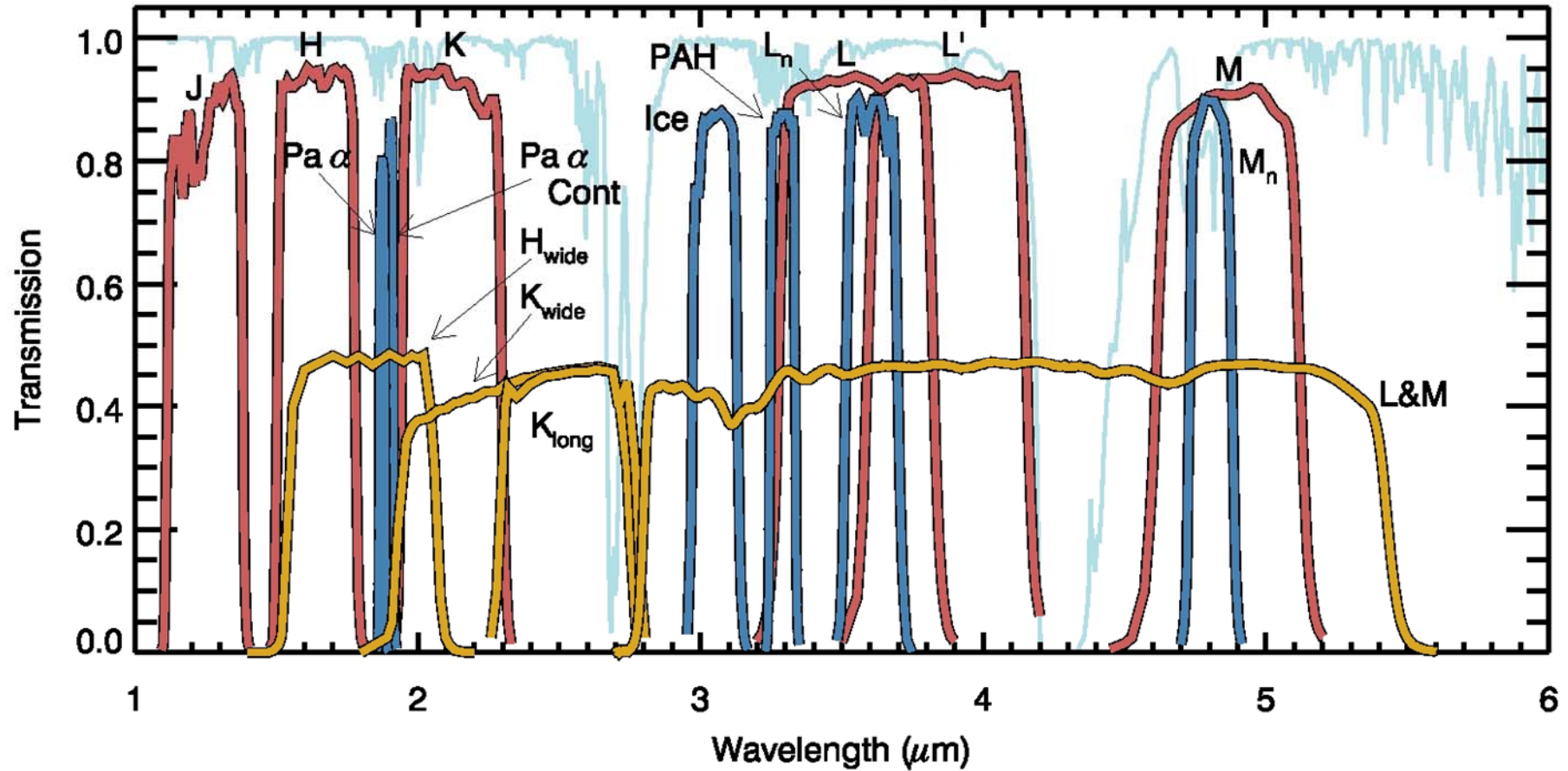
The detector has poor performance in the corners.

FLITECAM FILTER SET

Filter Wheel 1	Filter Wheel 2
blank/dark (77 K)	Blank/dark (77 K)
Open	Open
J	Paschen-alpha (1.88 μm)
H	A grism – spectroscopy
K	Paschen-alpha (continuum 1.9 μm)
L'	Narrow Band L (3.6 μm)
L	B grism – spectroscopy
M	Ice (3.08 μm)
Hwide	PAH (3.29 μm)
Kwide	Narrow Band M (4.6 μm)
Klong	C grism – spectroscopy
L&M	N/A

FLITECAM FILTER PASSBANDS

FLITECAM Imaging Filters



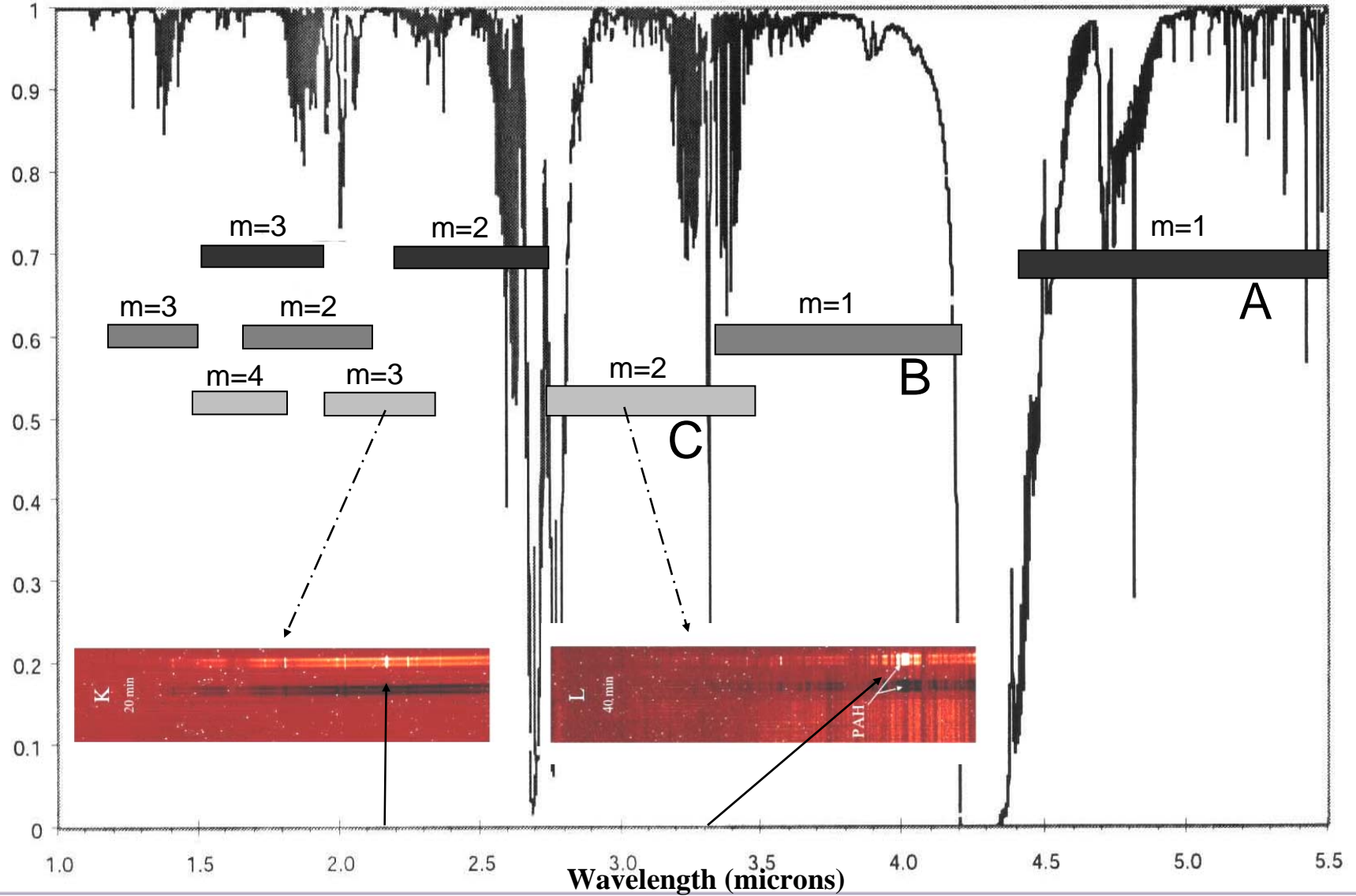
Order-sorting filter (OSF) passbands

Start, Center and End wavelengths for each passband are given in microns

Grism	lines/mm	Order (m)	OSF	Start	Center	End
A	162.75	1	LM	4.395	4.96	5.533
A	162.75	2	Klong	2.216	2.5	2.784
A	162.75	3	Hwide	1.497	1.69	1.877
B	217	1	LM	3.307	3.73	4.16
B	217	2	Hwide	1.649	1.86	2.076
B	217	3	J	1.14	1.28	1.424
C	130.2	2	LM	2.756	3.11	3.467
C	130.2	3	Kwide	1.872	2.11	2.346
C	130.2	4	H	1.445	1.62	1.801

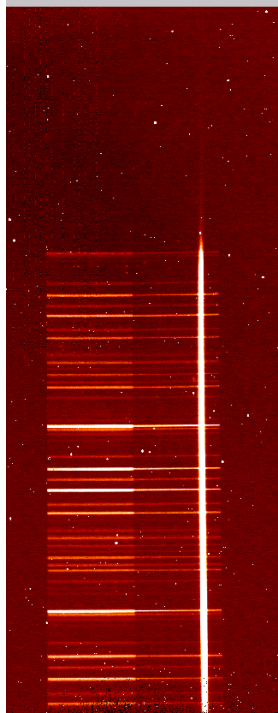
Spectral coverage is displayed pictorially in the next slide.

FLITECAM GRISM SPECTRAL COVERAGE

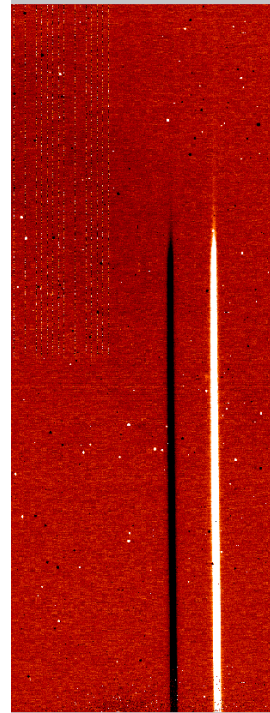


Example of Spectroscopy Mode

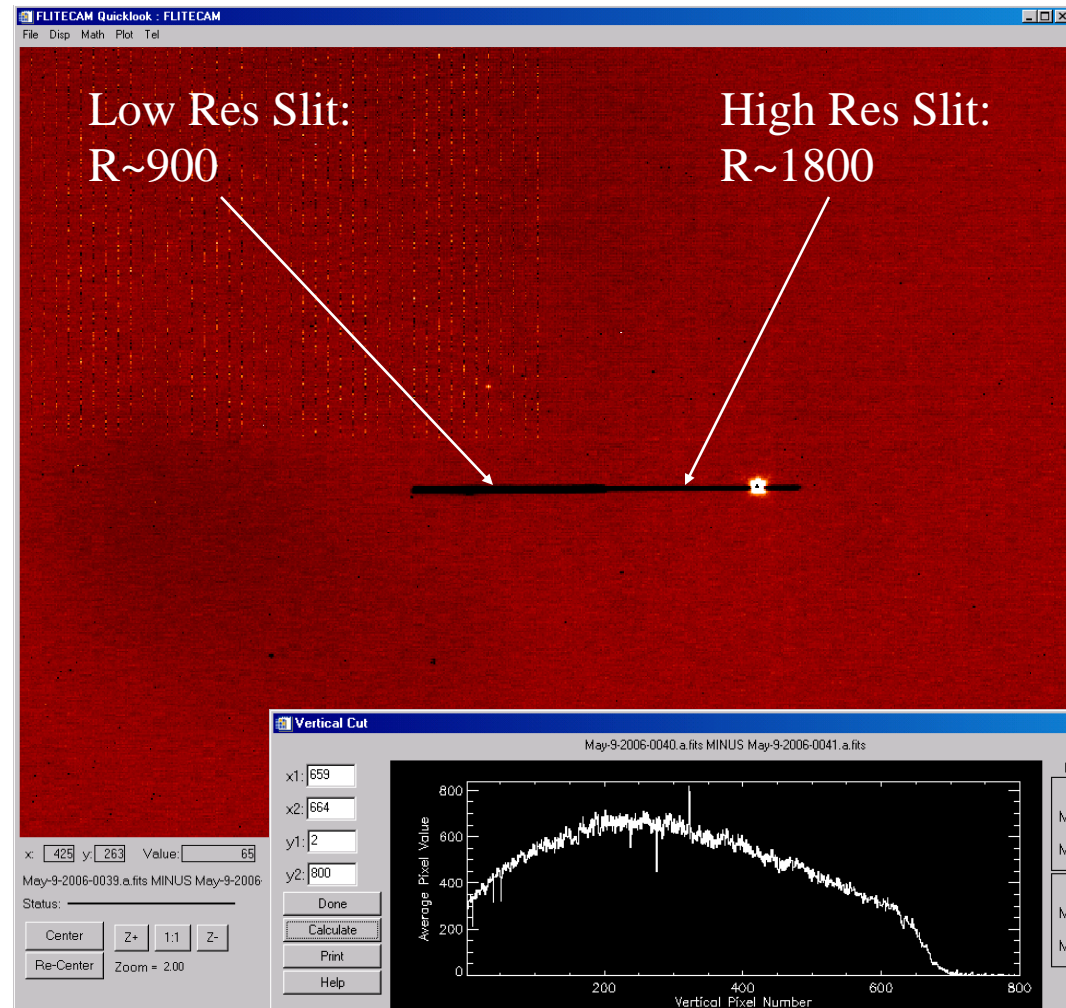
H band spectrum of a star; 120 s



Raw



Nod 2



Commissioning – February 2014



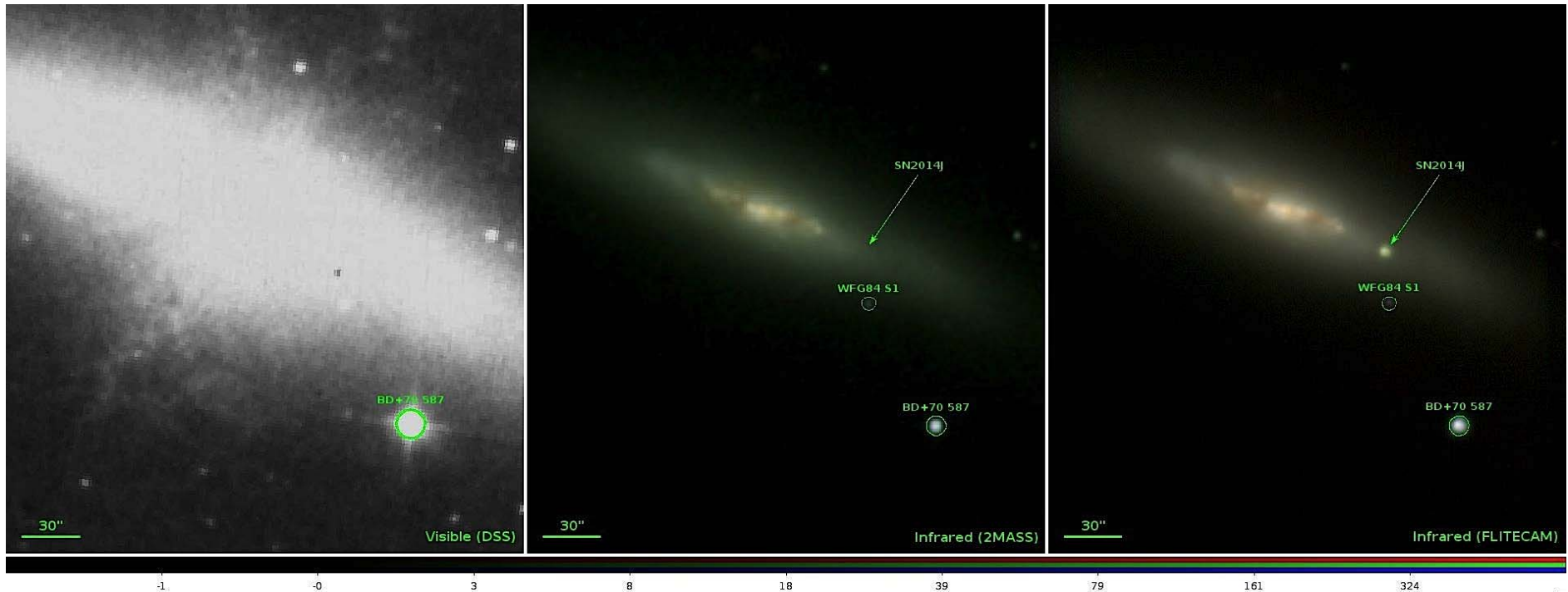
Main Goals for Commissioning

Data analysis is still in progress

- Boresight definitions: imaging, hi- and lo- res spectroscopy
- Repeatability; effect of LOS re-winds
- Focus; offset relative to HIPO
- Dither/tracking control for imaging
- Nodding along slit; nodding off and onto slit
- Precise photometry – effects of shear layer
- Sensitivity tests – standard stars
 - Measurements in all filters, if possible
 - Measurements in all grisms, if possible
- Sky Backgrounds
- Sky flats, Gate Valve flats, wavelength calibration, linearity
- Extended object imaging

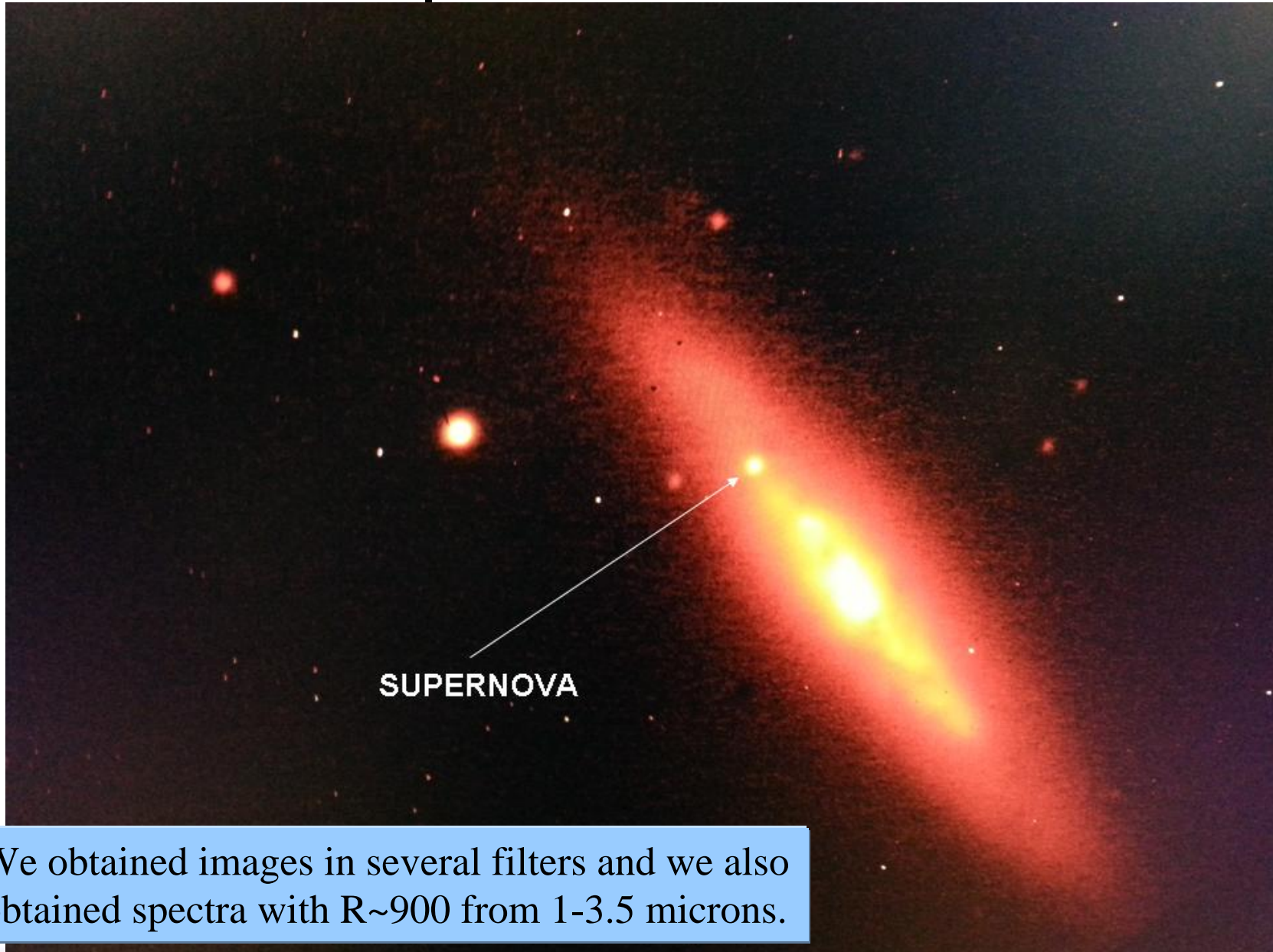
A Few Results

Images of M82 – FLITECAM JHK composite on right



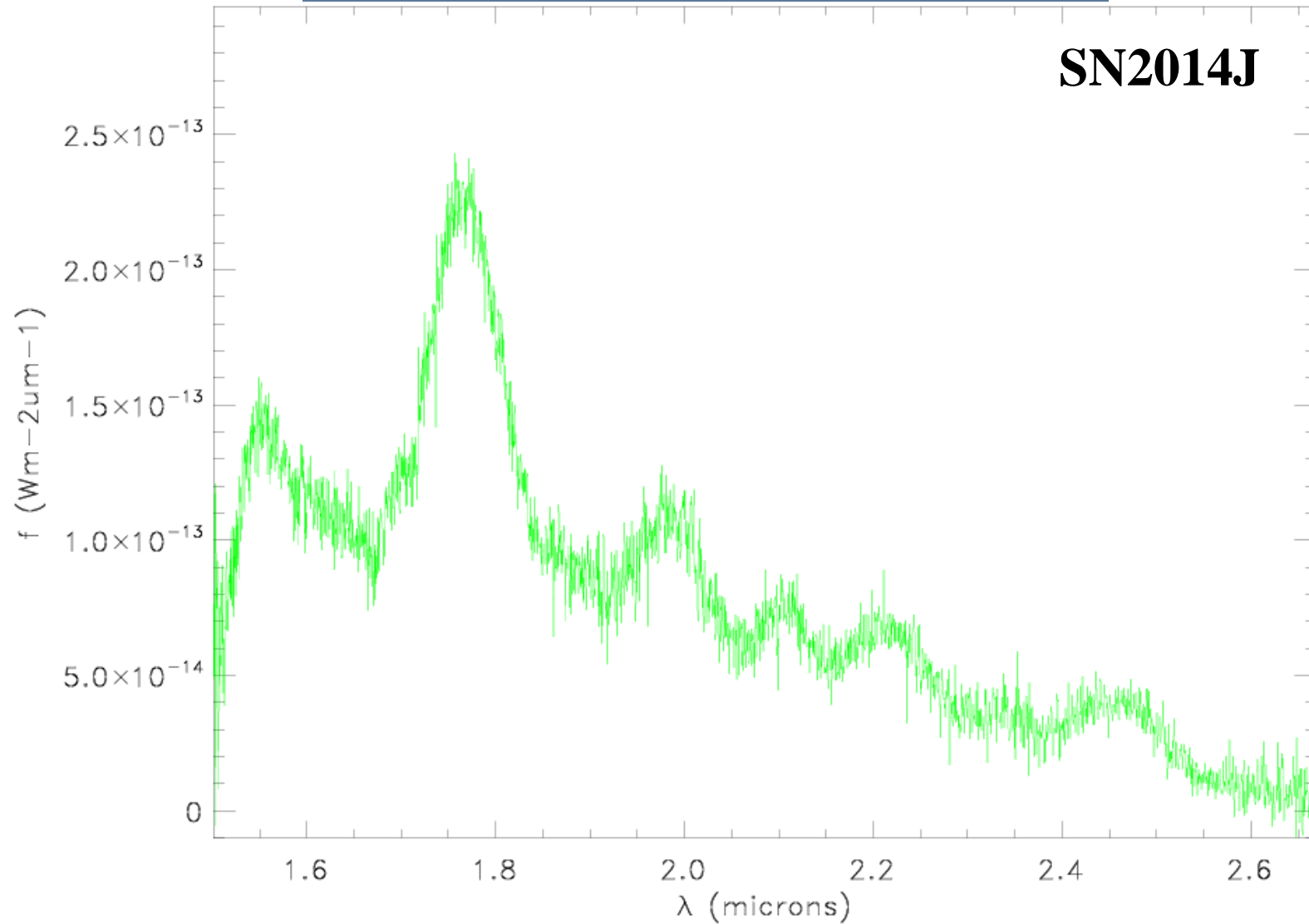
The first two images above show the central portions of M82 prior to the supernova explosion. The right image shows **supernova SN2014J** taken by the FLITECAM instrument on the SOFIA on February 20, 2014.

Supernova 2014J in M82



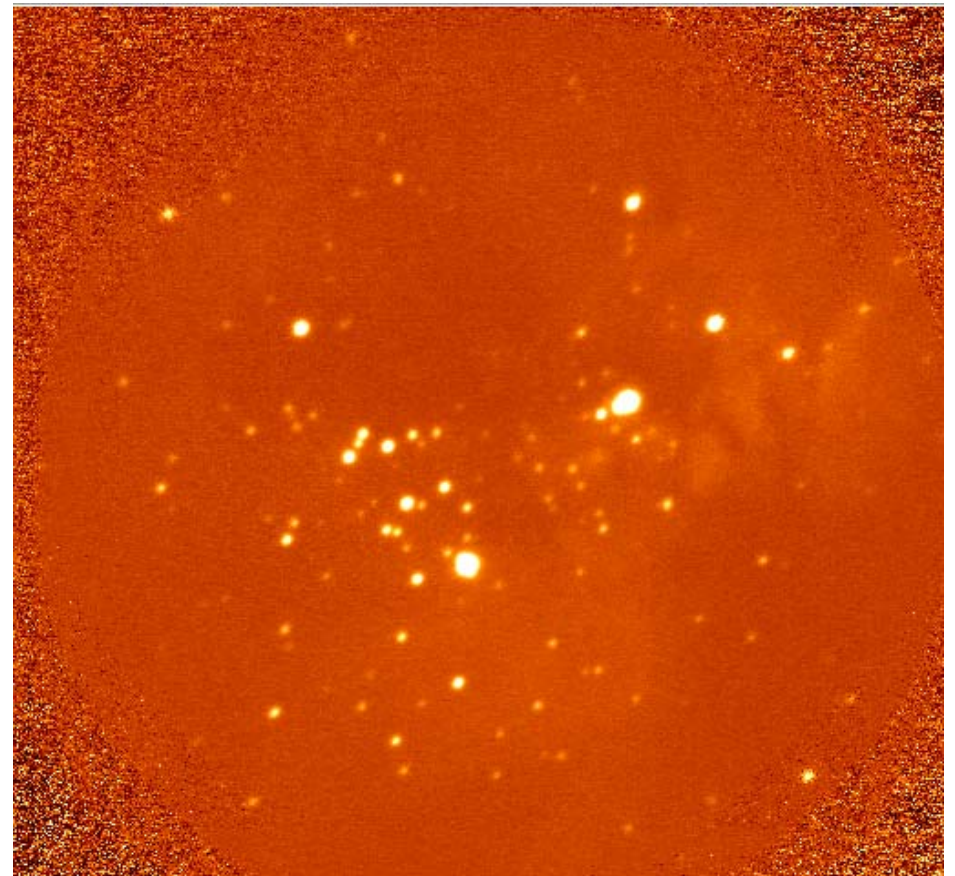
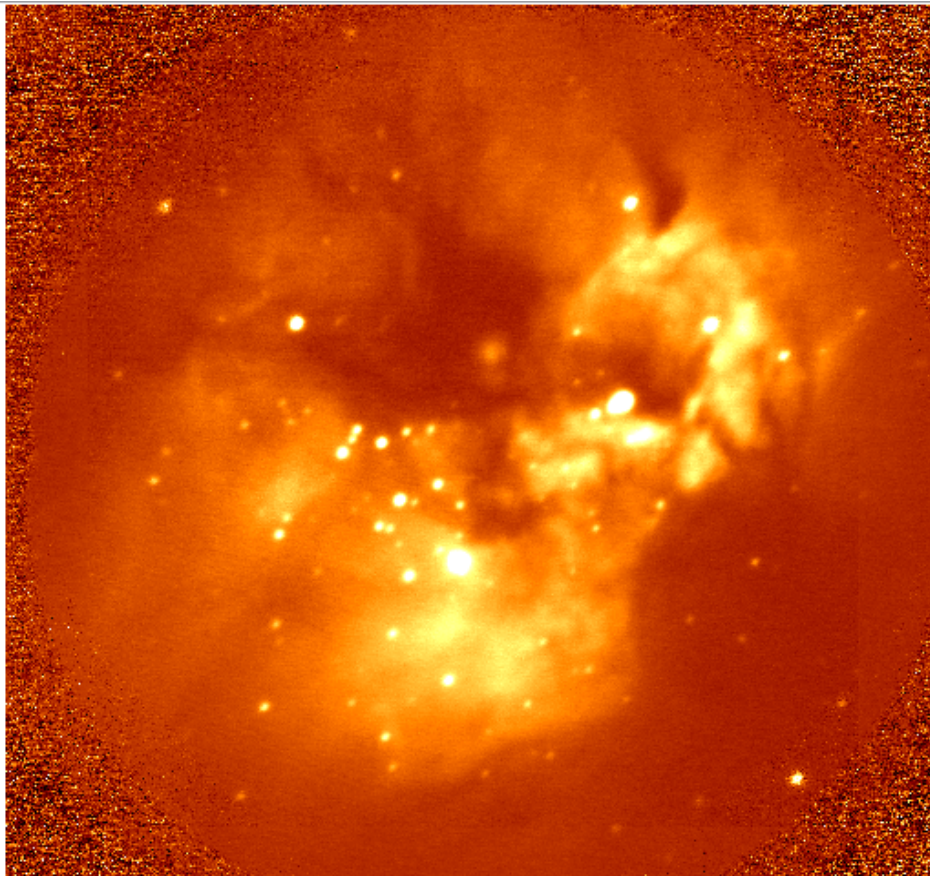
We obtained images in several filters and we also obtained spectra with R~900 from 1-3.5 microns.

Reduced spectrum of SN2014J produced by Bill Vacca.



Extended object imaging

Reduced images: on and off Paschen-alpha emission in NGC2024



Sarah Logsdon, Ian McLean (UCLA)

CURRENT STATUS

- Instrument is currently at UCLA
- Working towards an **Acceptance Review** in July, 2014
- Data analysis in progress
 - Pipeline development for imaging and spectroscopy
 - Release of SN2014J data
 - Release of data to Guest Investigators
 - PI team working on “results” paper for SPIE in June
- Next FLIPO run in November 2014