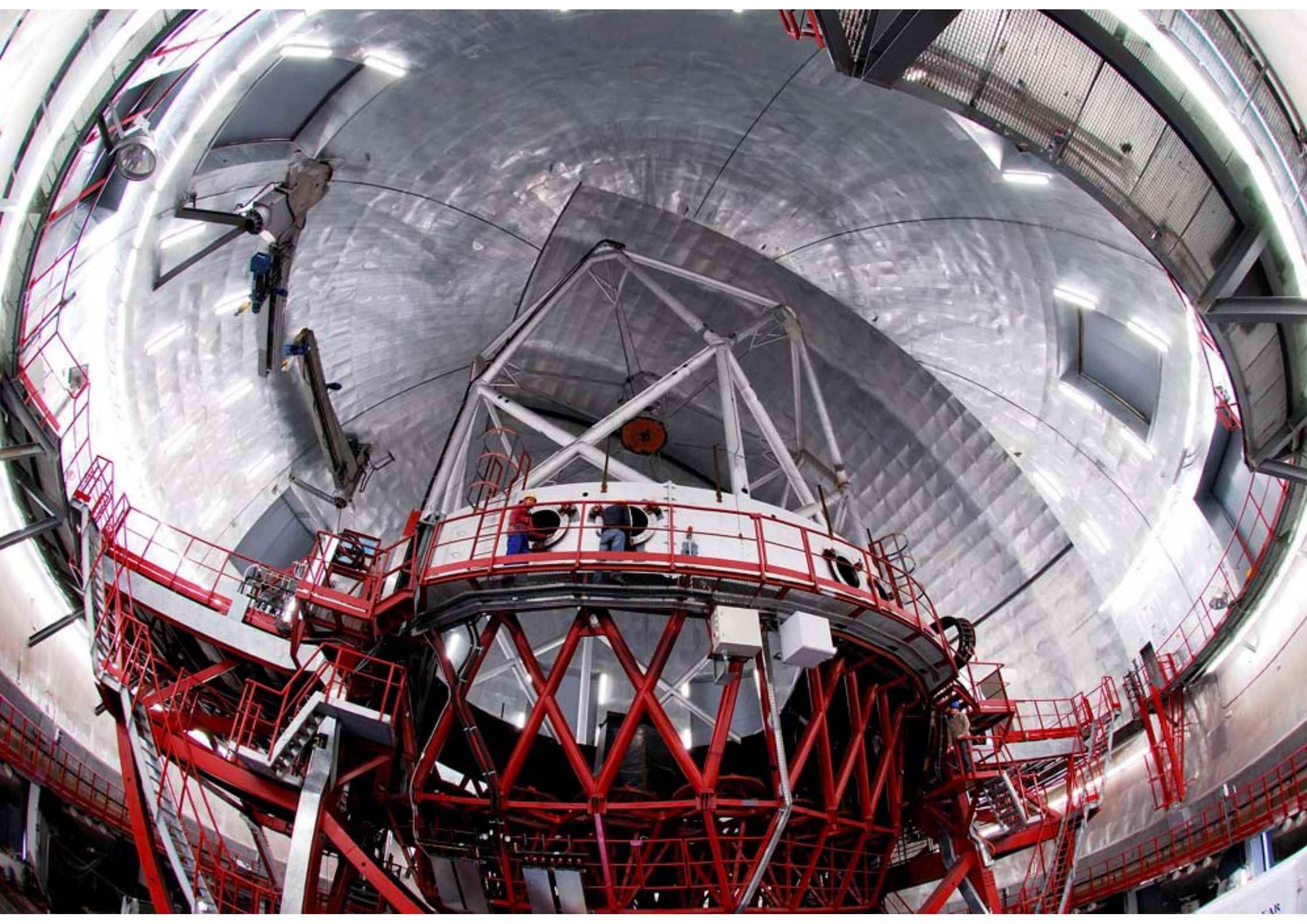


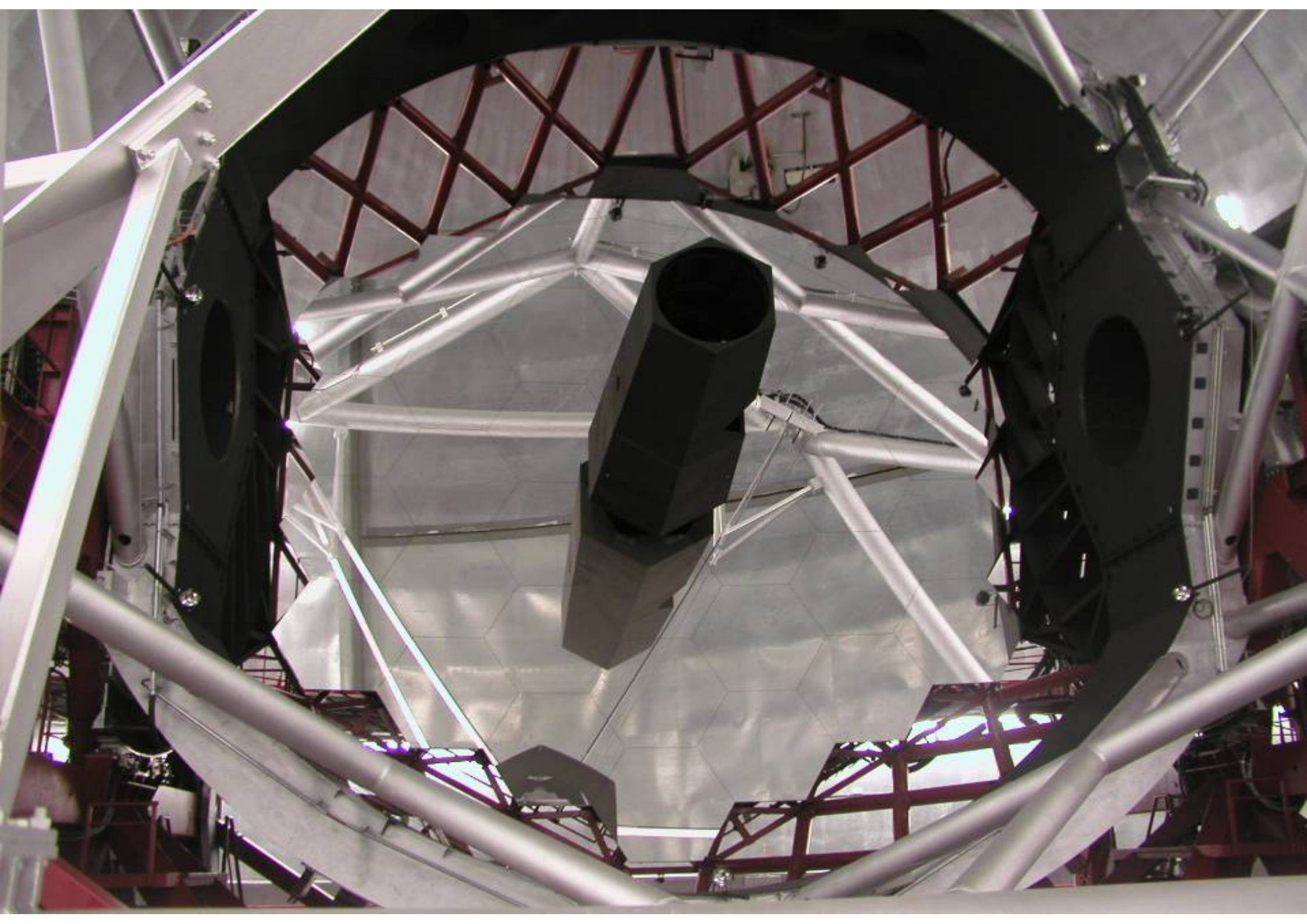


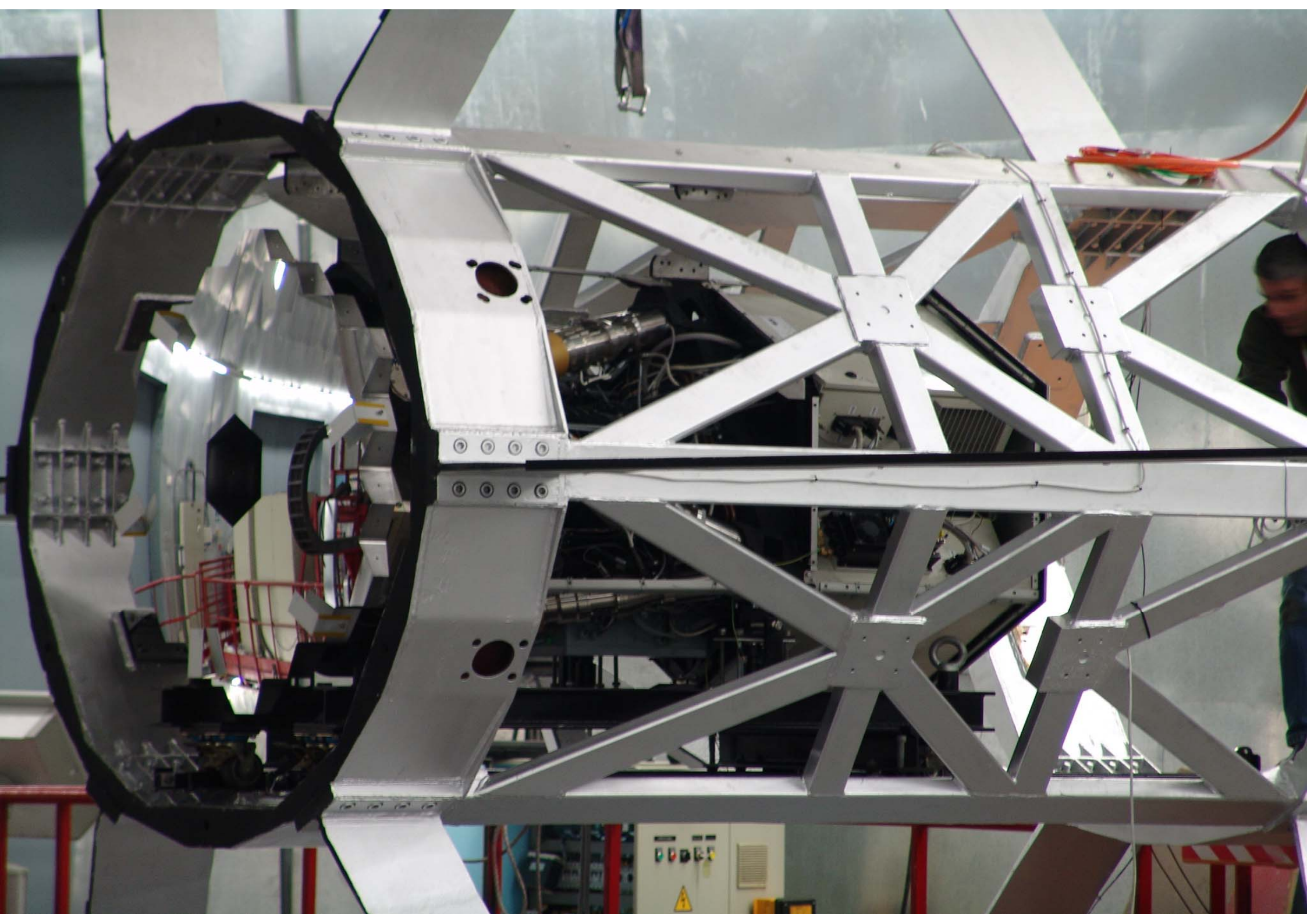
Integral Field instruments at the GTC













Telescope Status

- Routine operations started March 15 '09
- Pointing, Tracking & Guiding performing within specs.
- OSIRIS is the only science instrument
 - Modes offered:
 - Broad band imaging
 - Tuneable Filter imaging (Red TF only)
 - Long slit spectroscopy

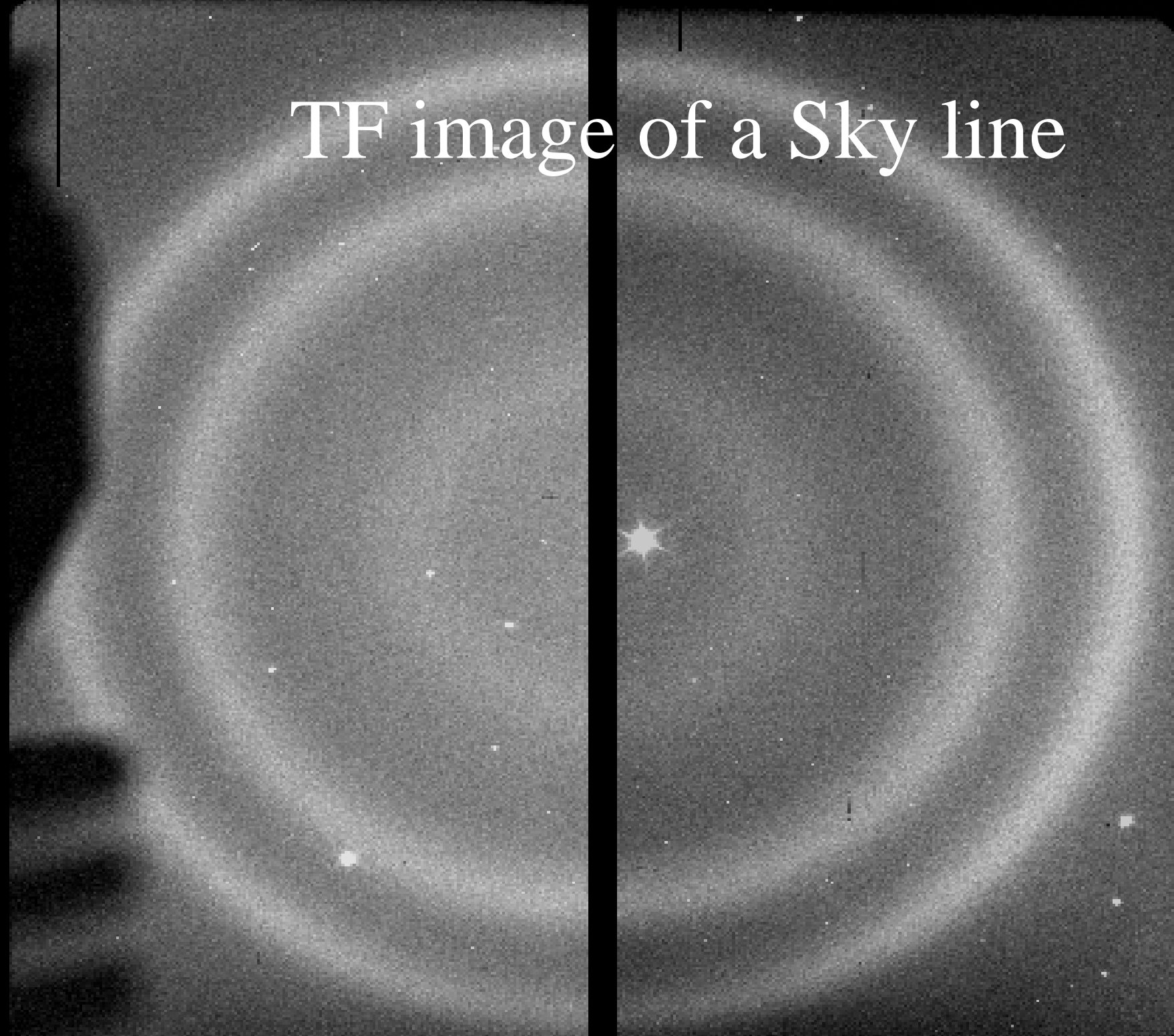


Integral Field observations with OSIRIS

- Tuneable Filter imaging
 - 8 x 8 arcmin² Field of View
 - Allows line scanning
- Starting September, the Multi-Object slit spectroscopy will be available
 - Will allow multi-object spectroscopy
 - Nod & Shuffle for better sky subtraction



TF image of a Sky line





OSIRIS RTF imaging

- Only RTF is now available. Operational range is 651.0 – 934.5 nm.
- $\Delta\lambda$ attainables:
 - 20 Å for $\lambda < 800$ nm
 - 15 Å for $800 < \lambda < 850$ nm
 - 12 Å for $\lambda > 850$ nm(minimum of 12 Å defined by OS, but it can be decreased depending on the combination λ - OS)



OSIRIS RTF imaging

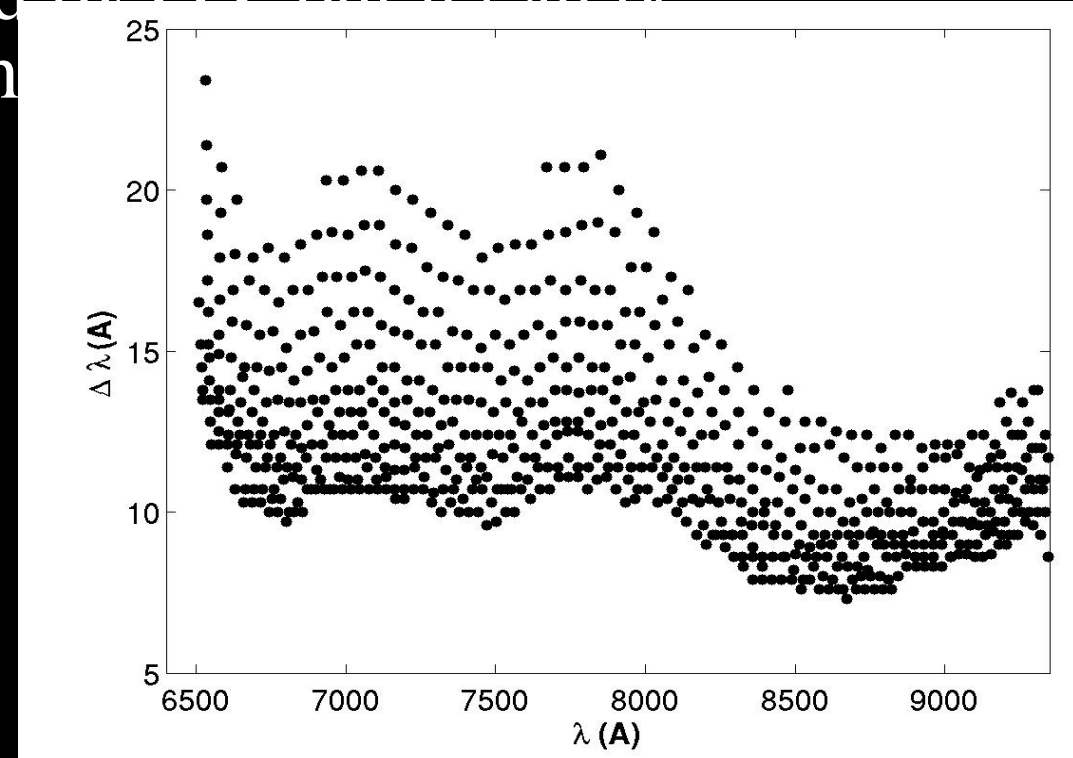
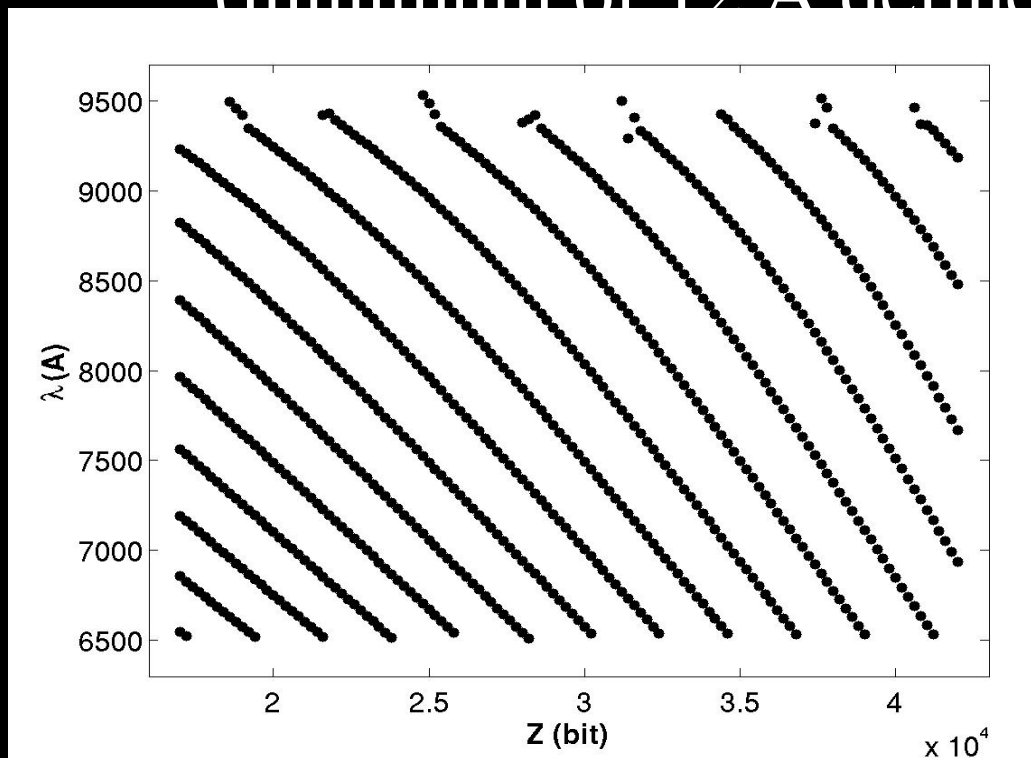
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–20 Å for $\lambda < 800$ nm

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(minimum of 12 Å defined by OS but it can be

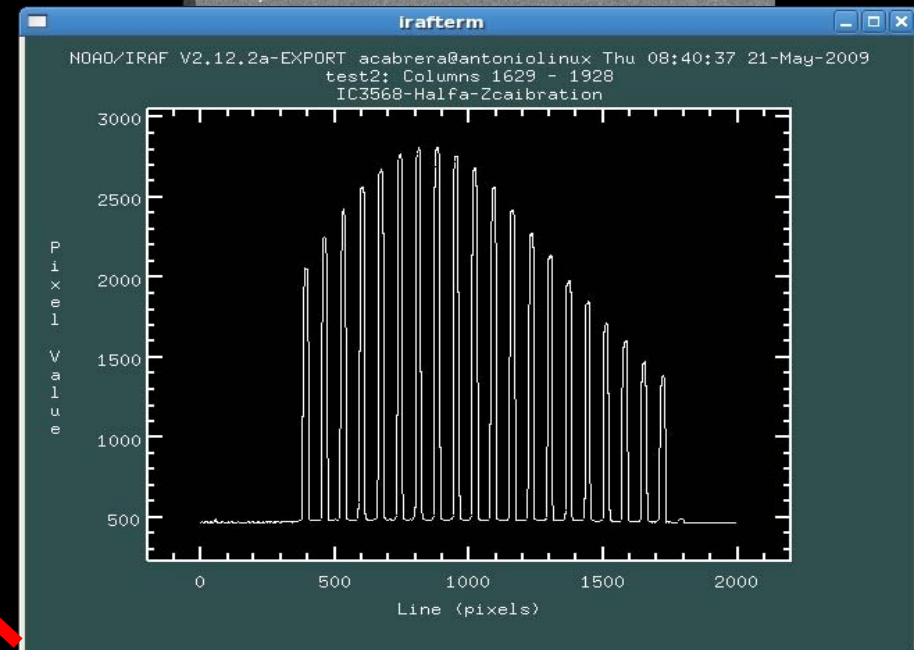
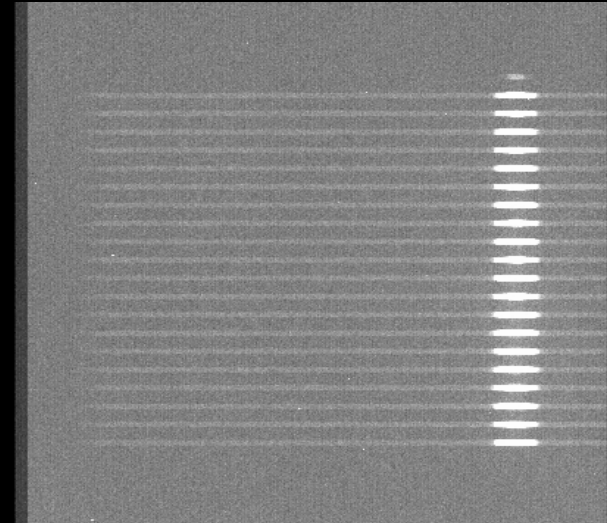
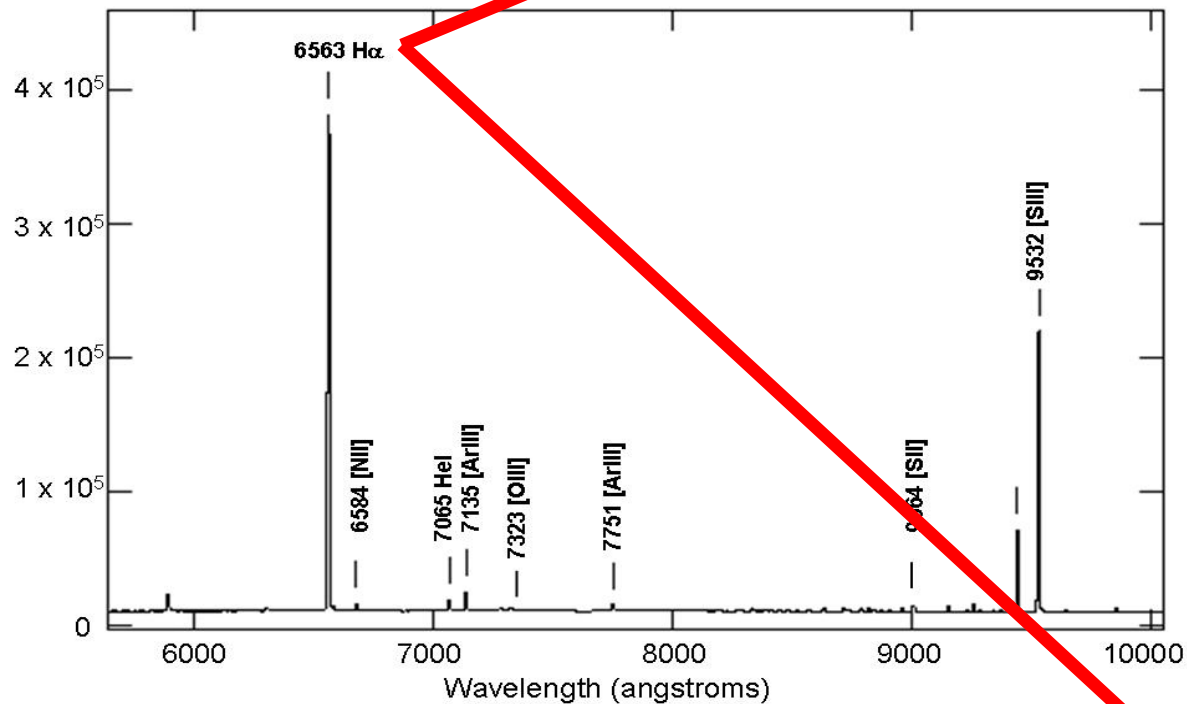




OSIRIS RTF imaging

- Comparisons on-sky with PN emission lines yields to differences of less than 0.4 Å!!

PN IC 3568 emission lines (OSIRIS R1000R)

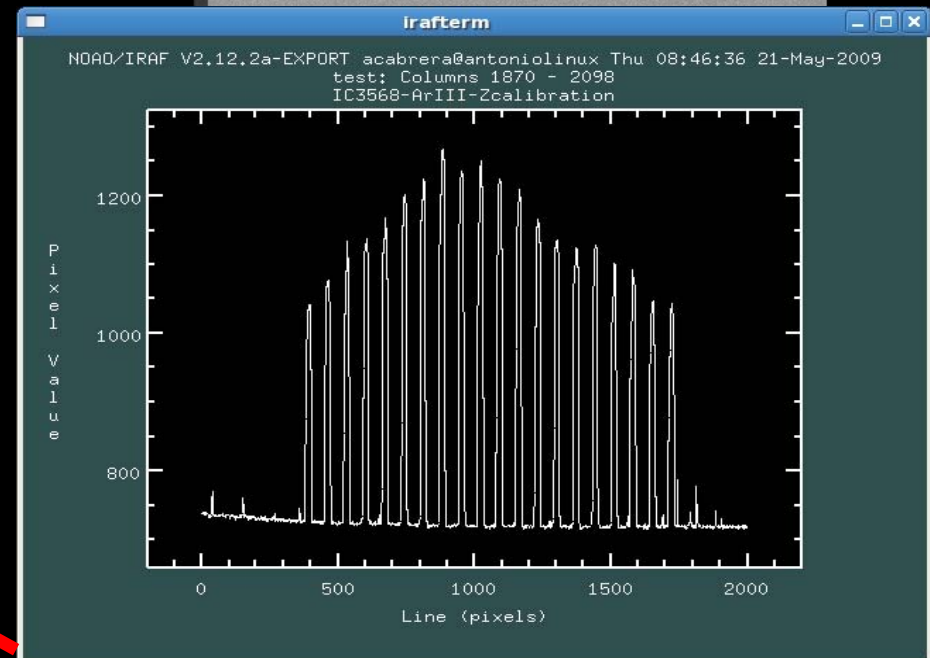
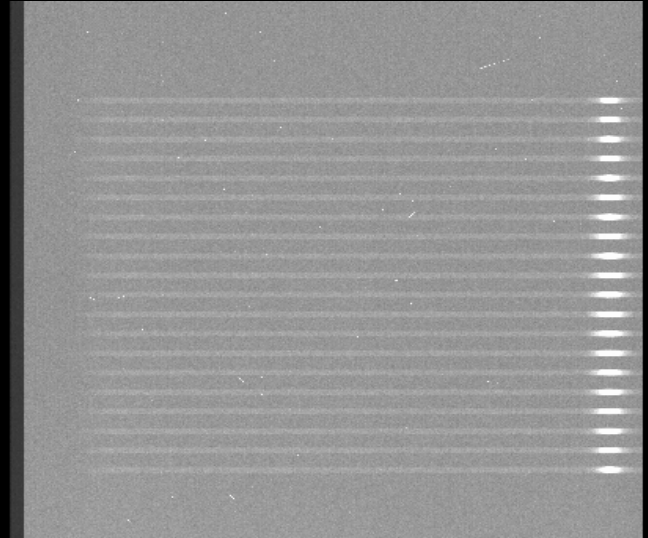
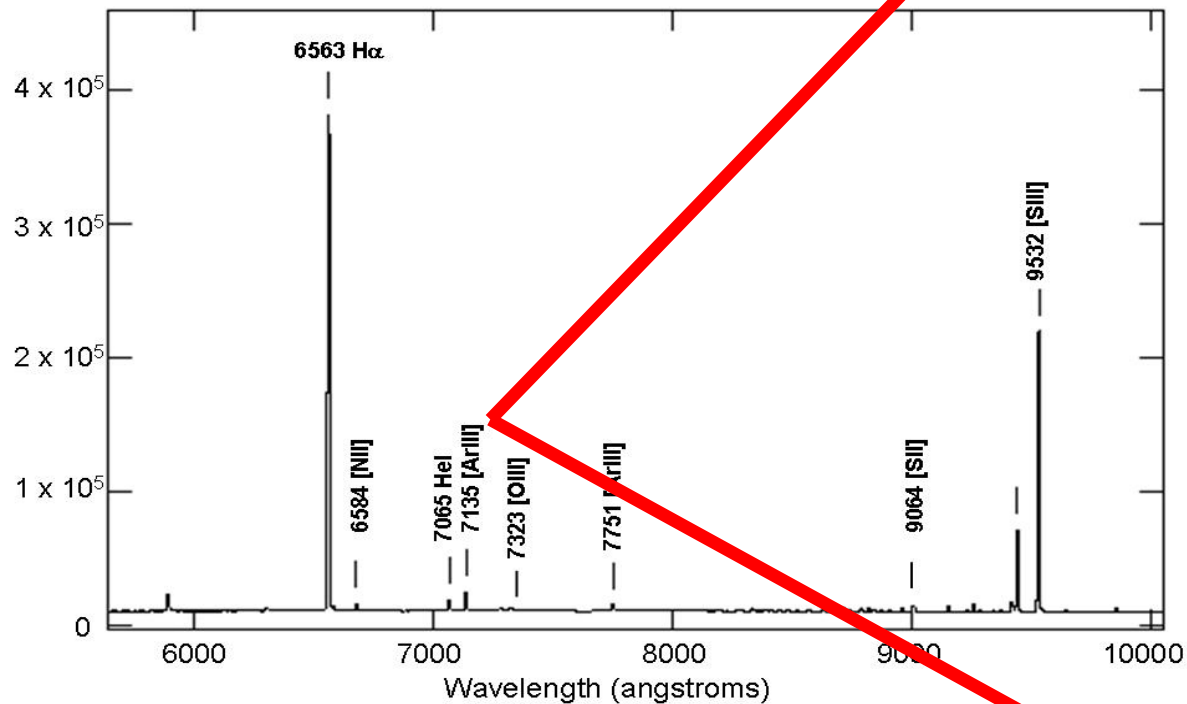




OSIRIS RTF imaging

- Comparisons on-sky with PN emission lines yield to differences of less than 0.4 Å!!

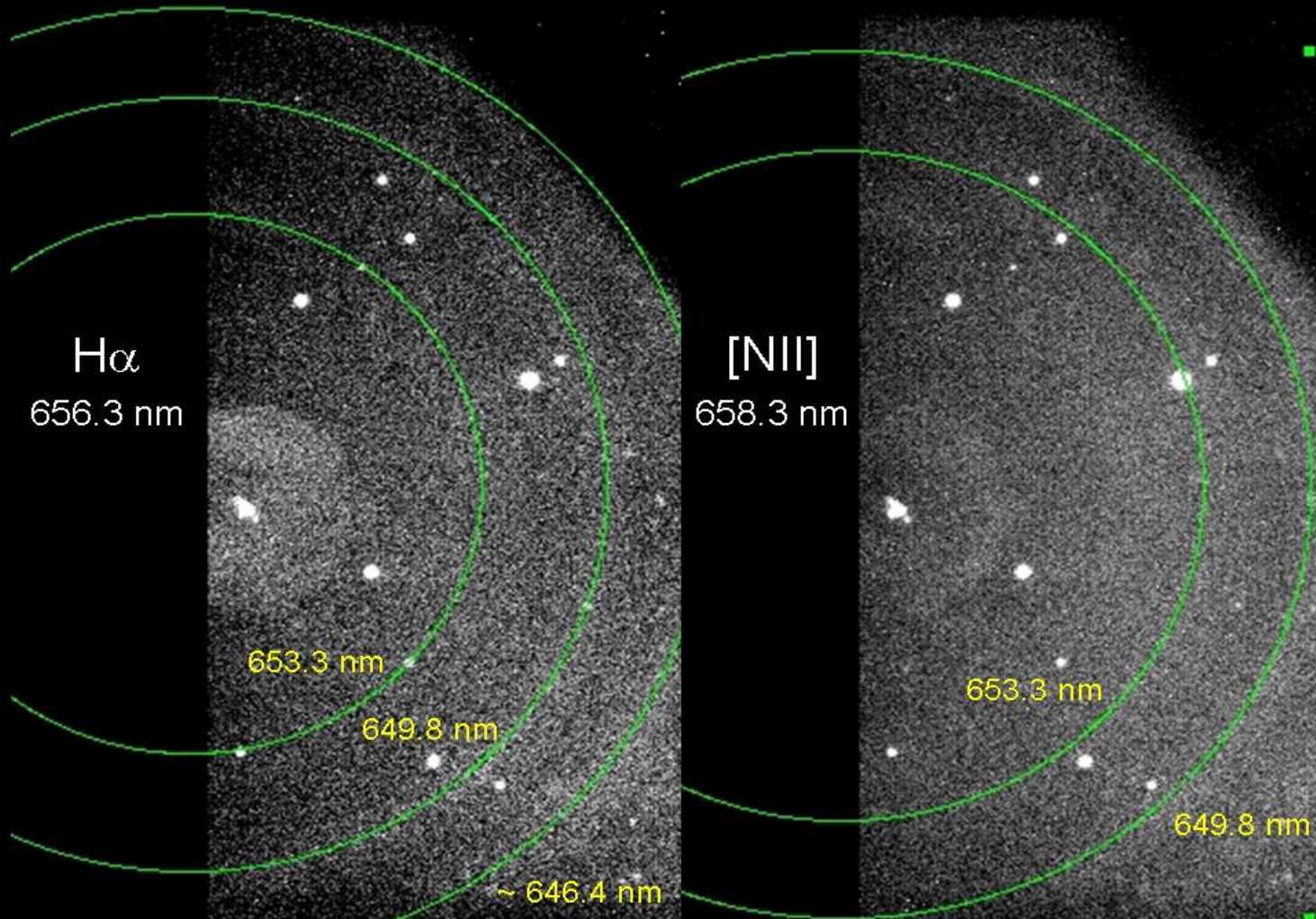
PN IC 3568 emission lines (OSIRIS R1000R)





OSIRIS RTF imaging

- Sky lines can be used as additional calibrators, but you need one!



RTF Calibration is reliable!!!

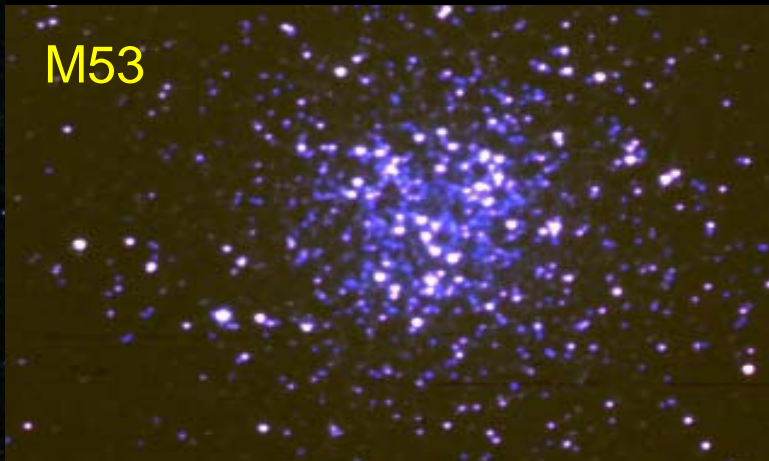


Examples of OSIRIS performance

(not the best ones...)



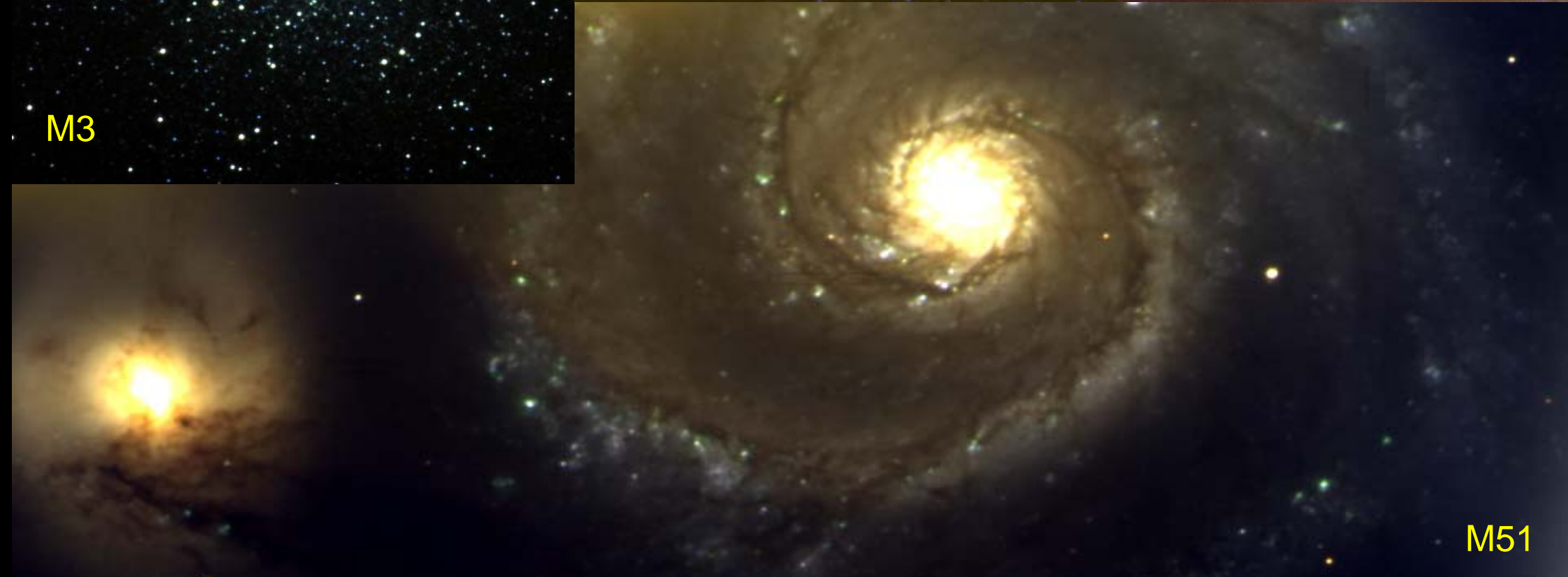
M3



M53



M83



M51



EMIR

- EMIR will be available in 2011
- Will allow for Multi-object cryogenic near IR spectroscopy
- 6 x 4 arcmin² field of view for spectroscopy
- Resolving power of up to 4500 in the J, H & K bands
- Micro-dithering of the detector array will help subtracting background
- EMIR is now starting assembly in the lab.



FRIDA

- FRIDA is by design a full fledged IFU instrument
- Will use the GTC Adaptive Optics System
- Being built in Mexico, under the leadership of Beto López (UNAM, Ensenada)
 - Strong collaboration with Florida, the IAC & the UCM
- Should be at the telescope by 2012



FRIDA: Instrument Definition

Imaging Mode with 3 scales: three Cameras

Spectro-Imaging mode with three Resolving Powers

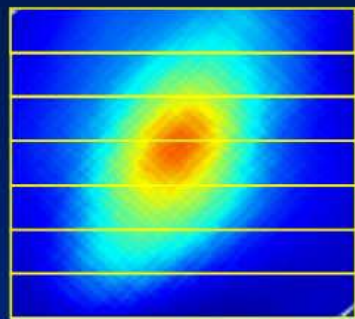
$$R = \lambda / \Delta \quad \lambda = 1400, 4000 \text{ \& } 30\,000$$

0.9 μm to 2.5 μm Diffraction Limited

Cryogenic Instrument

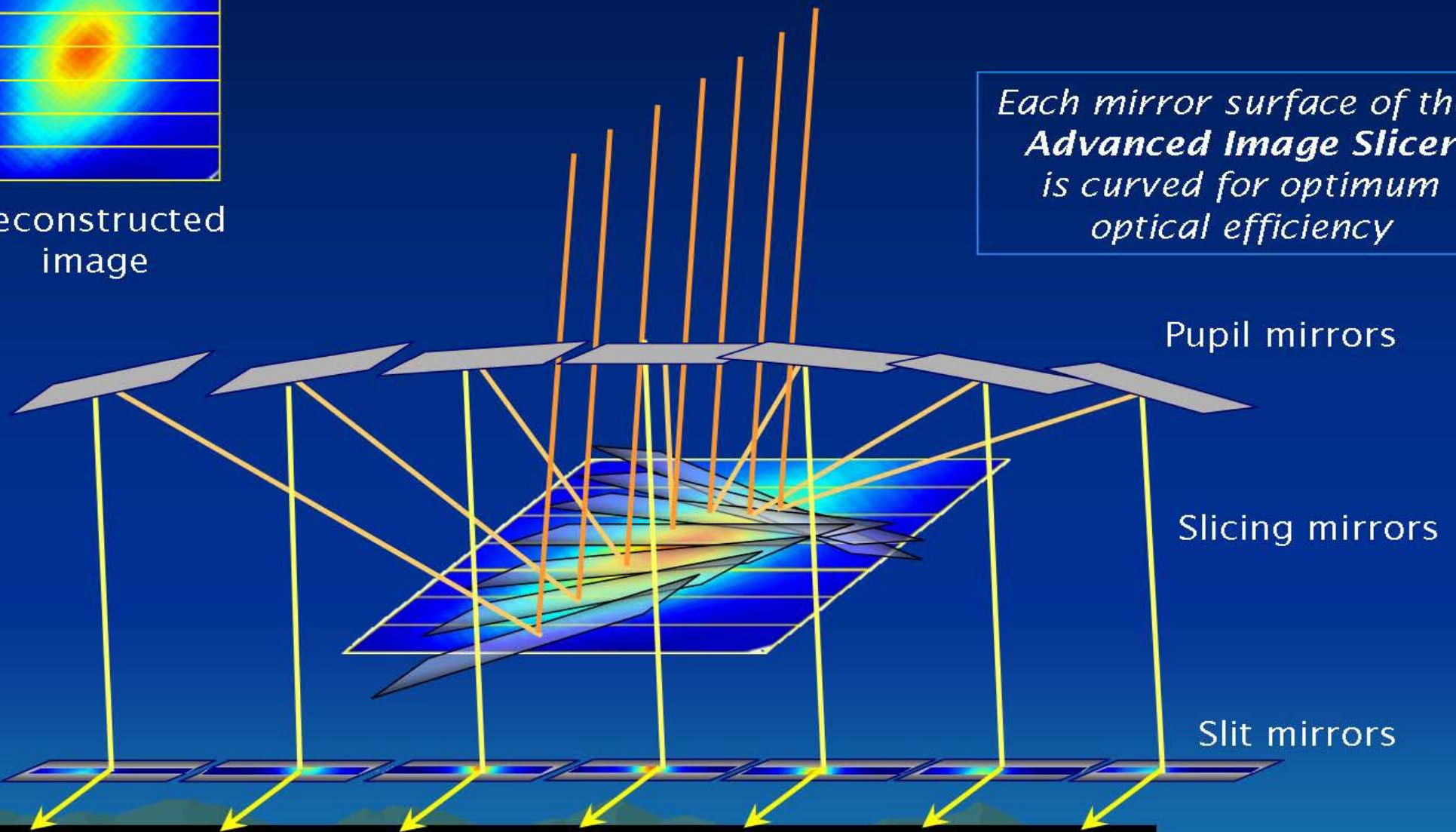
One 2048X2048 HgCdTe Detector (Hawaii II) For both modes

Image slicing 101



Reconstructed image

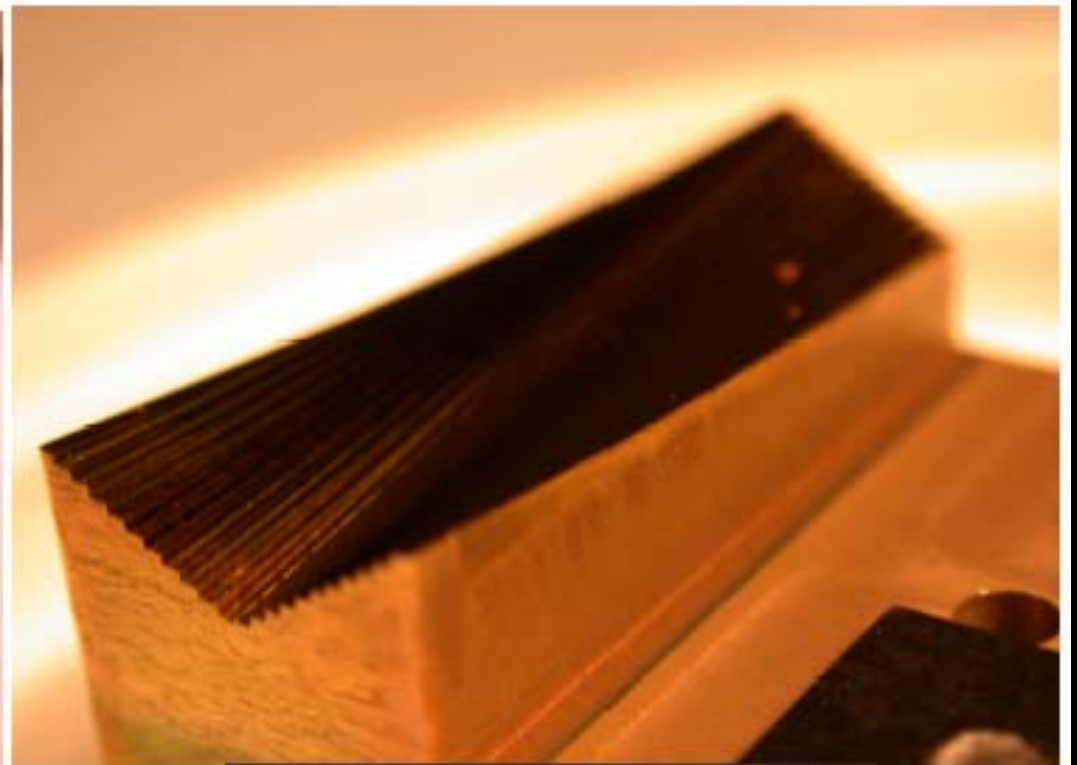
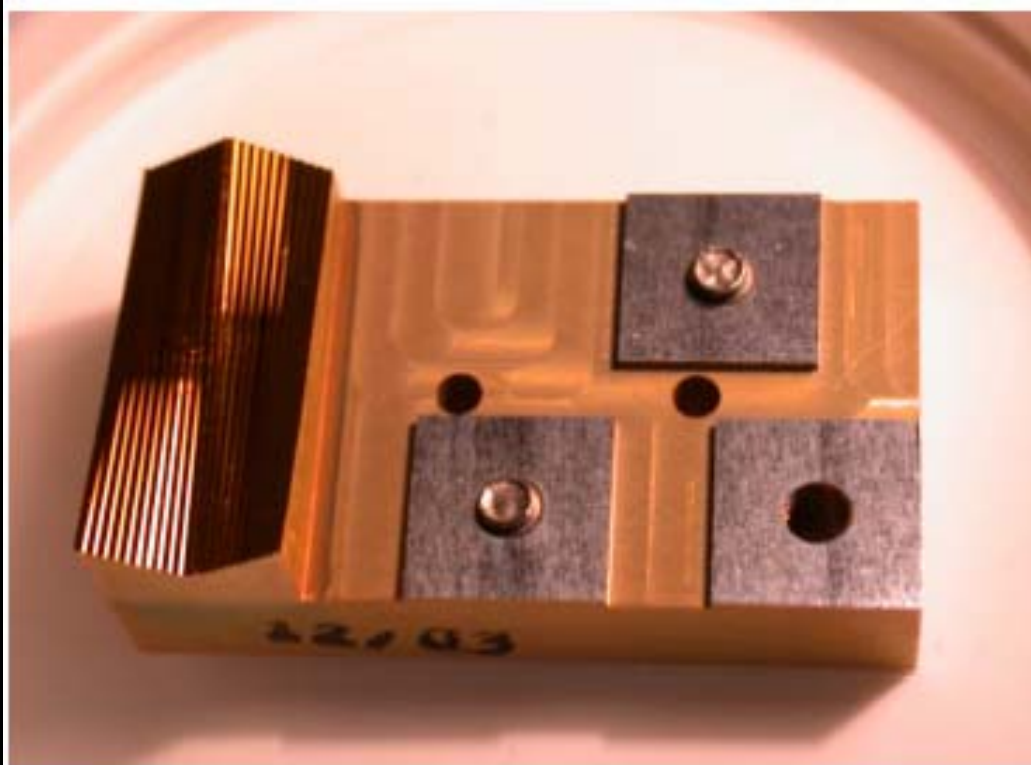
*Each mirror surface of the **Advanced Image Slicer** is curved for optimum optical efficiency*





FRIDA: Instrument Definition

- Integral Field Spectroscopy using an Image Slicer (Or Integral Field Unit IFU)
- FRIDA IFU based on FISICA, a monolithic IFU
- Built by University of Florida





FRIDA: Integral Field Unit



FRIDA INTEGRAL FIELD SPECTROSCOPIC MODE

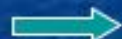
Seeing limited Frida



Diffraction limited Frida



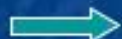
Telescope



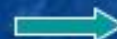
AO



System



FRIDA



Grating



IFU



Slicer



11/7/05

FRIDA Conceptual Design

Reconstructed Images