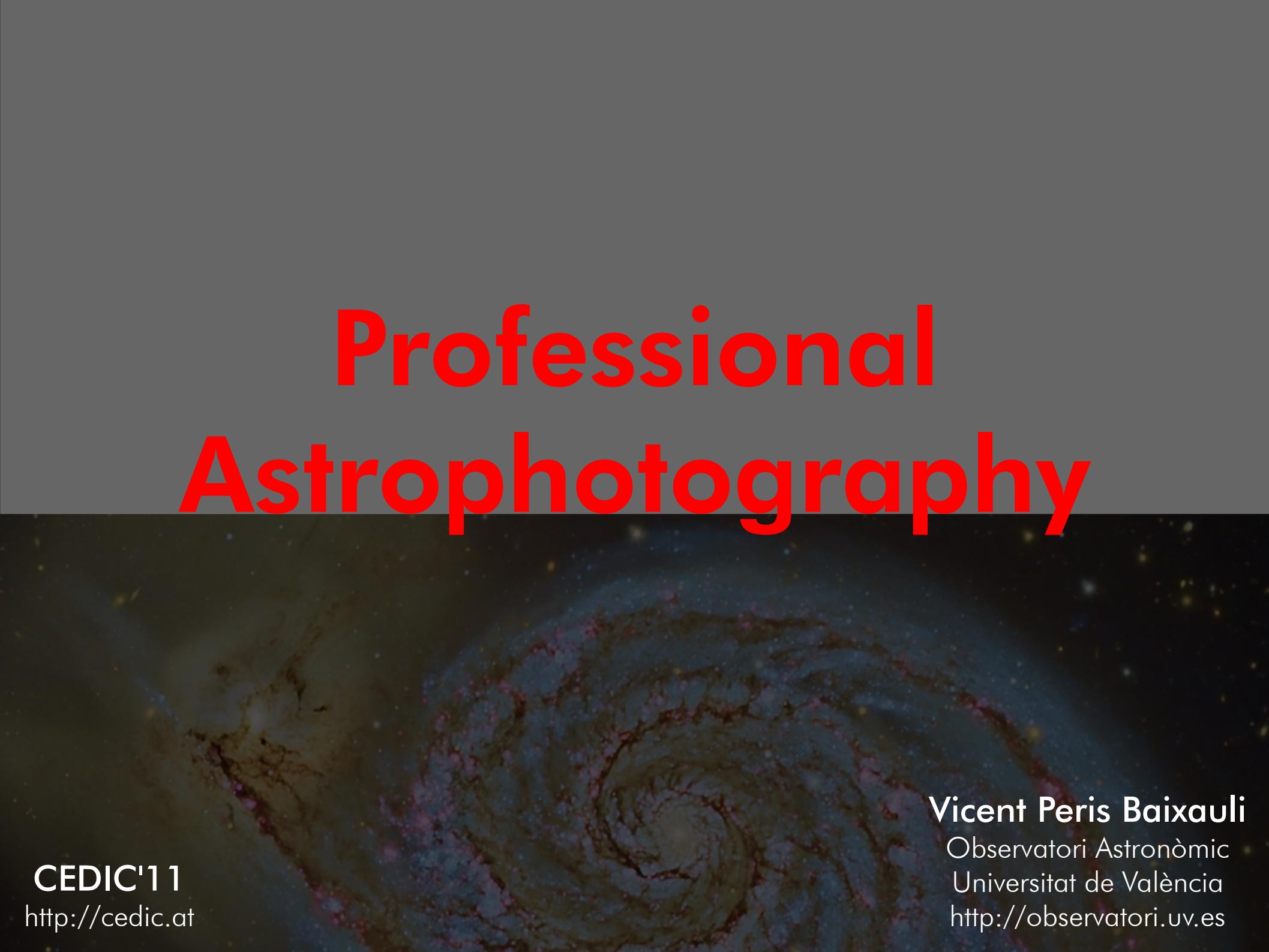


# Professional Astrophotography



**CEDIC'11**  
<http://cedic.at>

**Vicent Peris Baixauli**  
Observatori Astronòmic  
Universitat de València  
<http://observatori.uv.es>



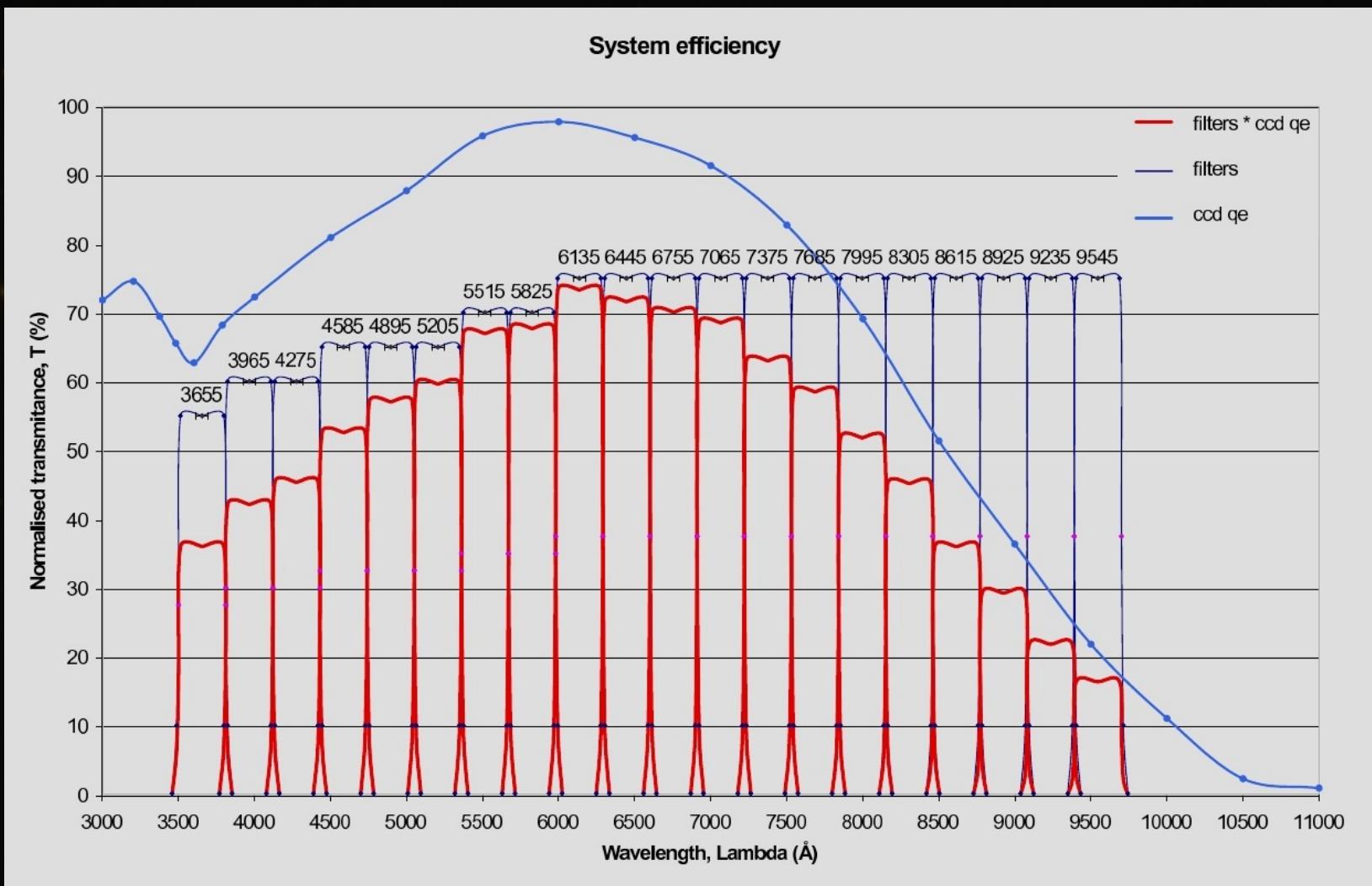
**NGC 6363**

Vicent J. Martínez (OAUV), Rodney Smith (Cardiff Univ.), Fernando J. Ballesteros (OAUV), Vicent Peris (OAUV)



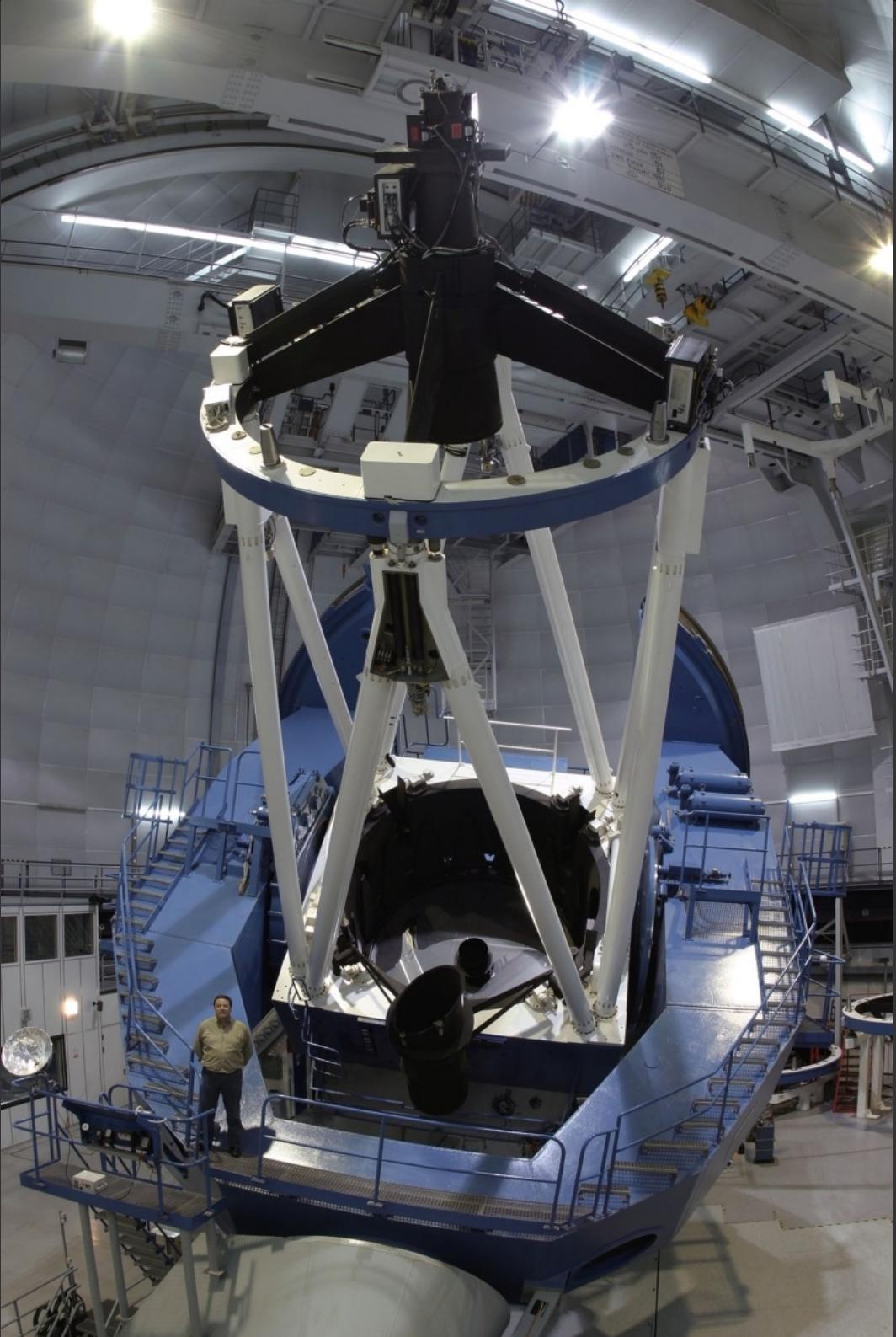
## ALHAMBRA Survey

Mariano Moles (CEFCA) / Vicent Peris (OAU)





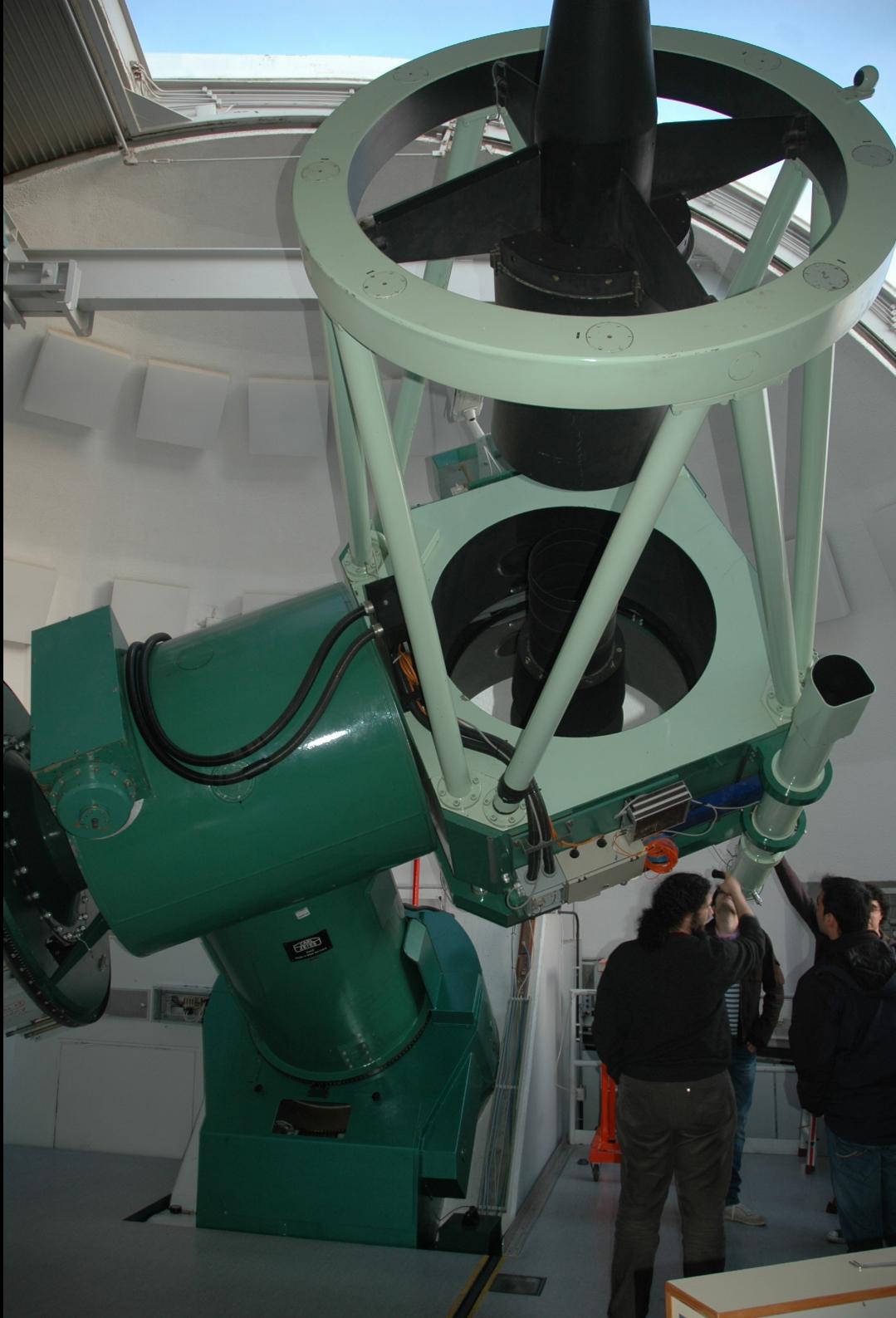
**3.5 meter telescope  
with LAICA camera (4x16 mp)  
at primer focus (f3.9)**



A large telescope, likely the 1.23-meter telescope at Calar Alto Observatory, is shown mounted on a complex green metal truss structure. The telescope's main body is a dark grey or black cylindrical tube. The truss structure is made of thick, curved beams forming a triangular frame. In the background, there are other pieces of equipment and a window with a grid pattern. The overall scene is dimly lit, suggesting an indoor or shaded observatory setting.

# 1.23 Meter Telescope at Calar Alto Observatory

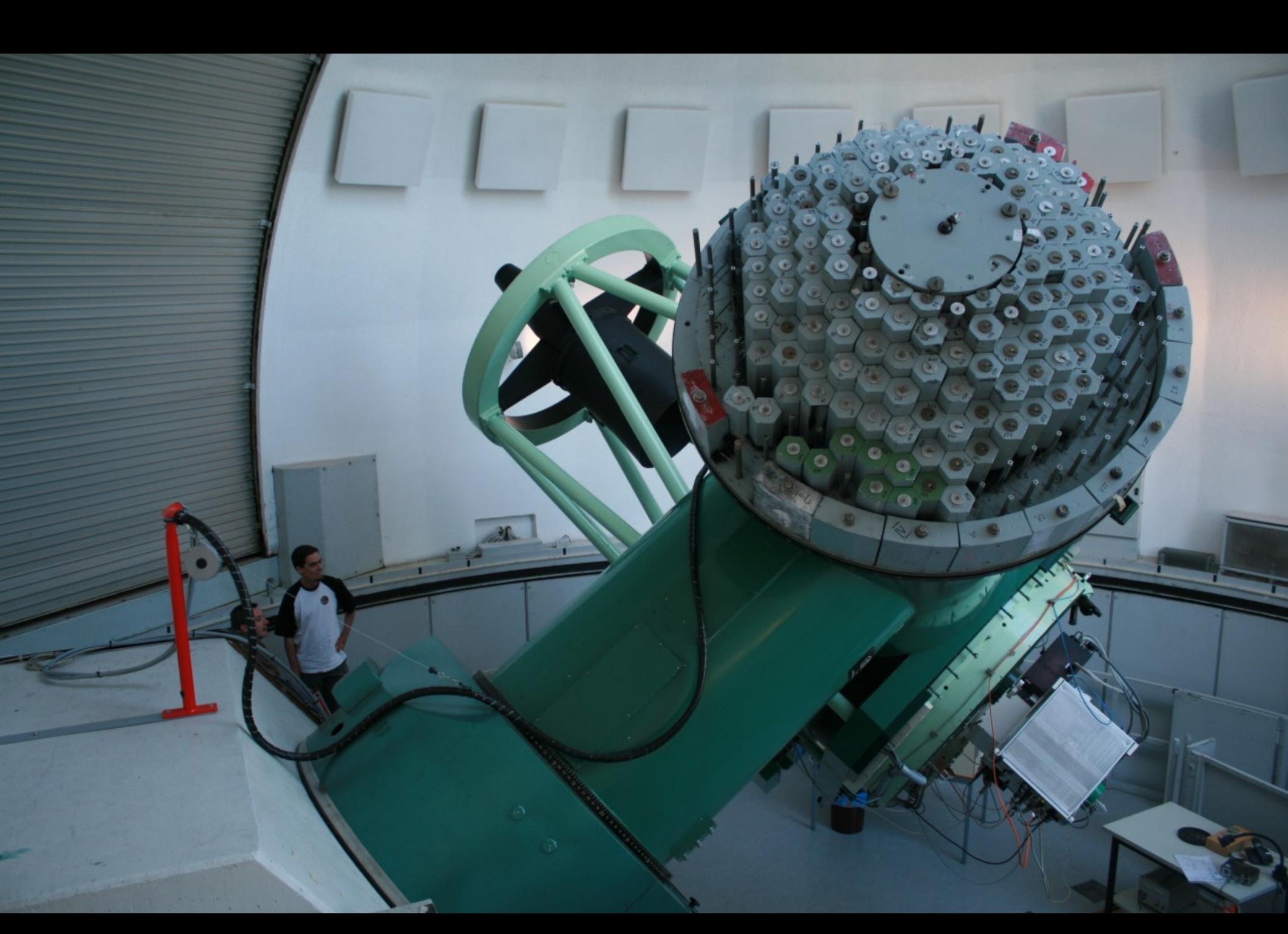


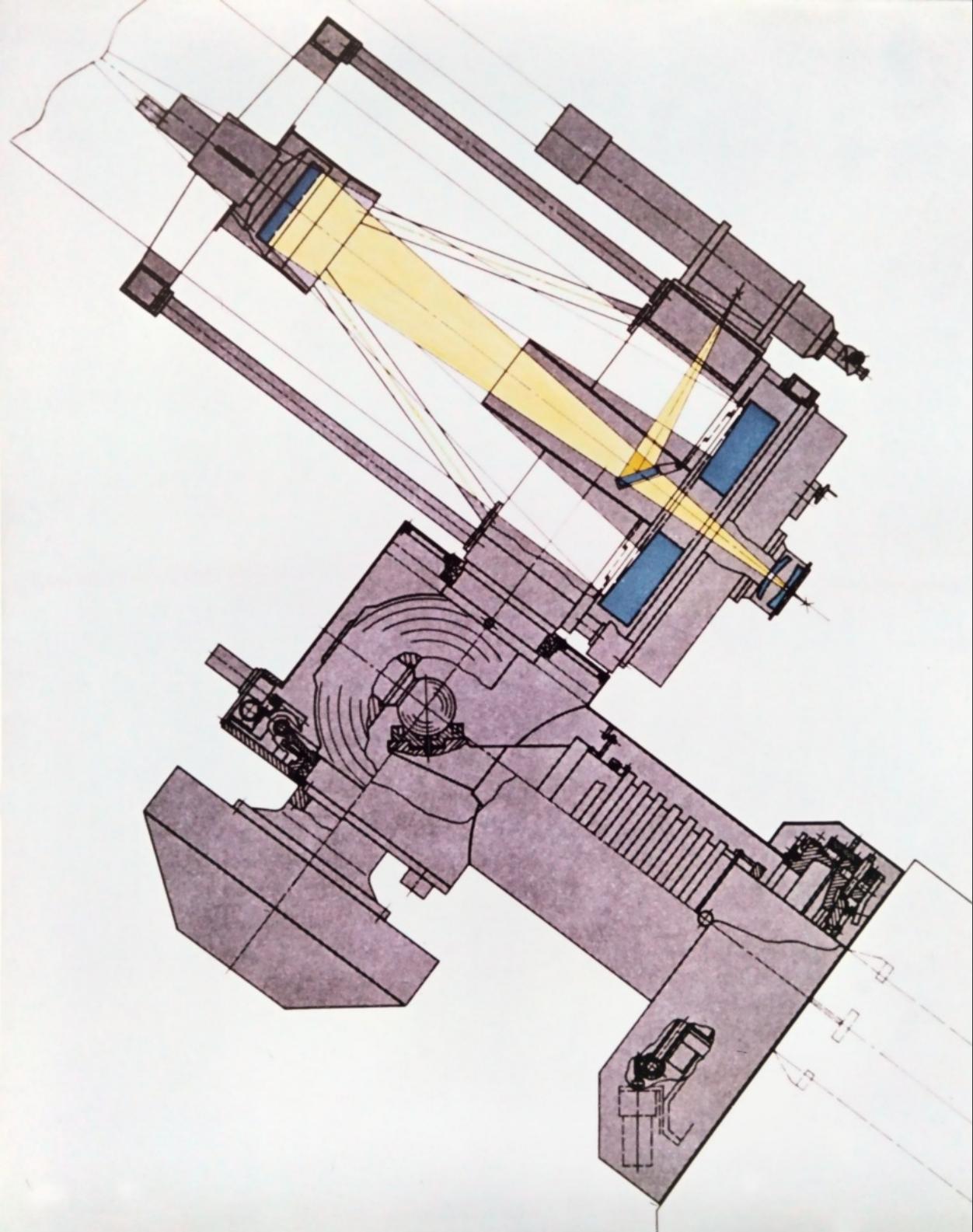


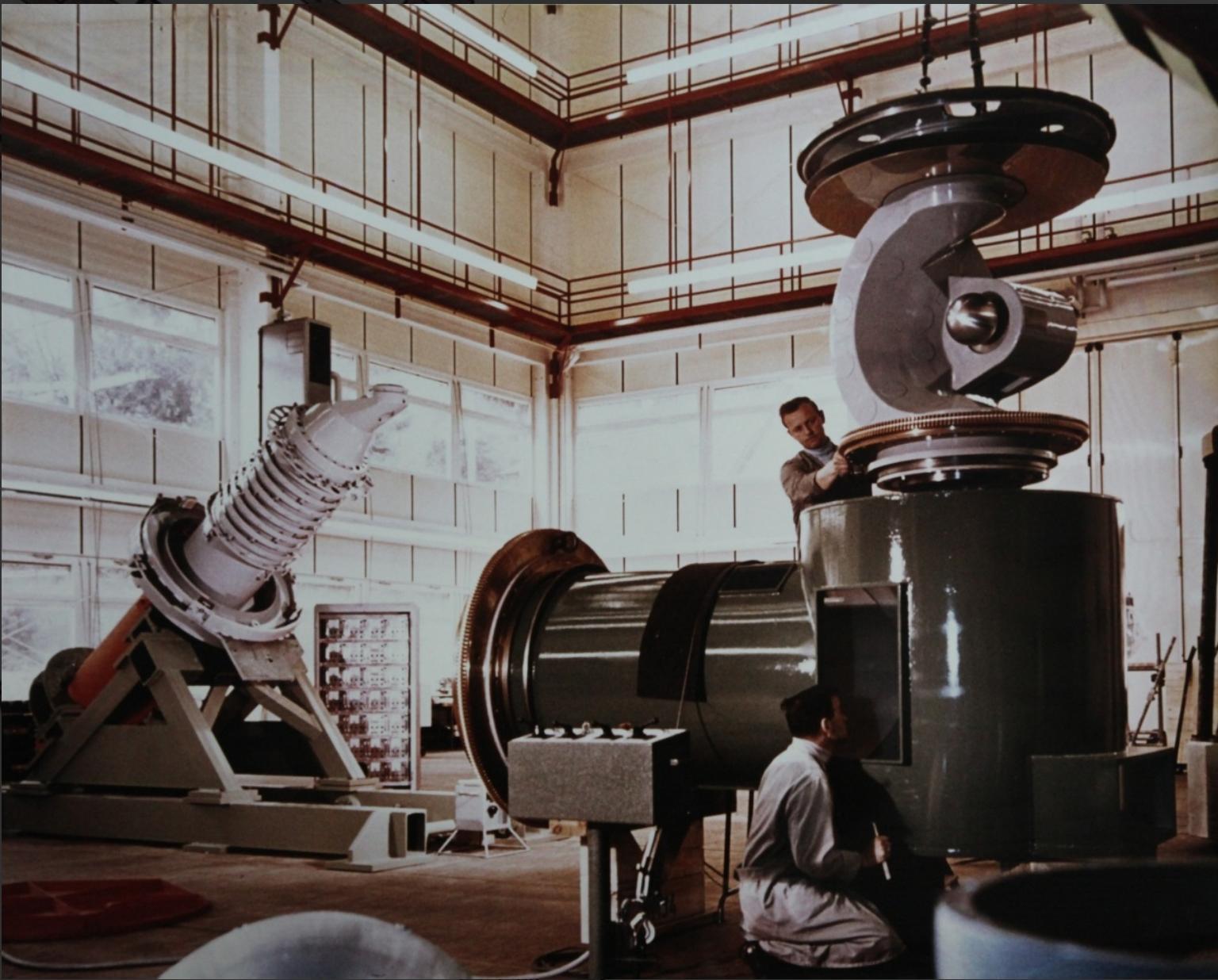
## Telescope Main Facts:

- Aperture: 1230 mm
- Focal length: 9857 mm ( $f/8$ )
- Central Obscuration: 582 mm  
(23% of primary mirror area)
- Eff. coll. Area:  $0.92 \text{ m}^2$
- Focal plane diameter: 257 mm
- Field of view diameter: 90 arcmin

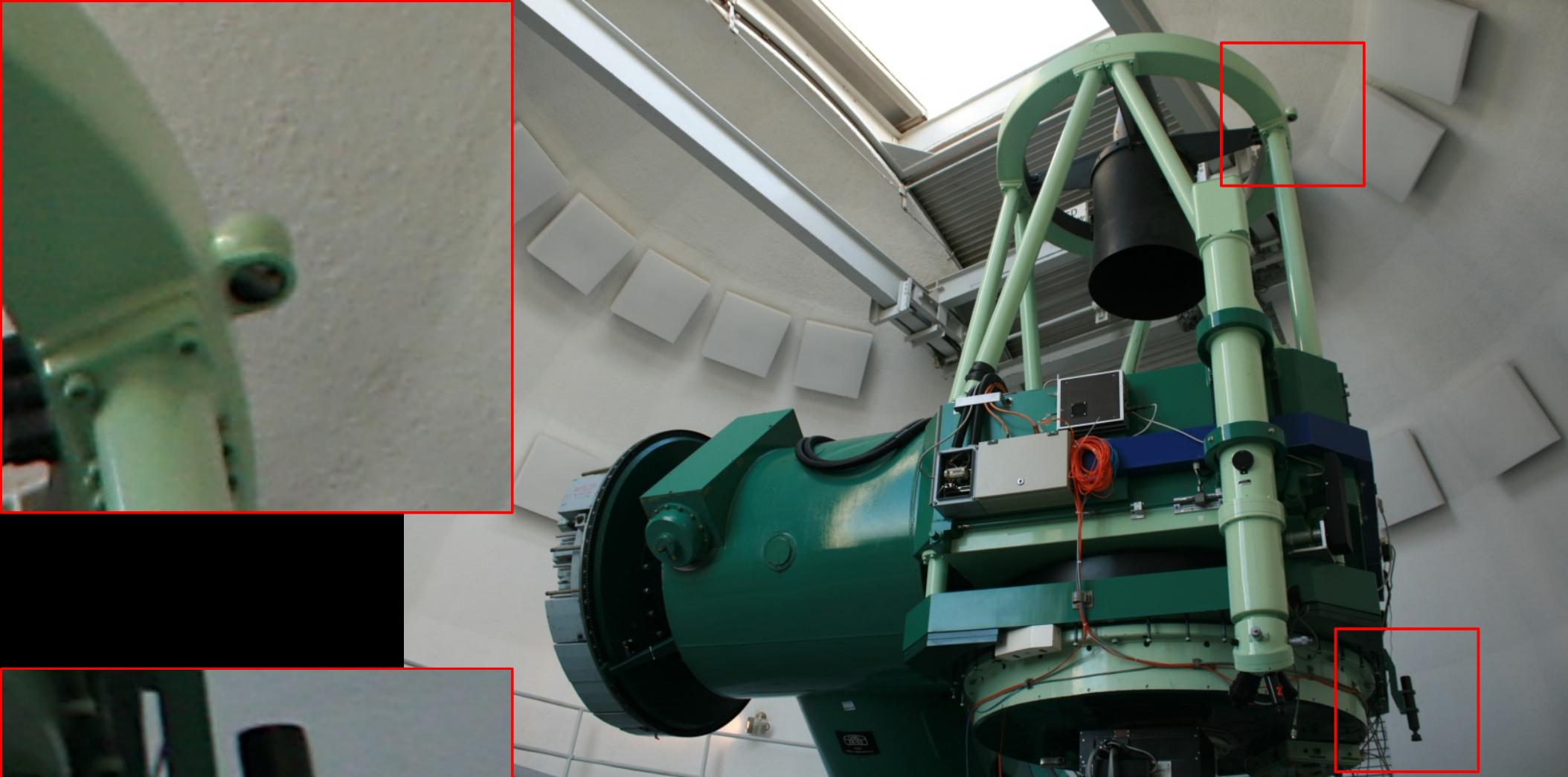












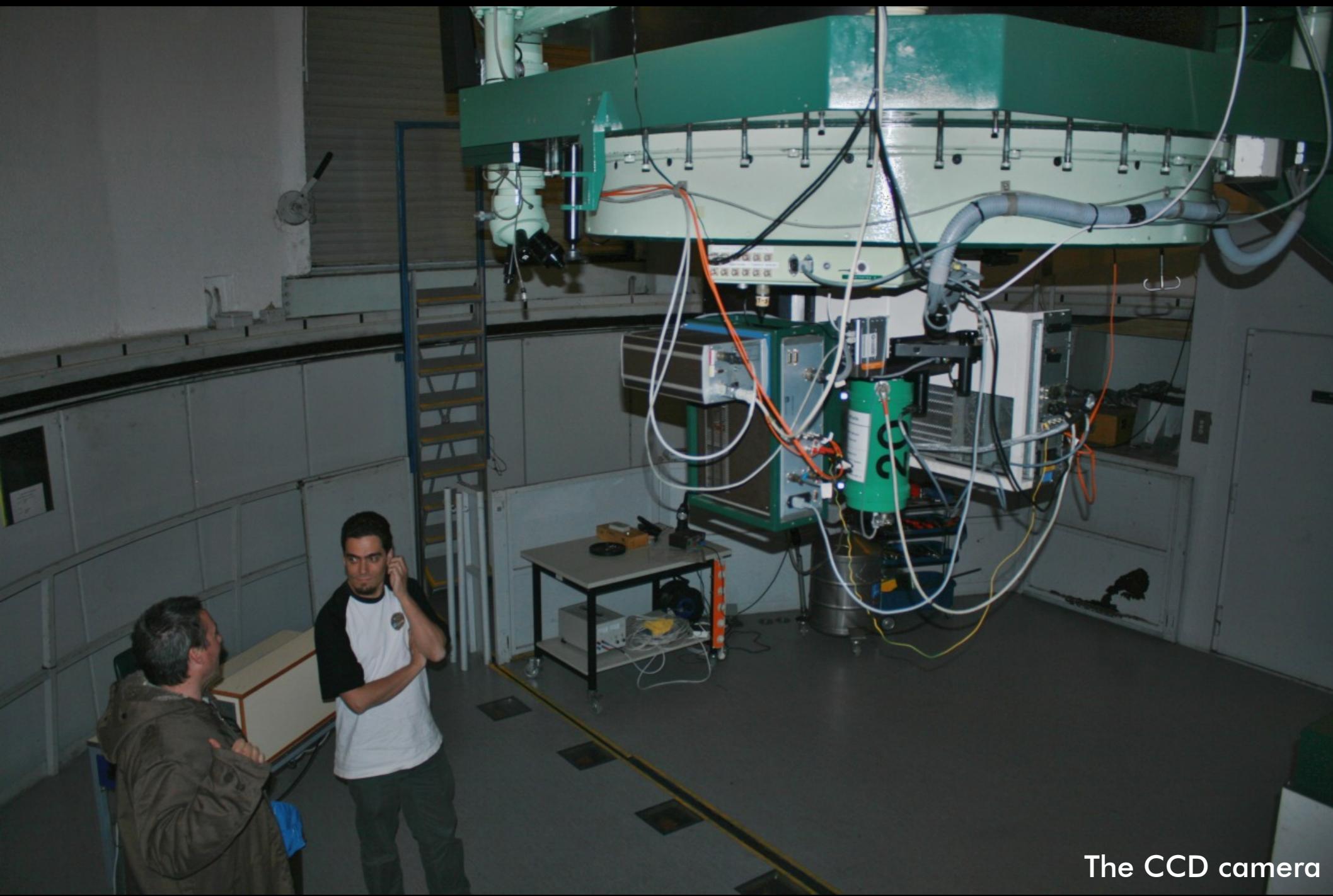
Old visual focuser



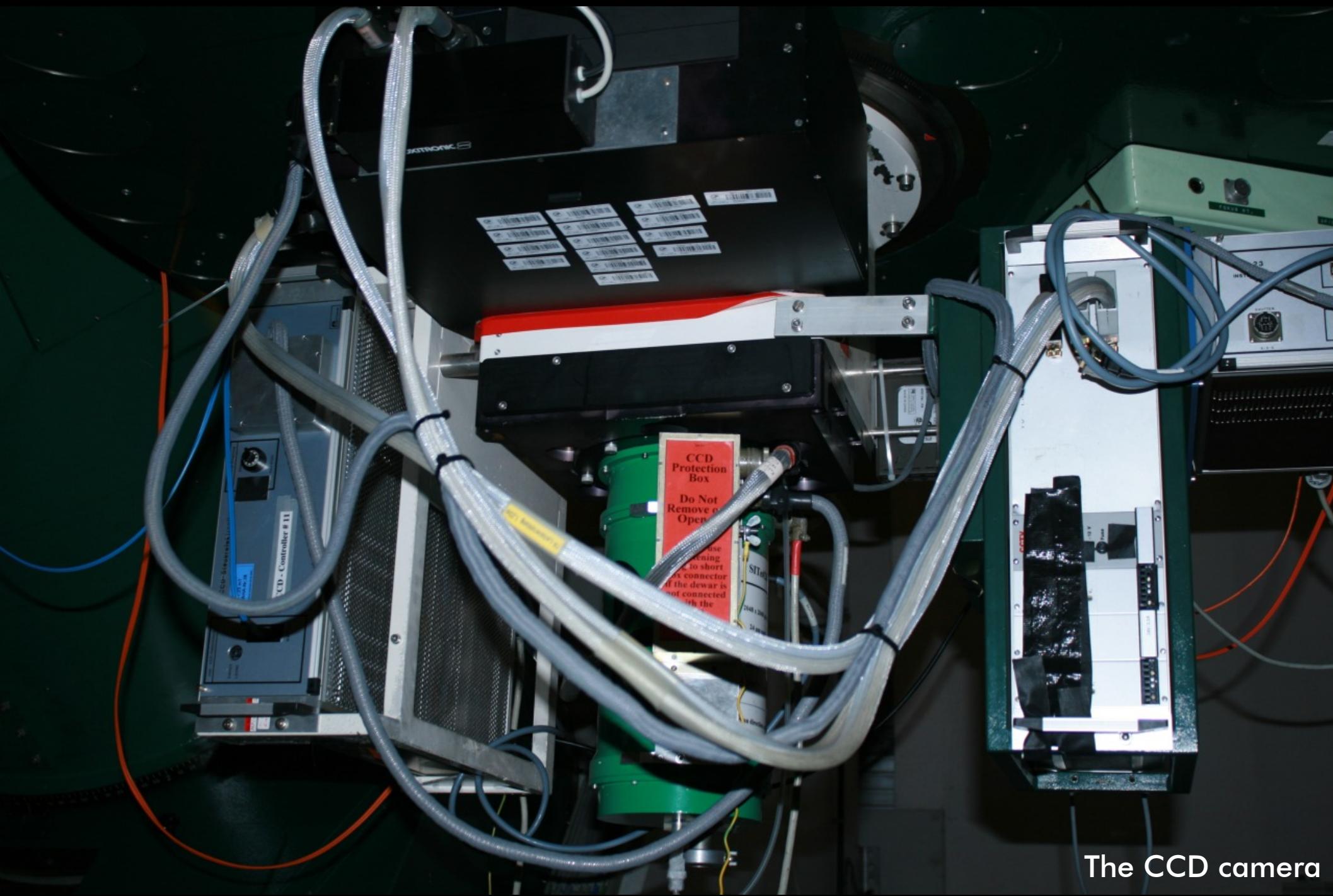
Field corrector and old photometric filters



"Star Trek" like control board



The CCD camera



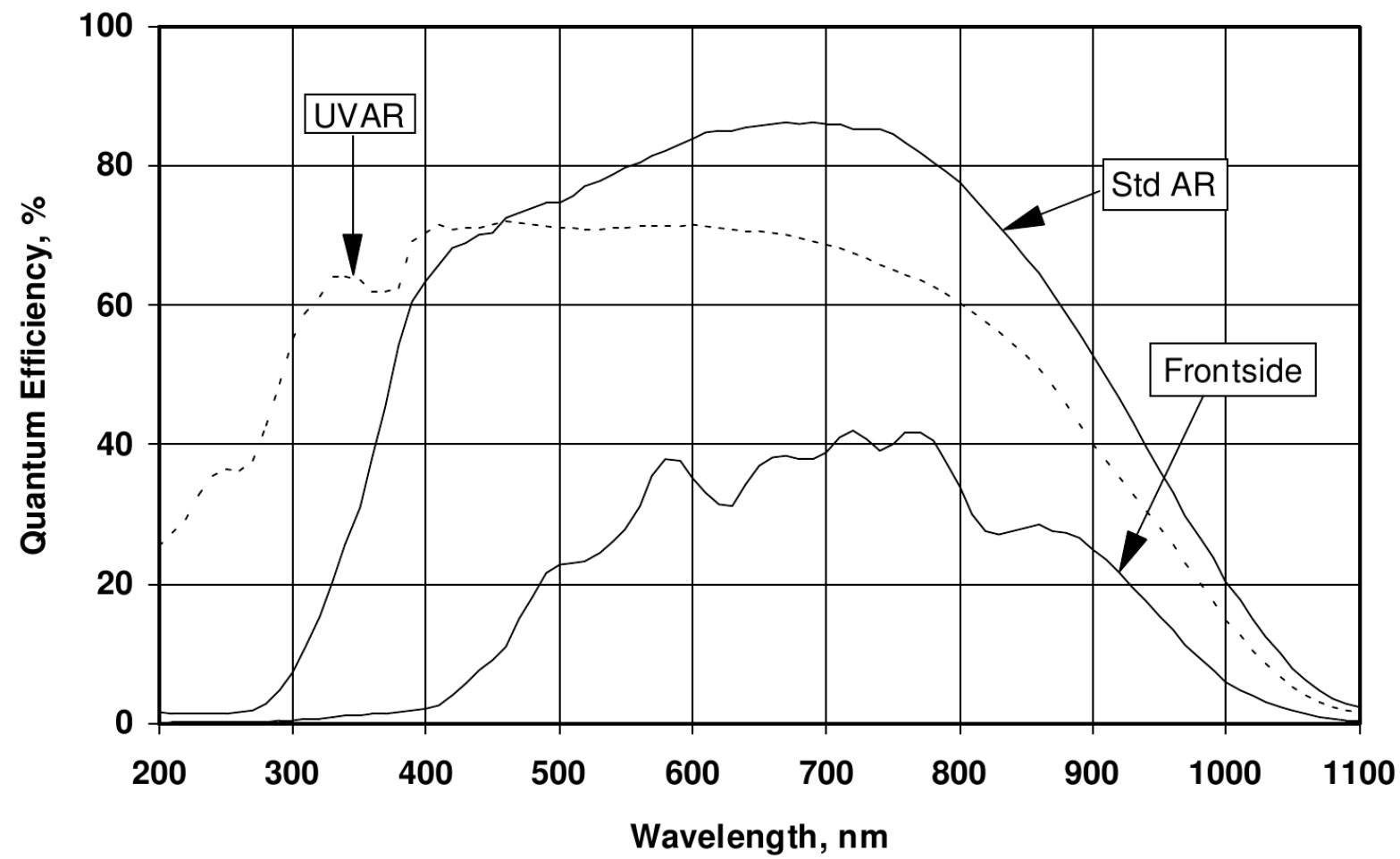
The CCD camera



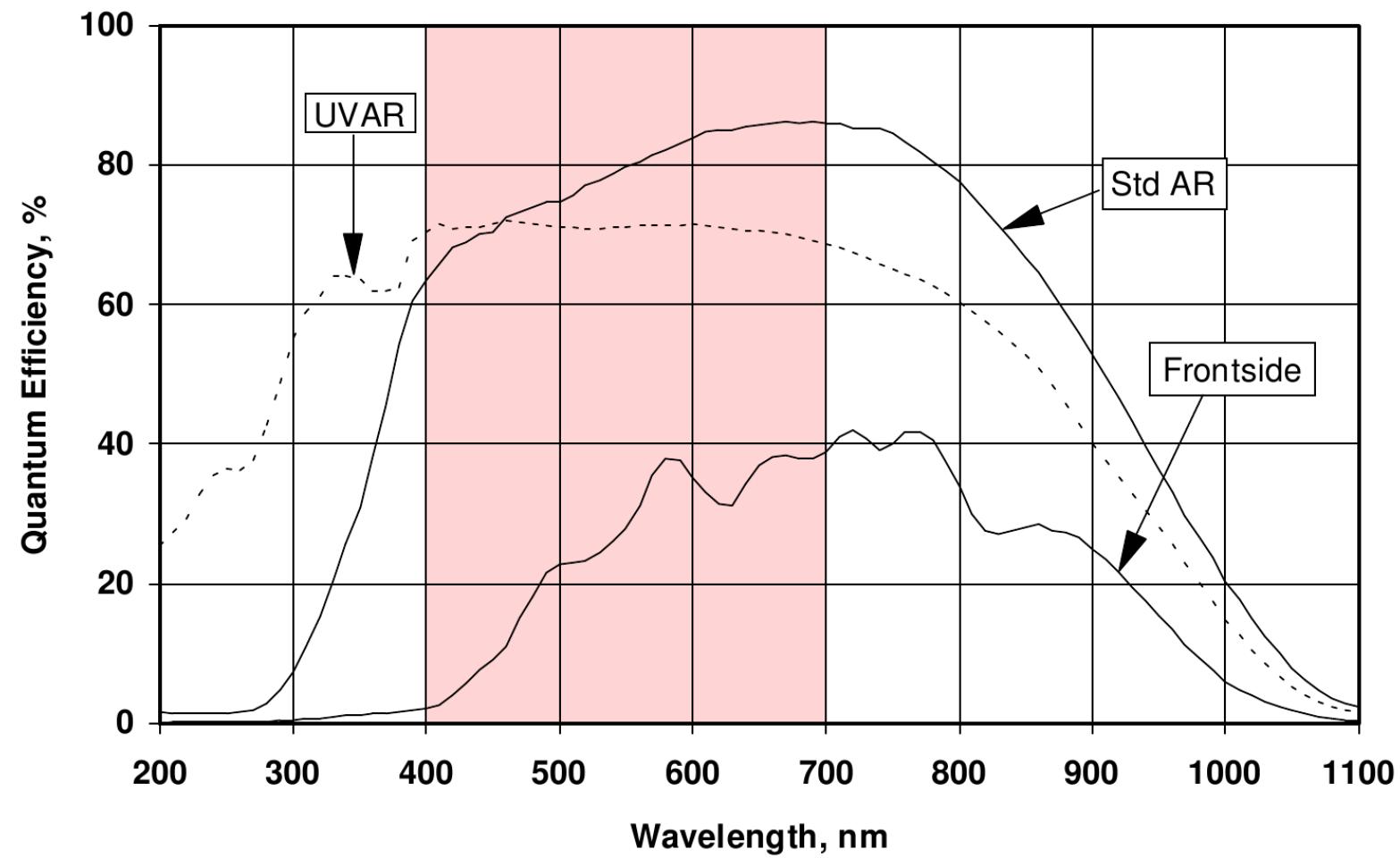
## SITe CCD Sensor Main Facts:

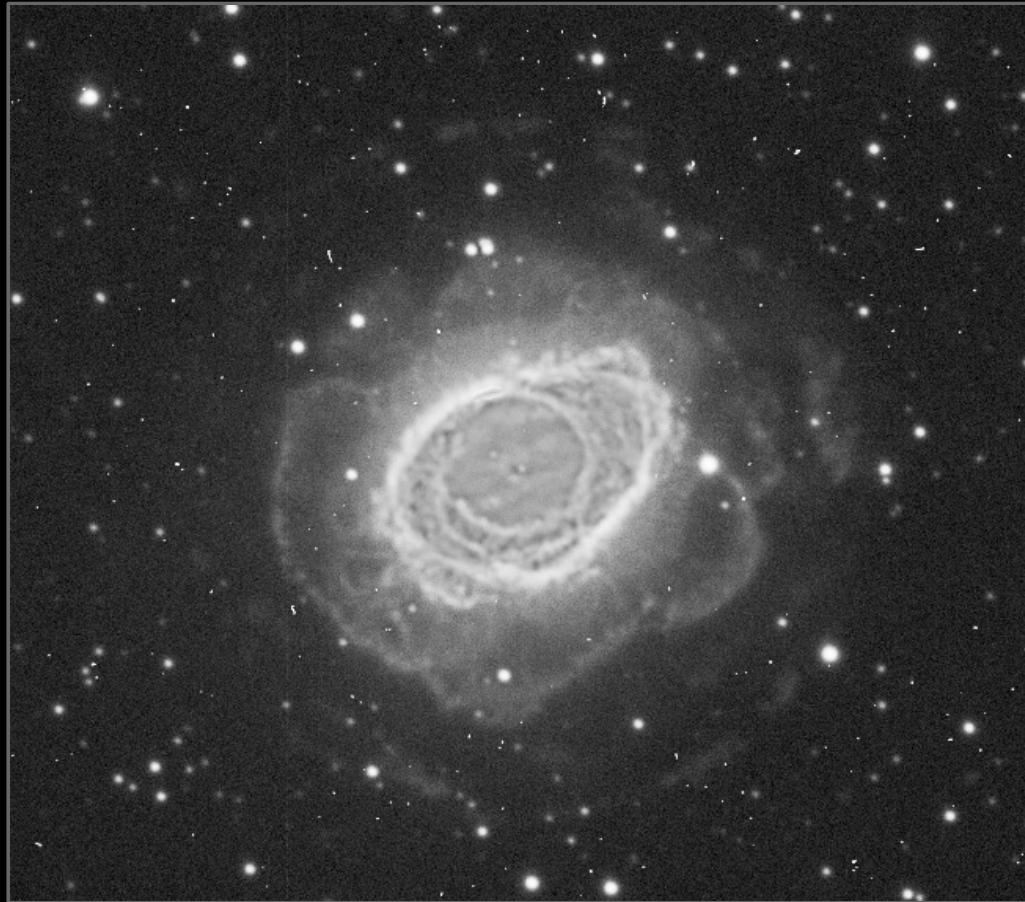
- 2Kx2K back-illuminated sensor
- 24  $\mu\text{m}$  photosite size
- 49x49 mm sensor size
- 0.5 arcsec/pixel image scale
- 17x17 arcmin field of view
- Liquid nitrogen cooling (-117°C)
- $6 \text{ e}^-$  readout noise
- Very slow readout (3 min) that forces us to make long subexposures: 20 min for RGB and 20 to 40 min for narrowband

## SITe CCD Sensor Quantum Efficiency



## SITe CCD Sensor Quantum Efficiency





5 mn bandwidth

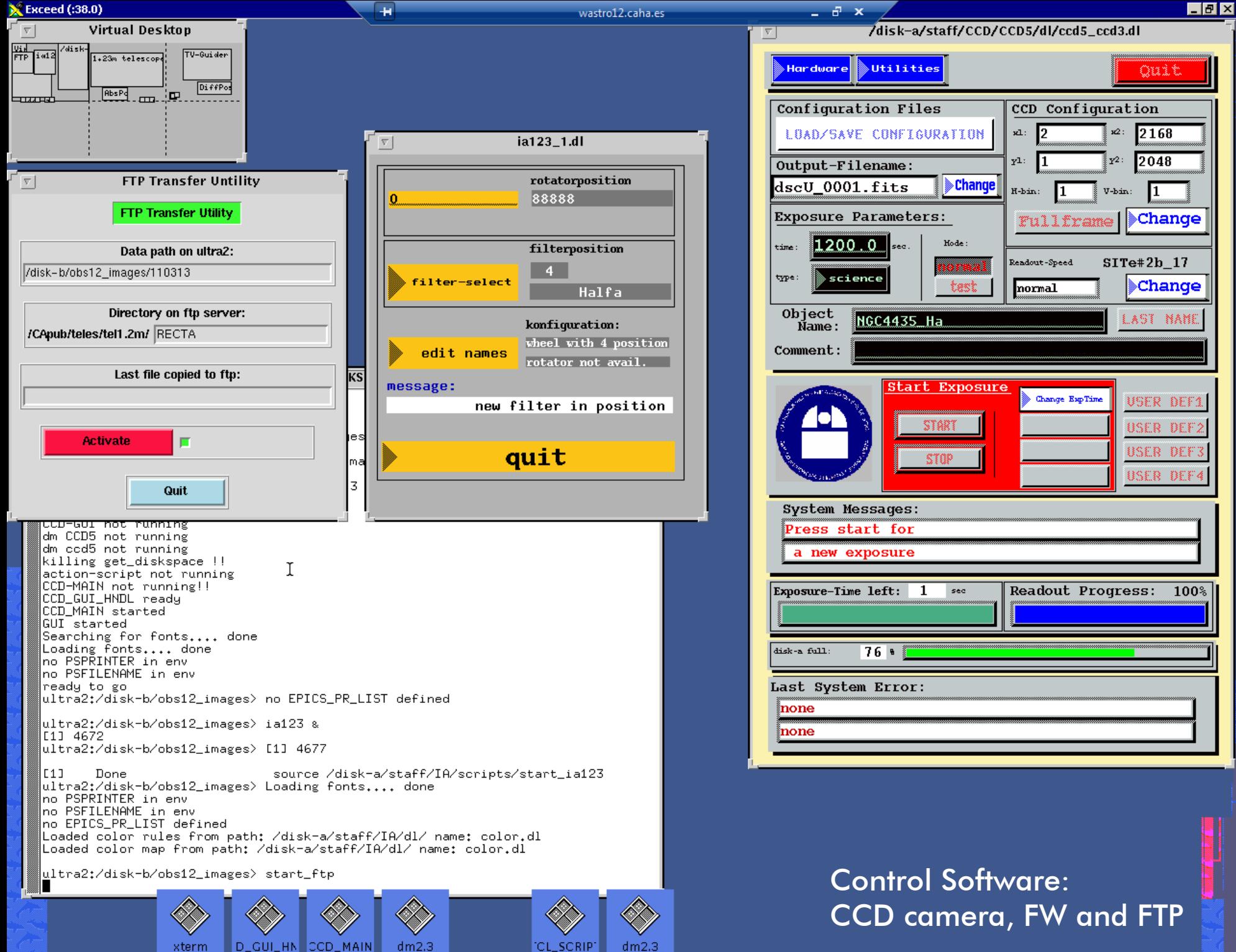


7 mn bandwidth

**Single, 20 minute H-alpha subexposures**

# Telescope Control Interface





Control Software:  
CCD camera, FW and FTP

**Exceed (:38.0)**

**Virtual Desktop**

wastro12.caha.es

**1.23m telescope Control**

**File Commands Emerg. Dome Emerg. Building Emerg. Telescope Emerg. Computer REMOTE Help**

**Startup**

**Shutdown**

**M1-Cover**

**Dome-Light**

**Abort**

**Main Drives**

Hydr HA Axis DEC Axis  
vme

**rw-design**

**Drives Hydraulics Tracking Dome Abs. Pos Dif. Pos Settings Info**

**Idle Observe Balance Maintenance**

**AbsPos**

R.A. **05 43 06.5** DEC **30 56 22**  
Epoch **2000** Comm  
object

**Help Exec Save Quit**

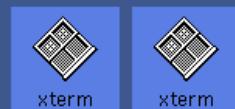
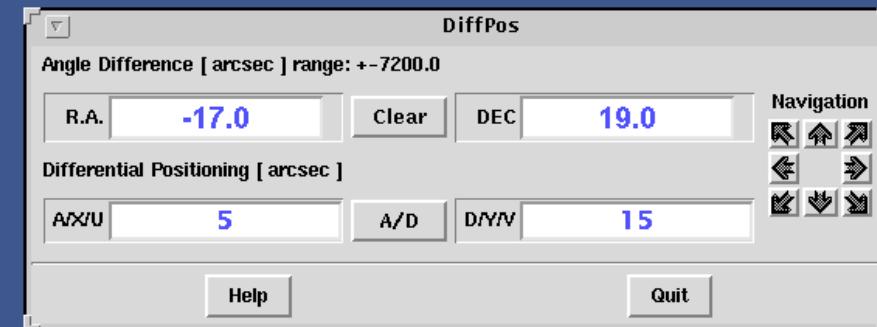
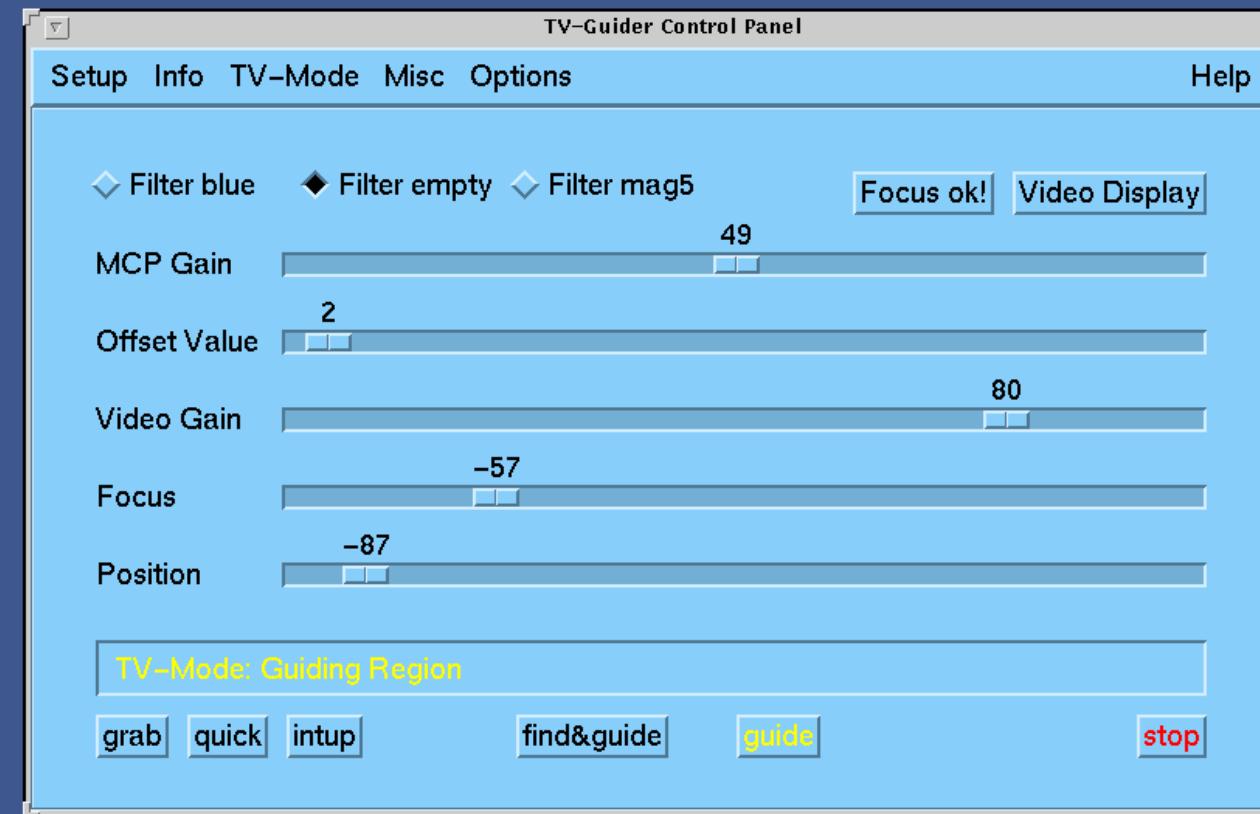
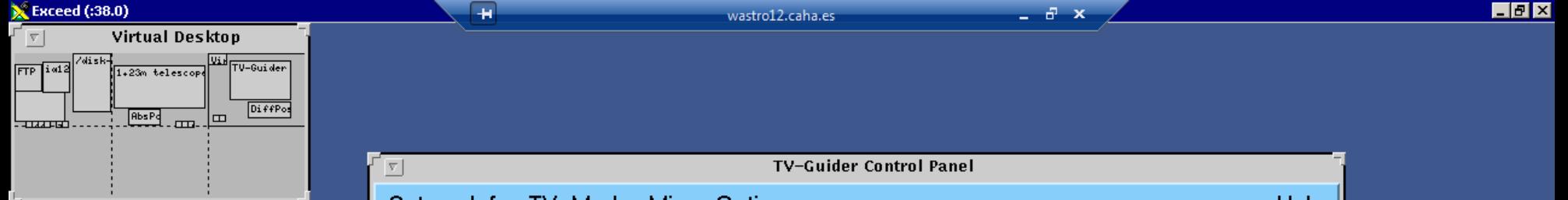
**xterm start tecs tecs.tcl**

**Inicio Exceed (:38.0)**

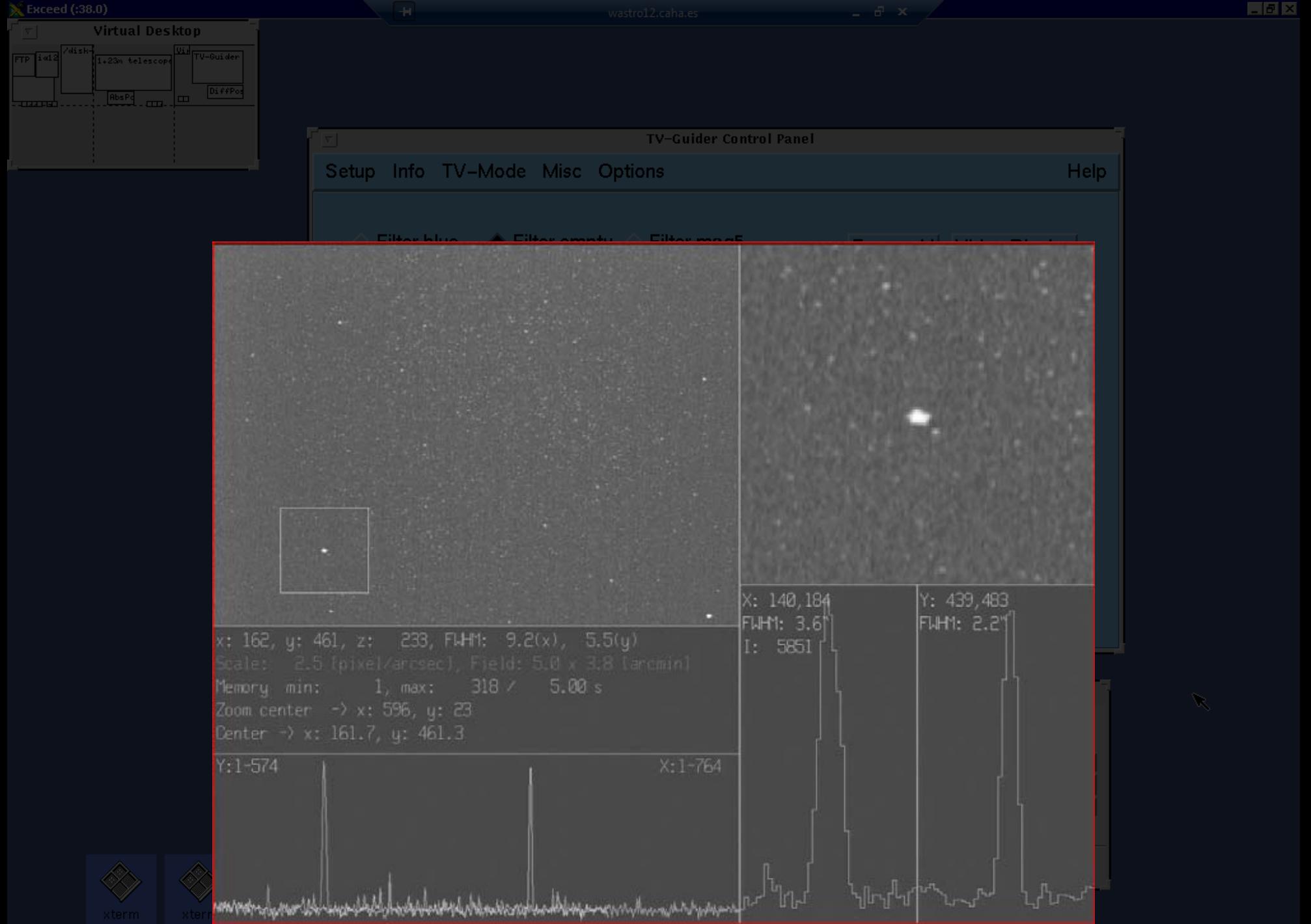
**ES**

18:13

**Control Software:  
Telescope Interface**

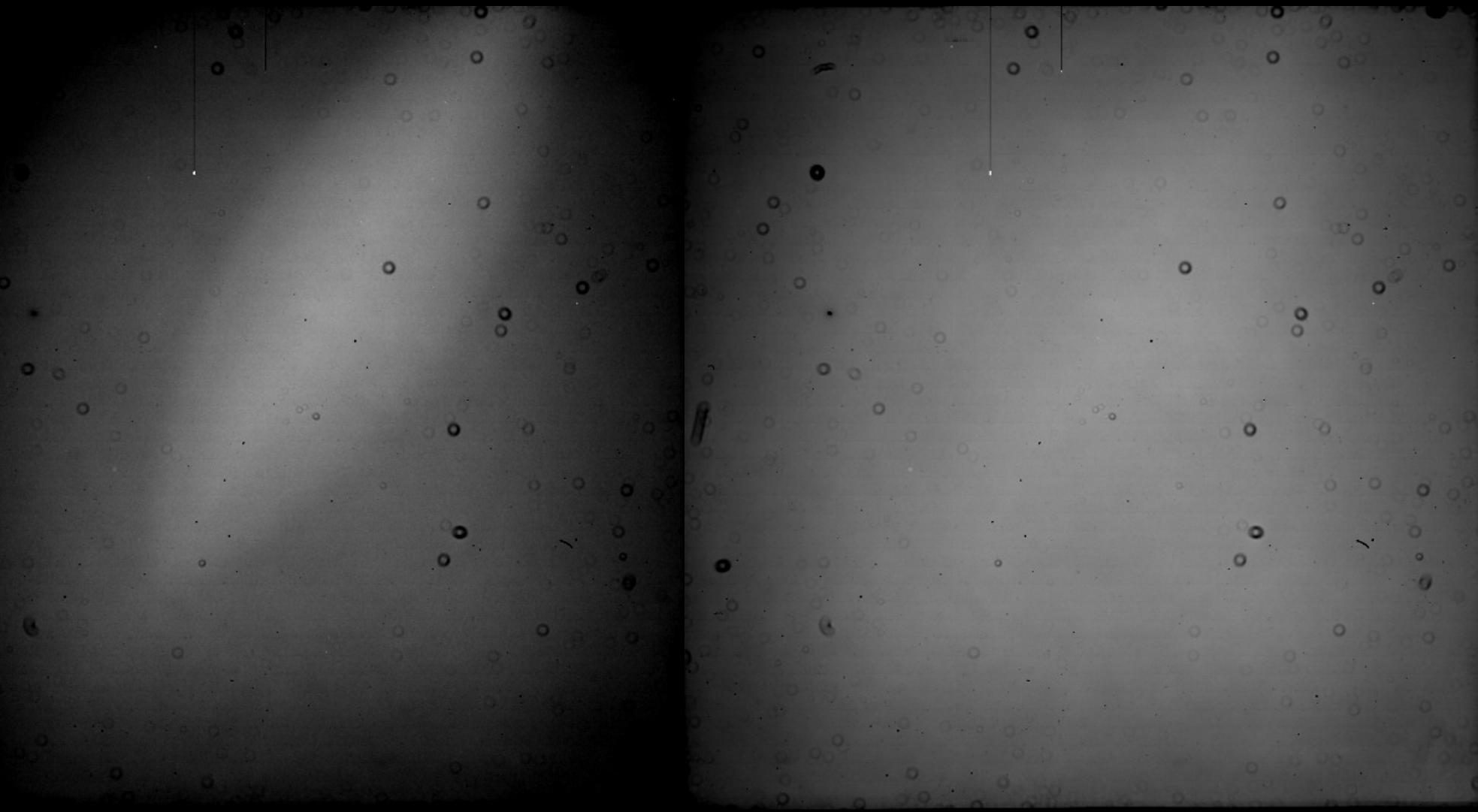


Control Software:  
AG and dithering control

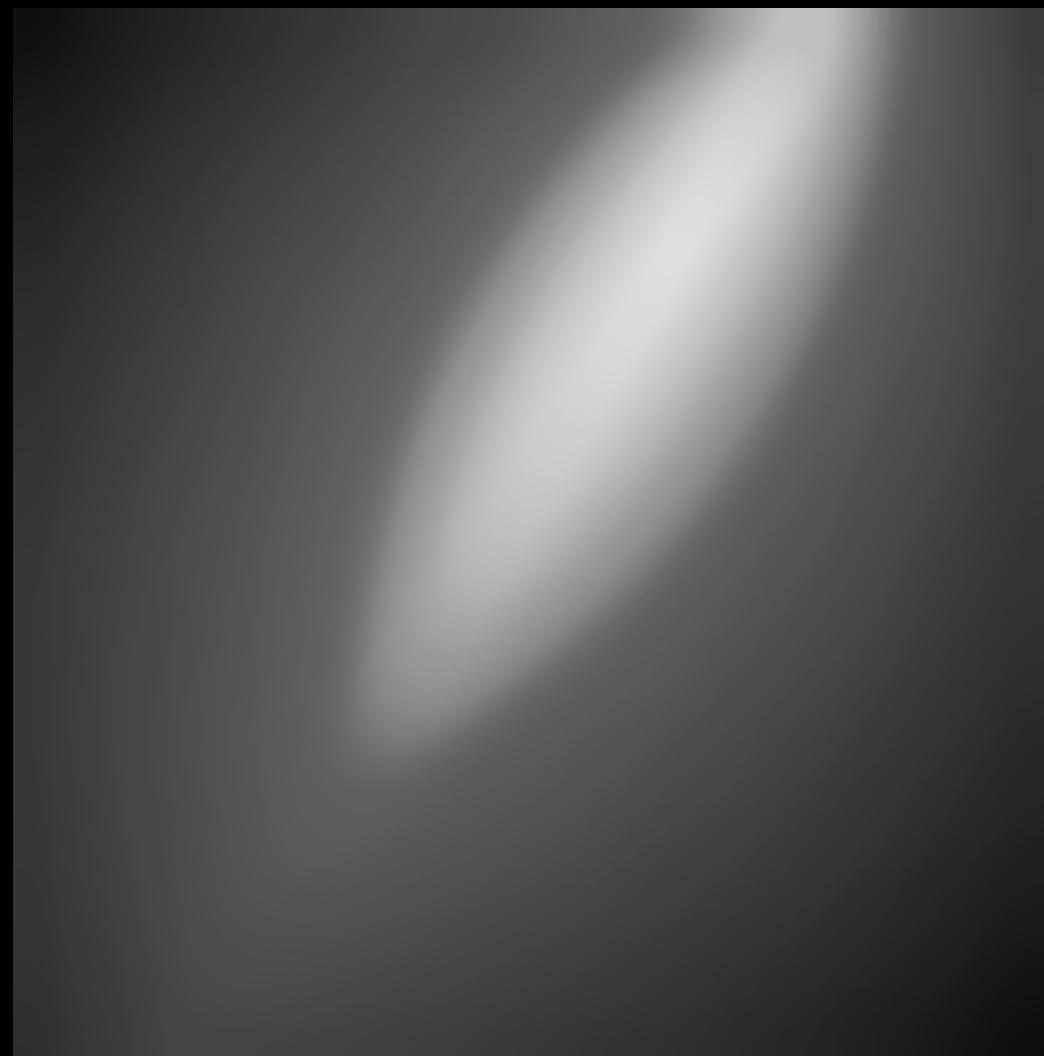
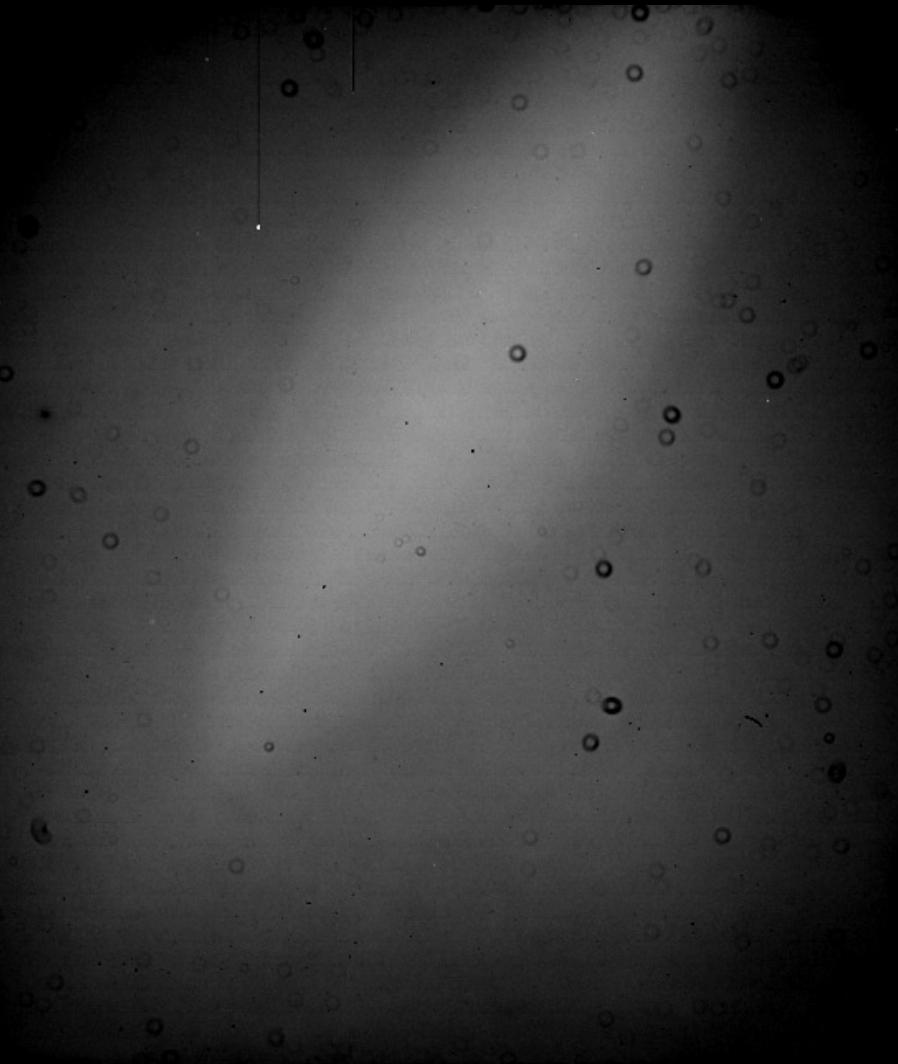


Control Software:  
Autoguider FOV

# Building a Master Image



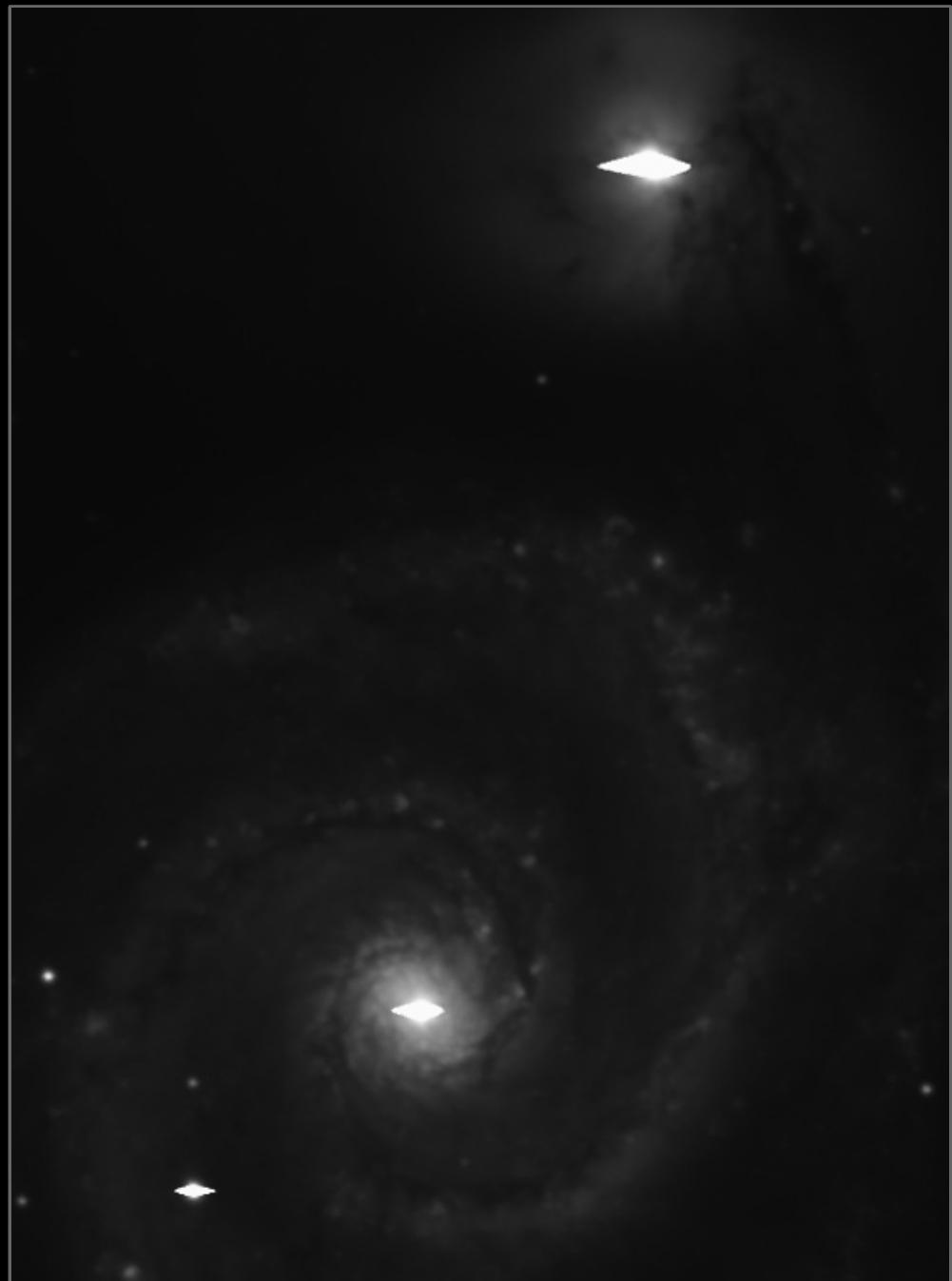
Shutter effects on flat frames



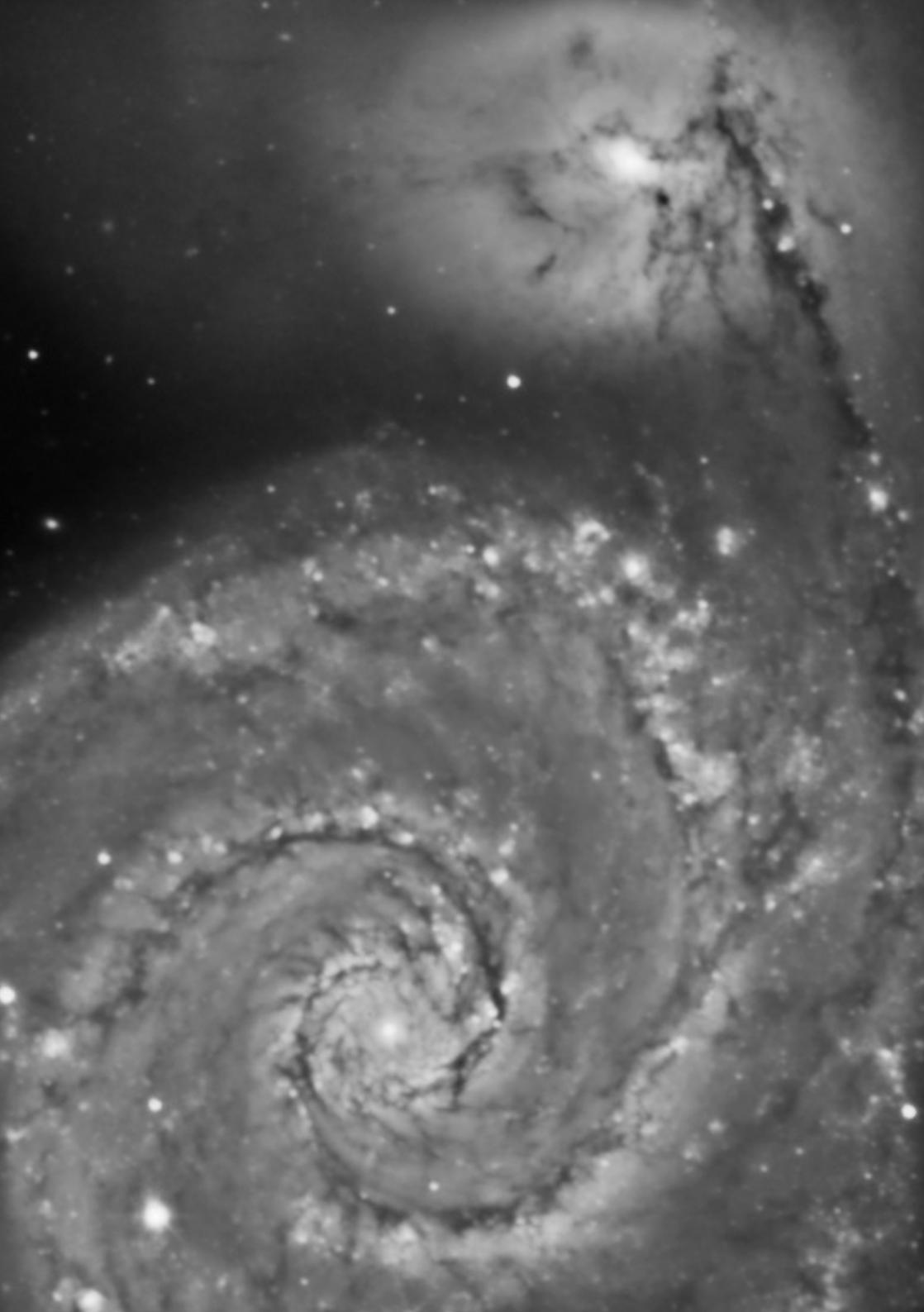
Shutter effect modelization



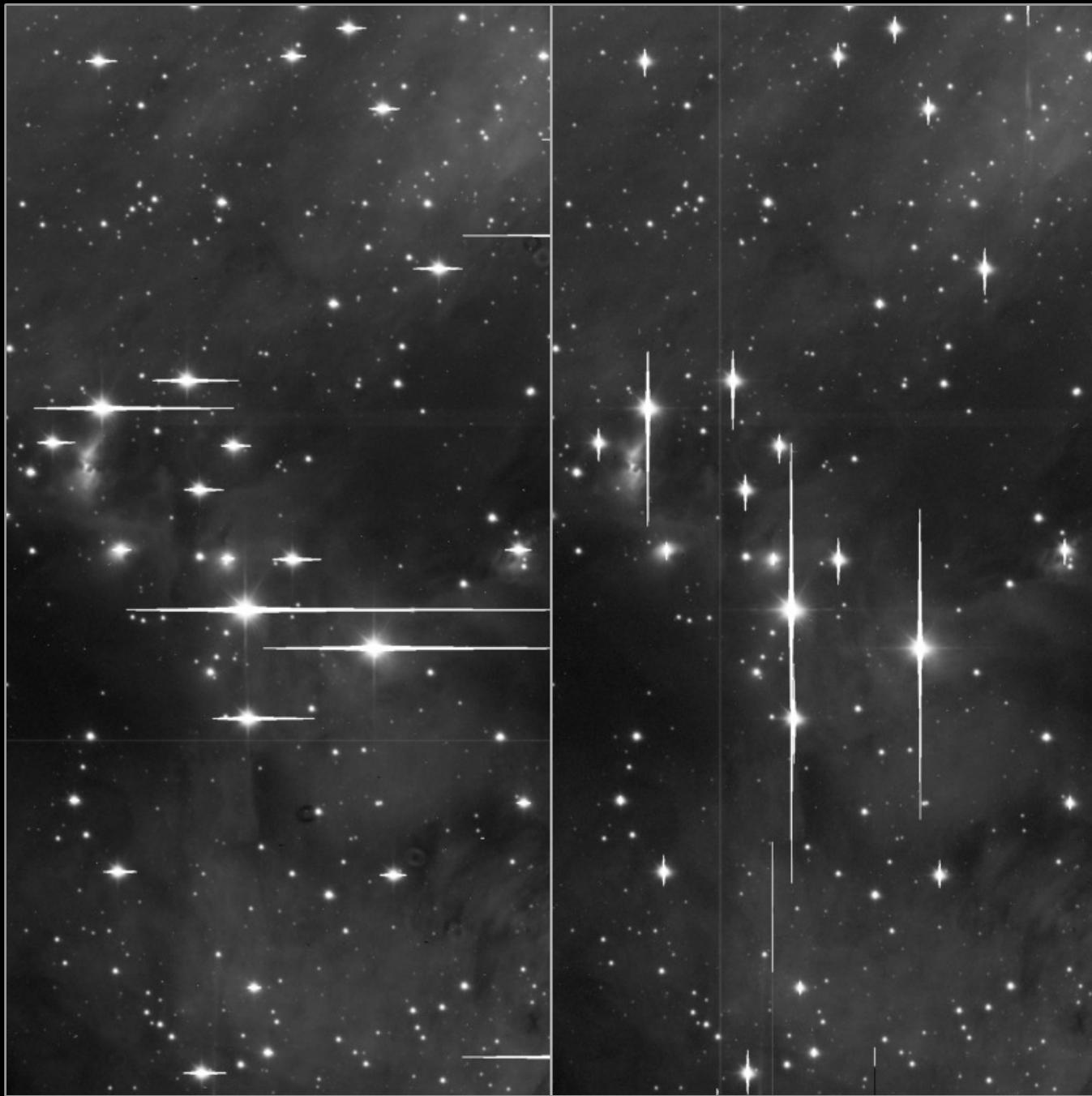
Blooming Suppression



Blooming suppression by HDR composition



Blooming suppression  
by HDR composition



Blooming suppression by camera rotation



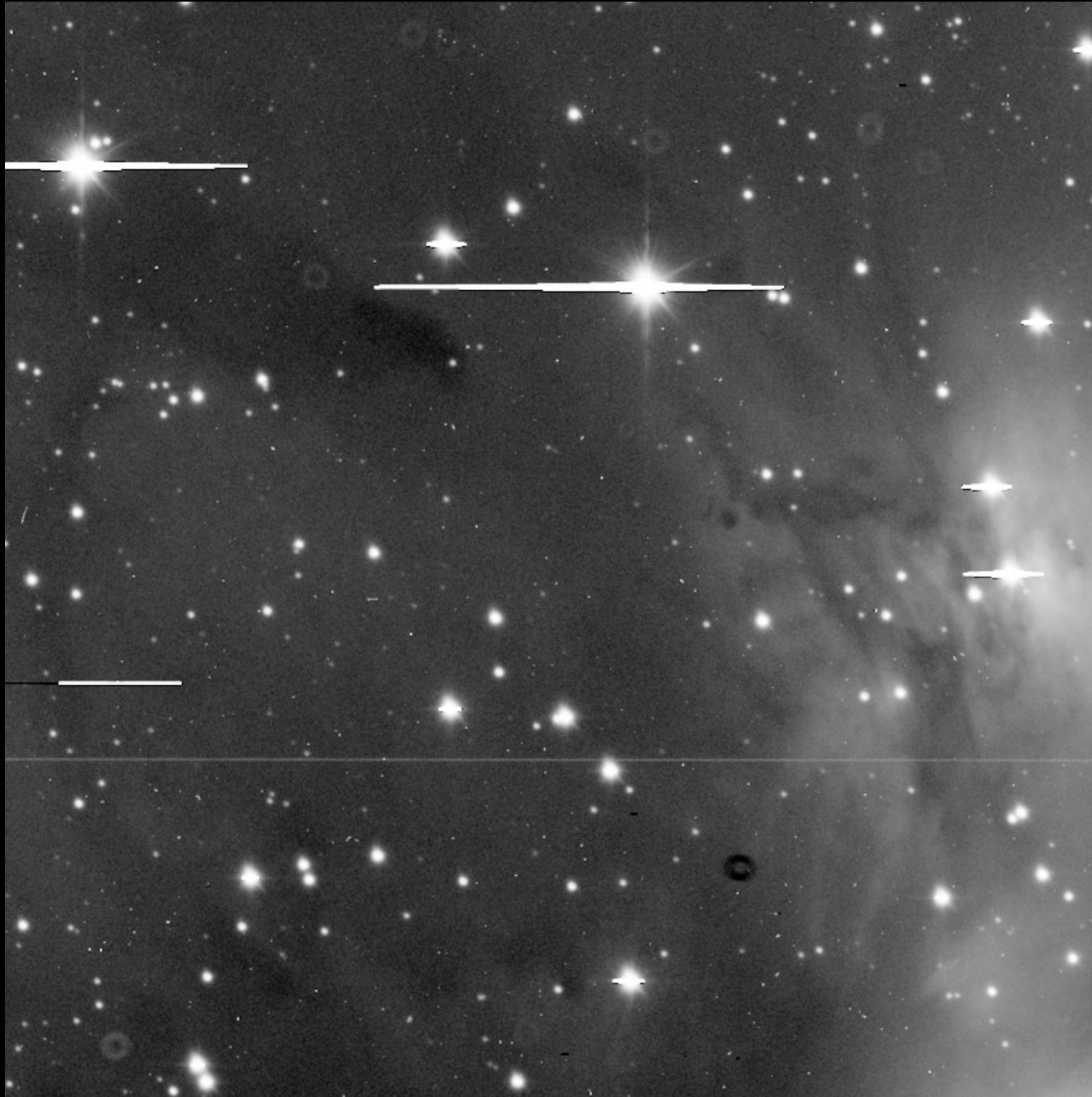
Blooming suppression by camera rotation



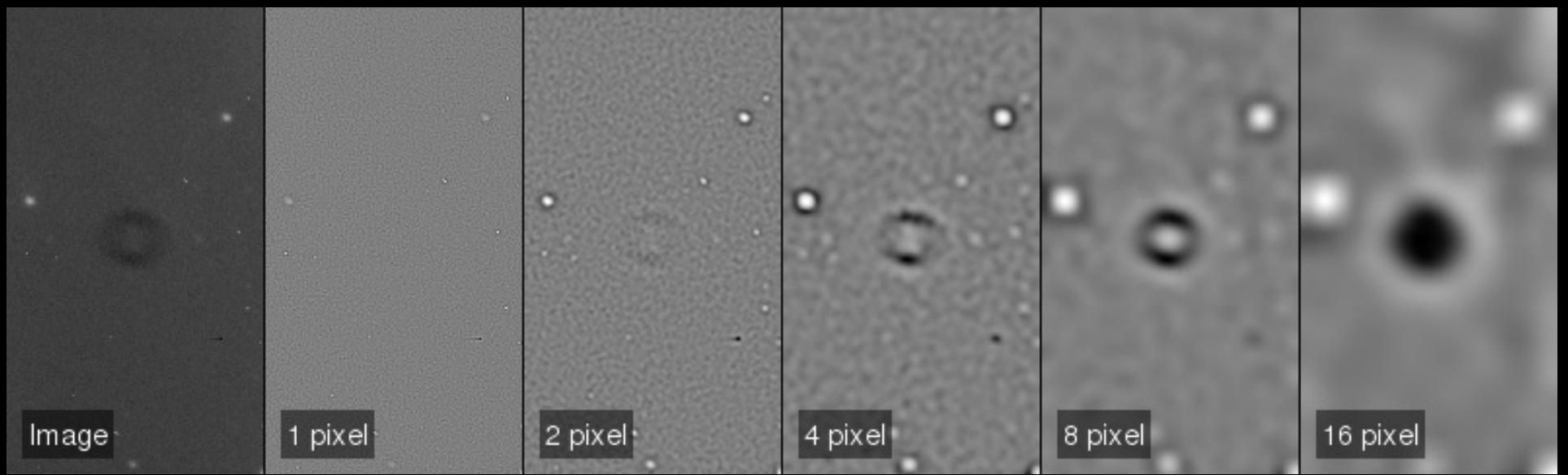
Blooming suppression by camera rotation



Artifact suppression by multiscale integration



Artifact suppression by multiscale integration



Artifact suppression by multiscale integration



Artifact suppression by multiscale integration

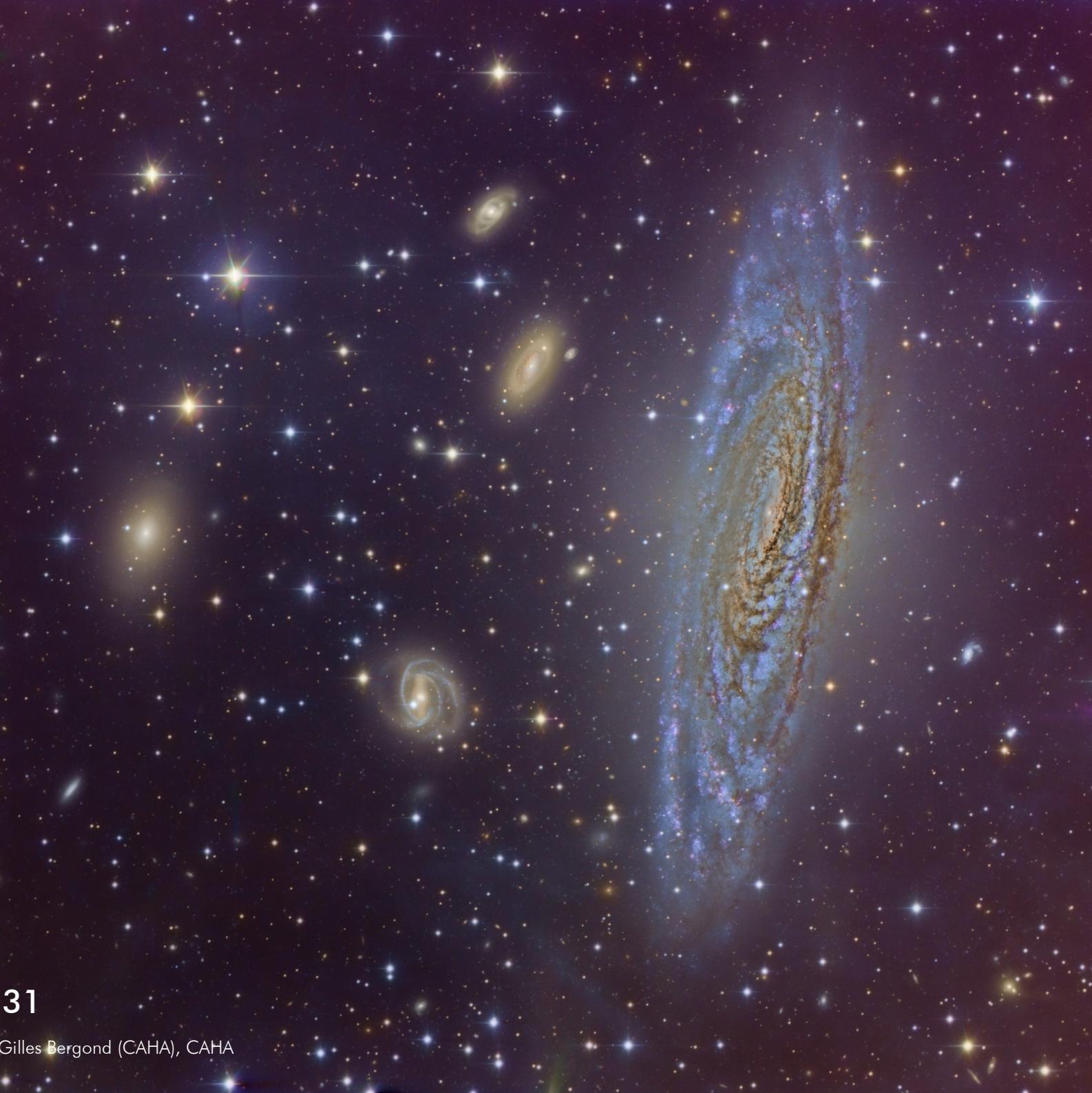


Artifact suppression by multiscale integration



# Image Gallery





**Messier 731**

Vicent Peris (OAVU), Gilles Bergond (CAHA), CAHA



Messier 7331



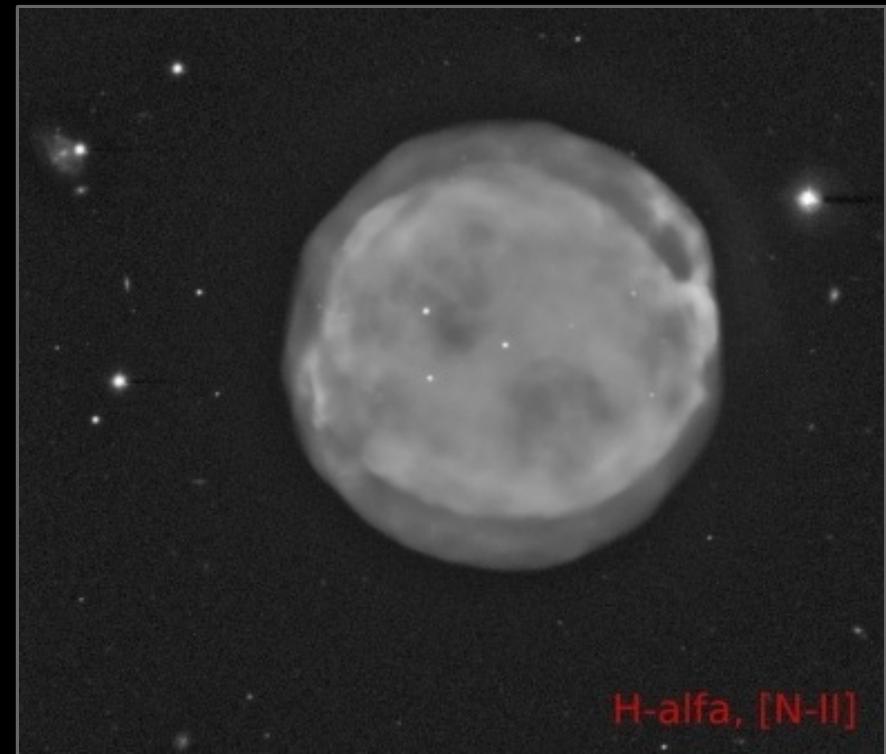
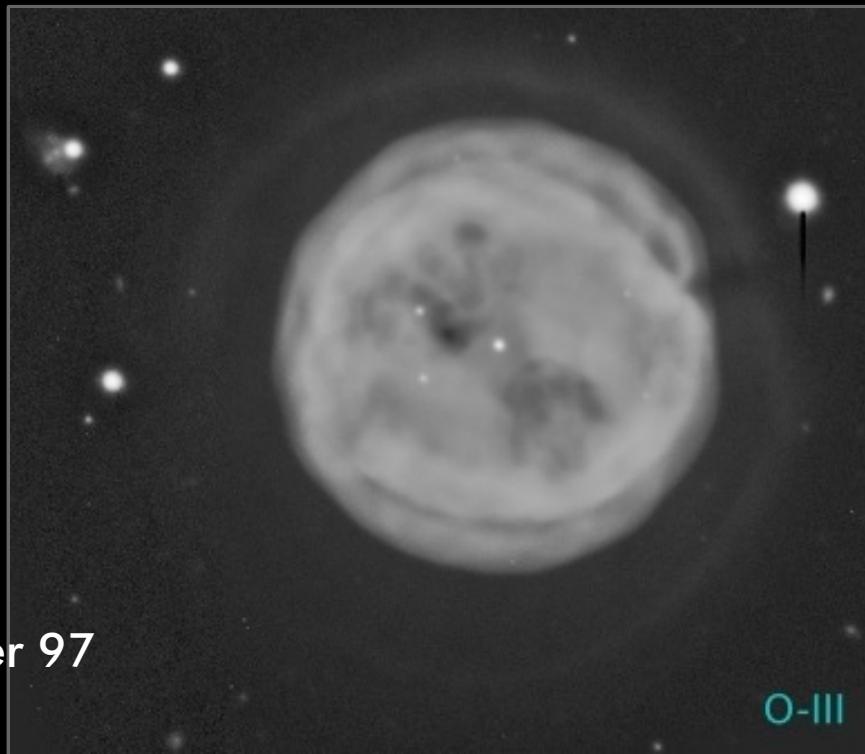
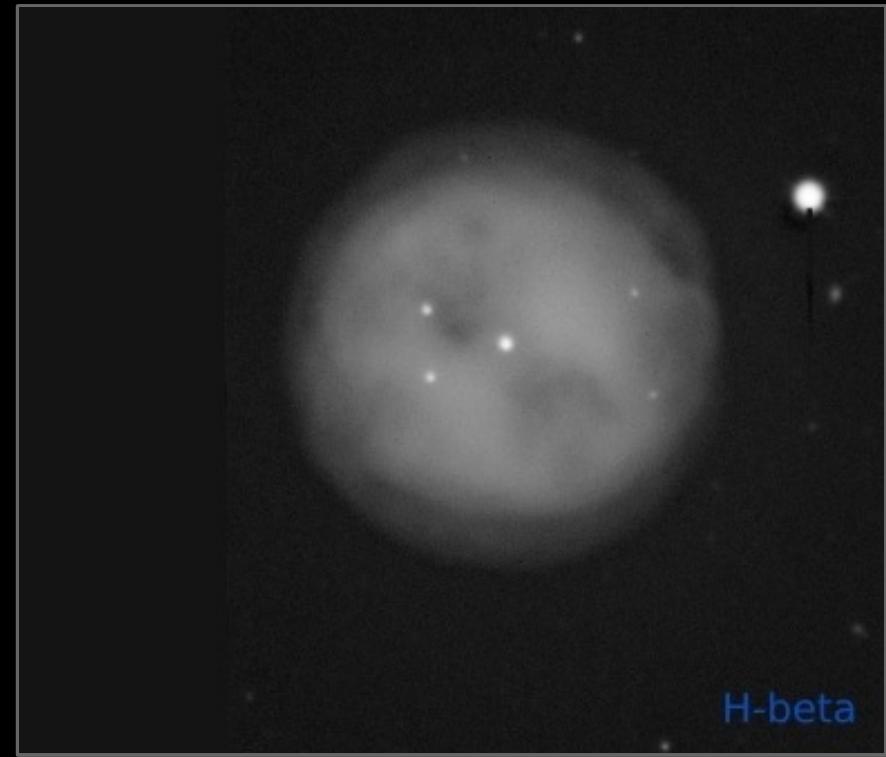
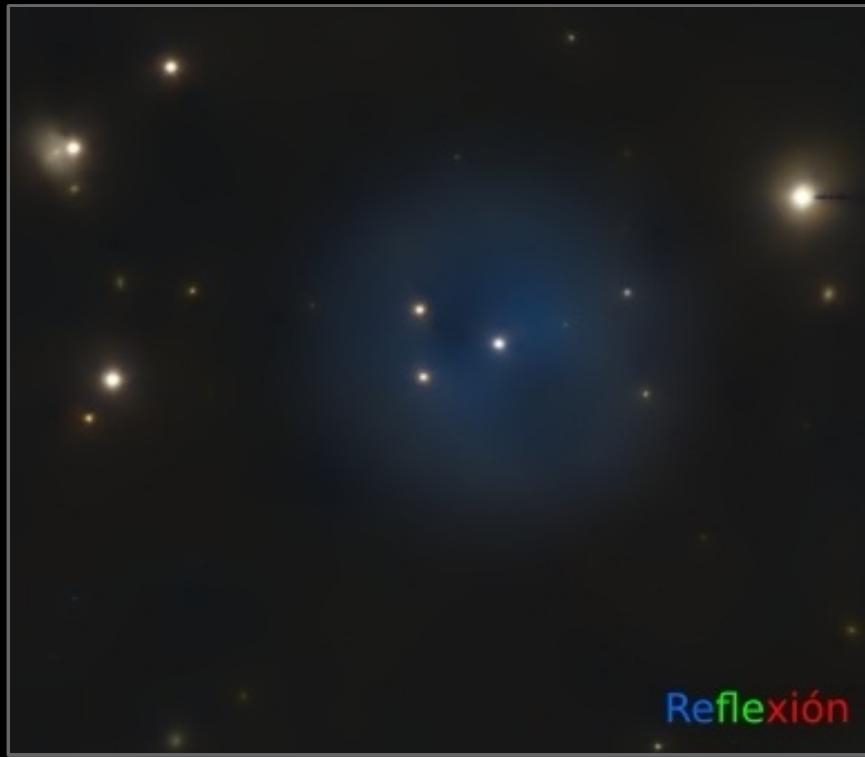
Messier 7331



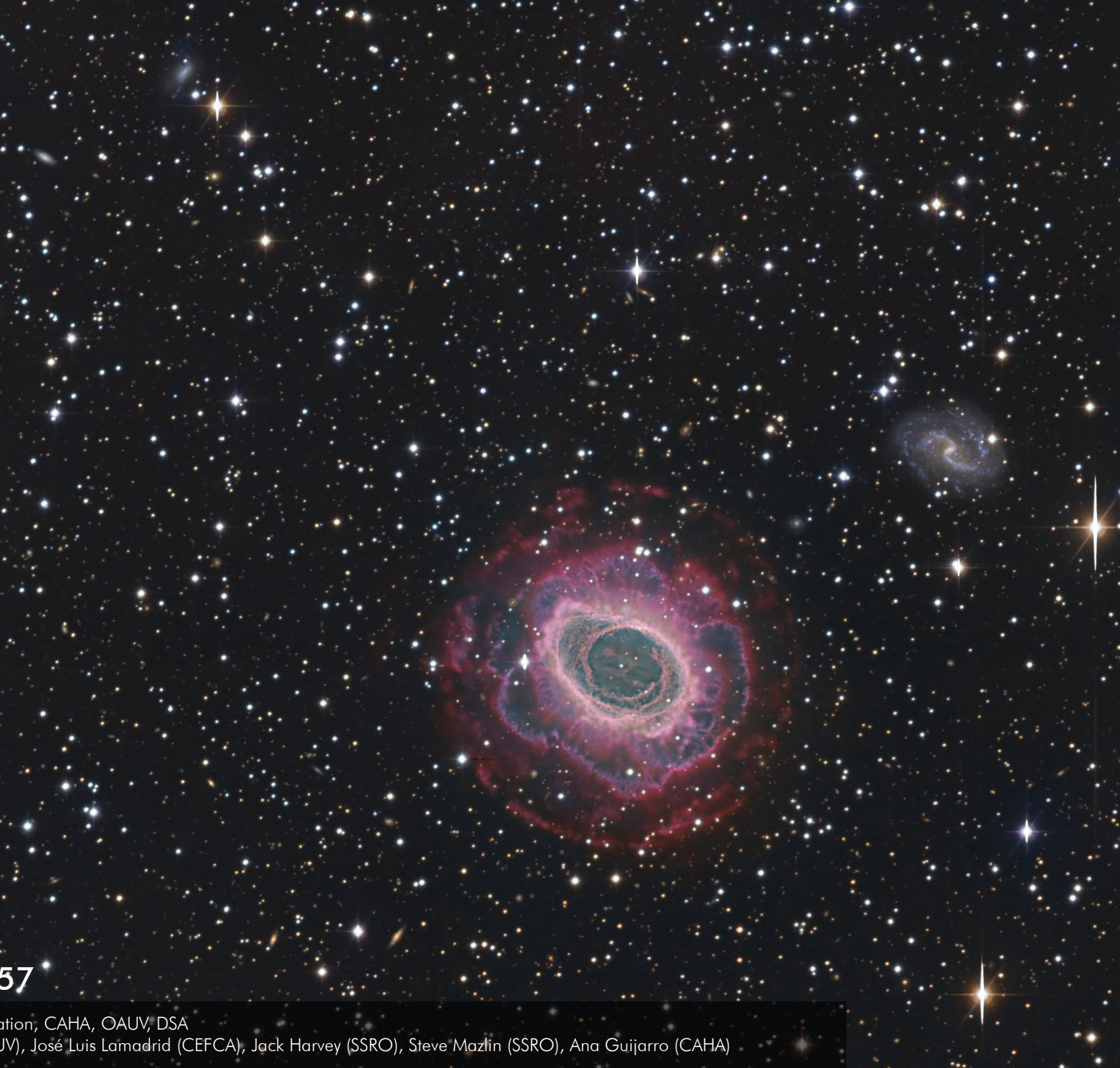
**Messier 97**

Descubre Foundation, CAHA, OAUV, DSA

Vicent Peris (OAUV), Jack Harvey (SSRO), Steven Mazlin (SSRO), José Luis Lamadrid (CEFCA), Juan Fabregat (OAUV), Gilles Bergond (CAHA)



Messier 97



## Messier 57

Descubre Foundation, CAHA, OAUV, DSA  
Vicent Peris (OAUV), José Luis Lamadrid (CEFCA), Jack Harvey (SSRO), Steve Mazlin (SSRO), Ana Guijarro (CAHA)

## Narrowband



## Broadband



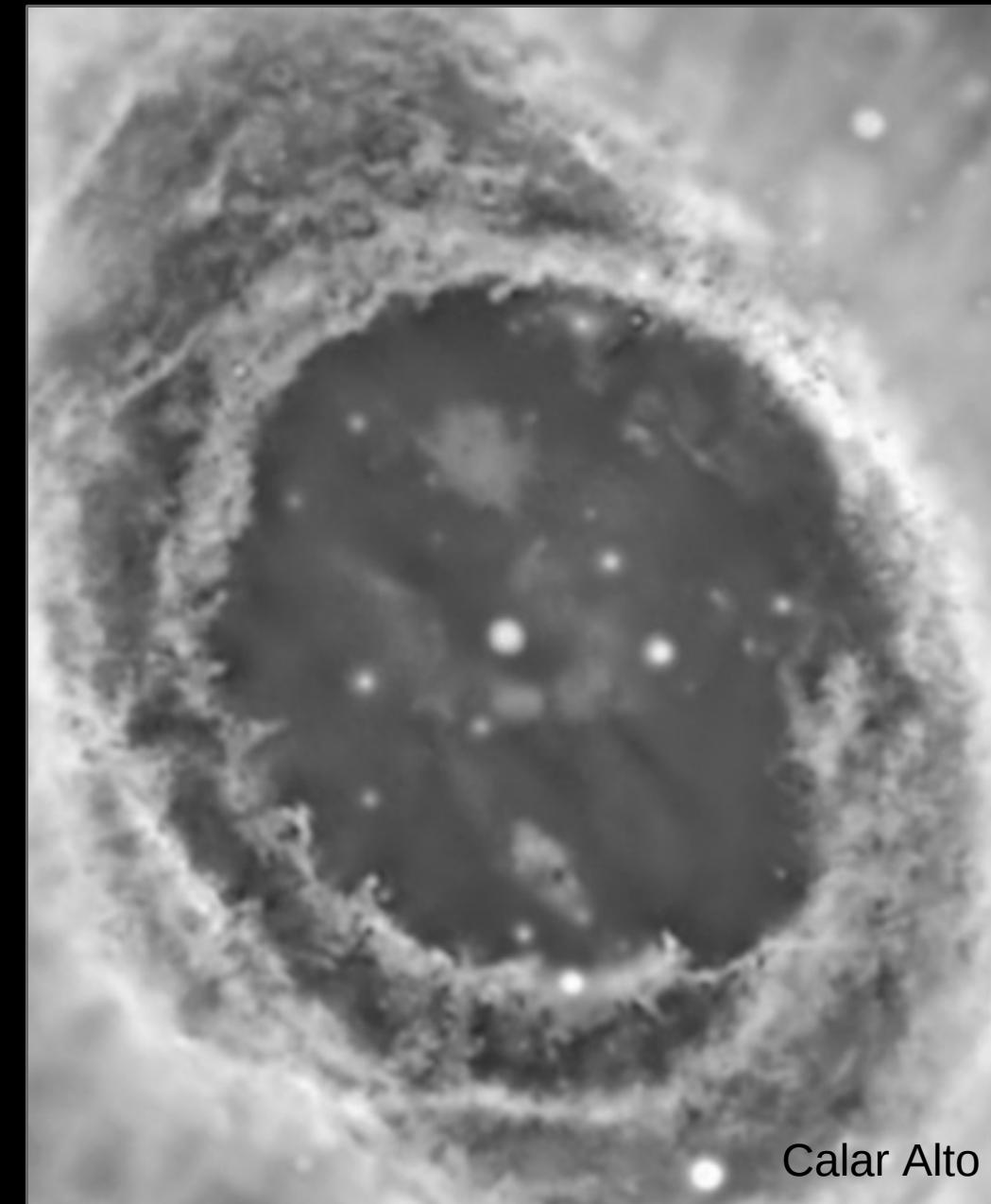
Messier 57



Messier 57

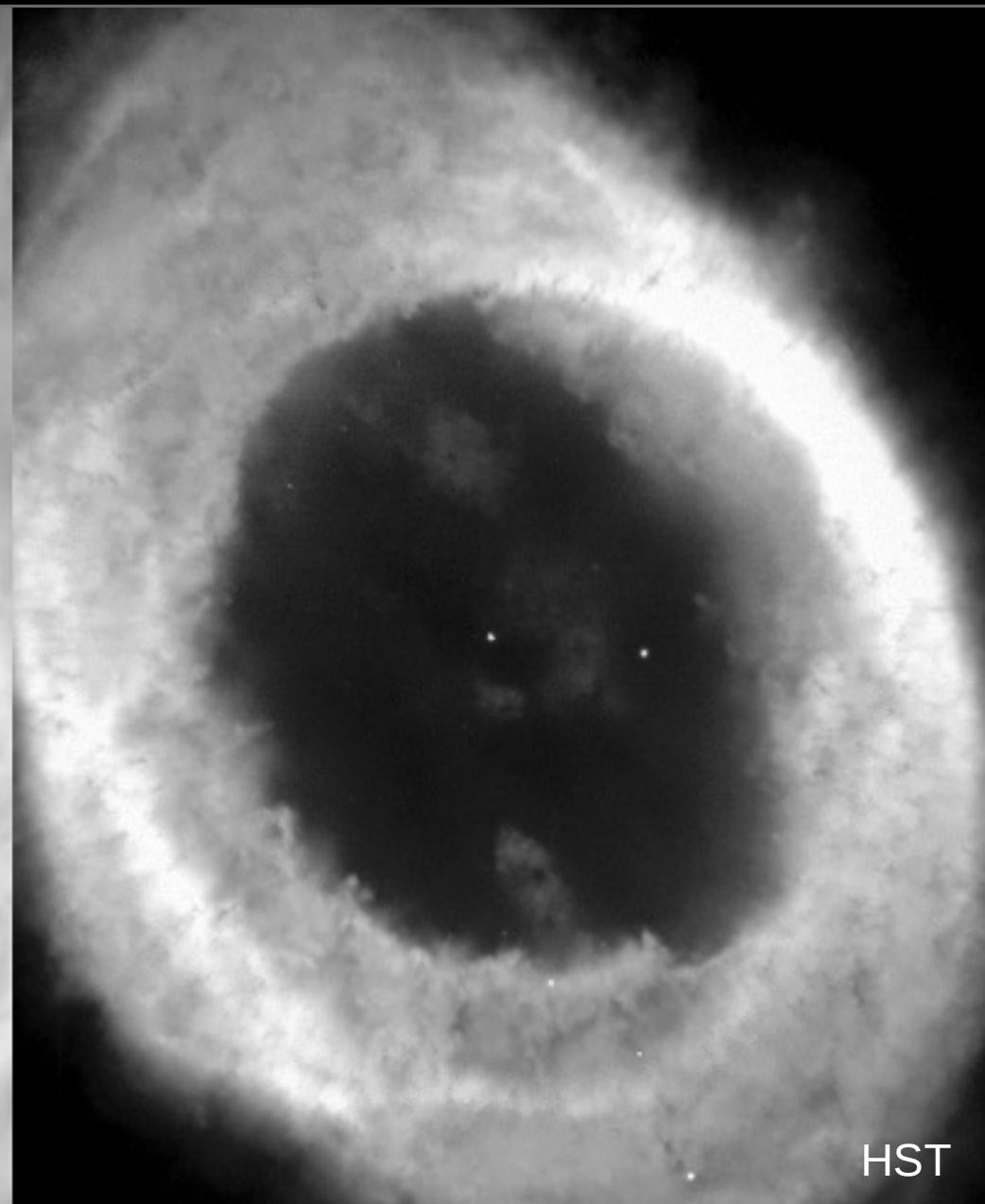


Messier 57

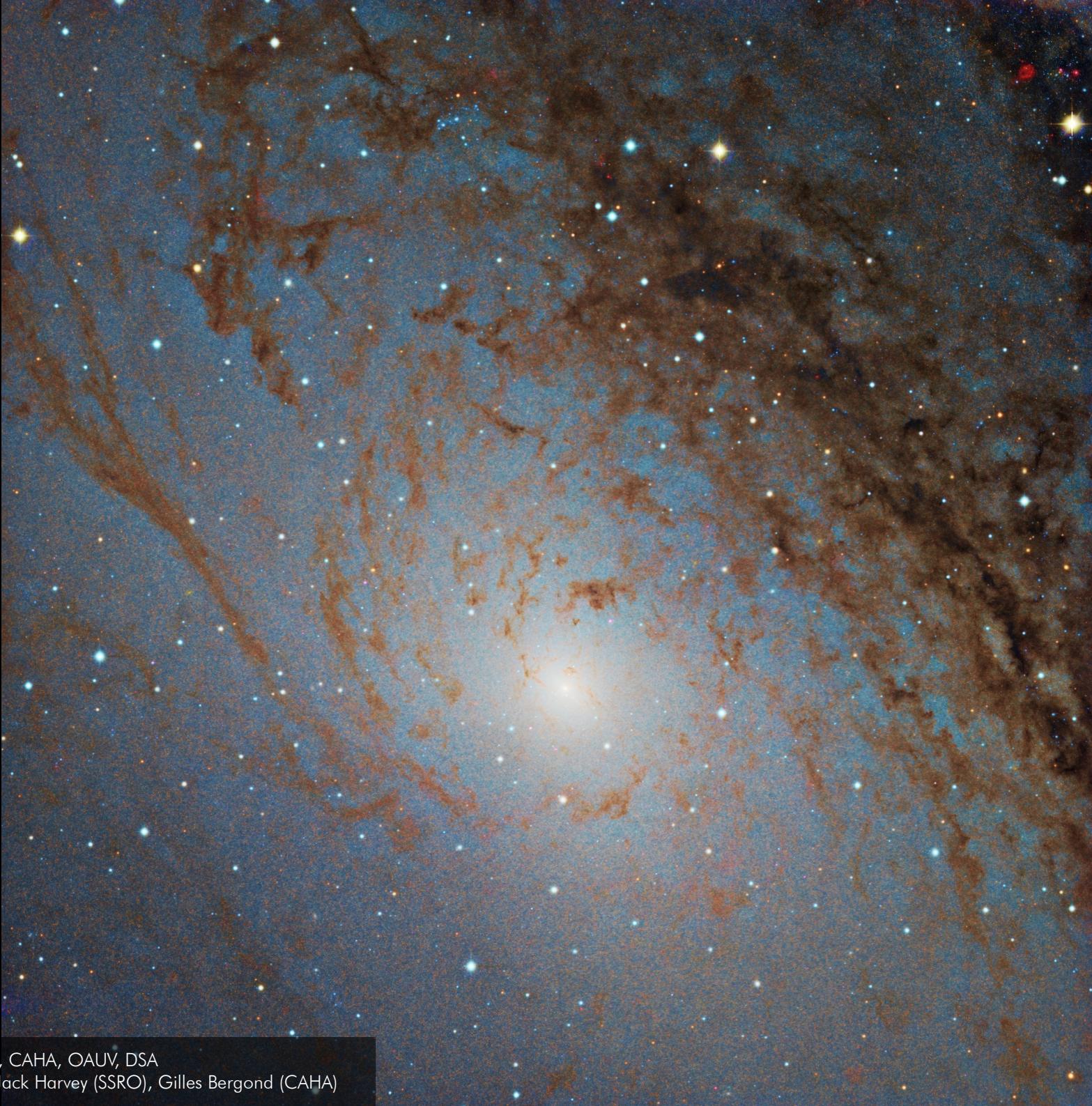


Calar Alto

Messier 57



HST



**Messier 31**

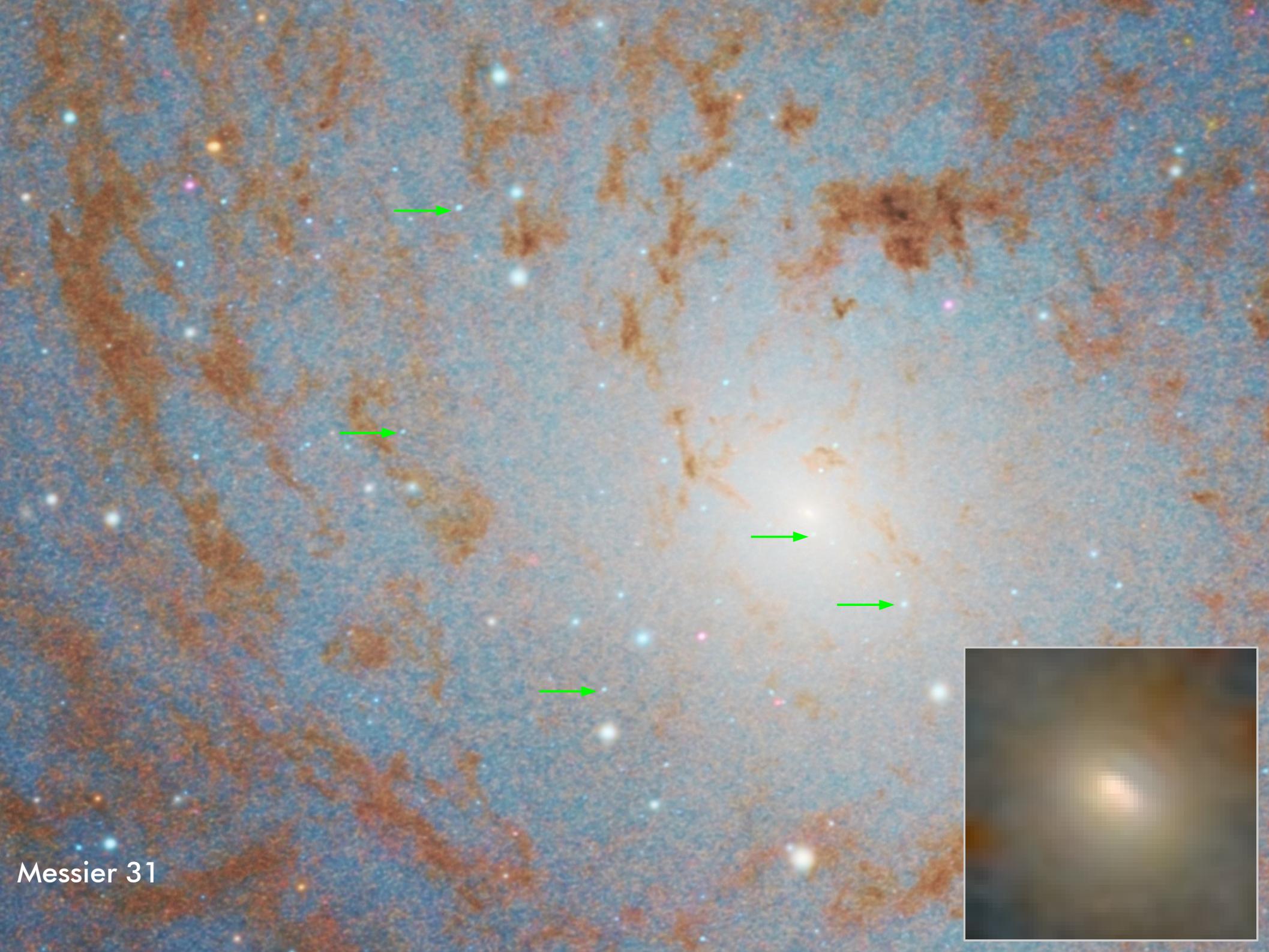
Descubre Foundation, CAHA, OAUV, DSA  
Vicent Peris (OAUV), Jack Harvey (SSRO), Gilles Bergond (CAHA)



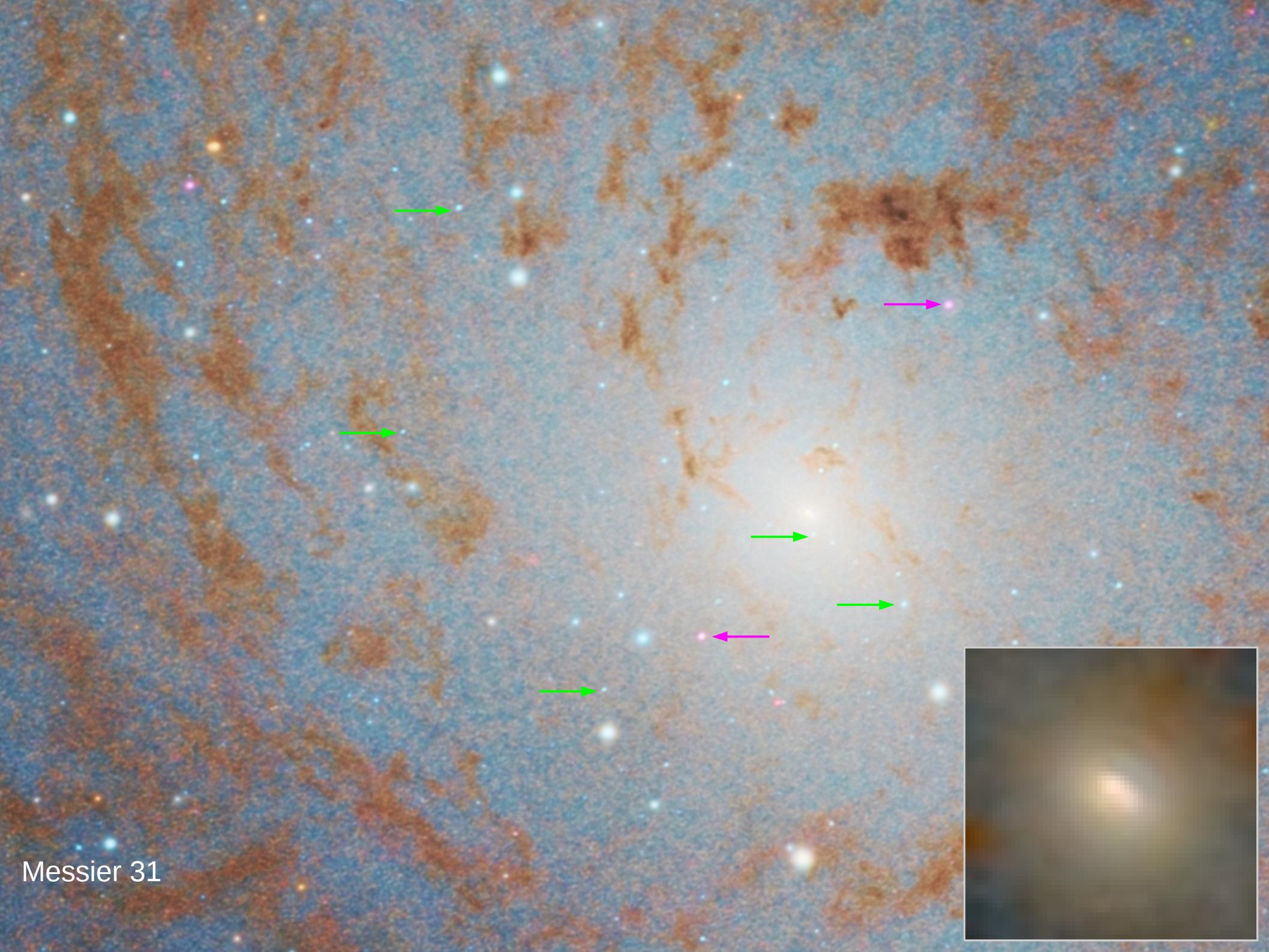
Messier 31



Messier 31



Messier 31



Messier 31



## Messier 74

Descubre Foundation, CAHA, OAUV, DSA

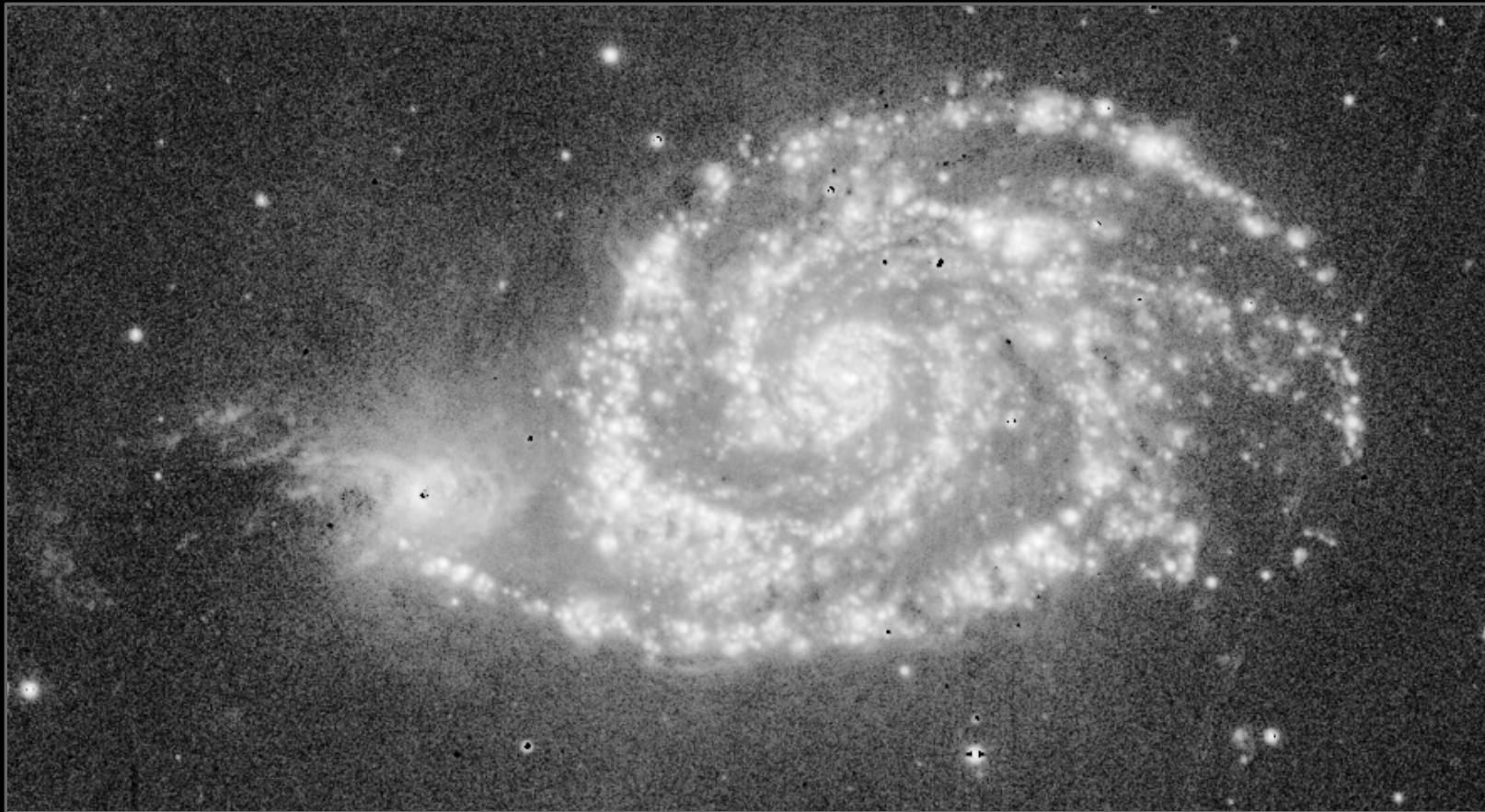
Vicent Peris (OAUV), José Luis Lamadrid (CEFCA), Jack Harvey (SSRO), Steve Mazlin (SSRO), Ivette Rodríguez, Oriol Lehmkuhl



## Messier 51

Descubre Foundation, CAHA, OAUV, DSA

Vicent Peris (OAUV), Jack Harvey (SSRO), Steven Mazlin (SSRO), Carlos Sonnenstein (Valkànik), Juan Conejero (PixInsight)



Messier 51



Messier 51



Messier 51



Messier 51



**NGC 6914**

Descubre Foundation, CAHA, OAUV, DSA  
Vicent Peris (OAUV), Jack Harvey (SSRO), Juan Conejero (PixInsight)

The background of the image is a deep space scene featuring a nebula with a rich palette of colors including red, orange, yellow, green, blue, and purple. A dense cluster of stars is visible on the left side, while a prominent, multi-pointed starburst is centered in the upper portion of the image.

Thank you!