EMIR at the GTC: results on the 1st commissioning at the GTC

F. Garzón @ EMIR Team

EMIR PI

EMIR: general description

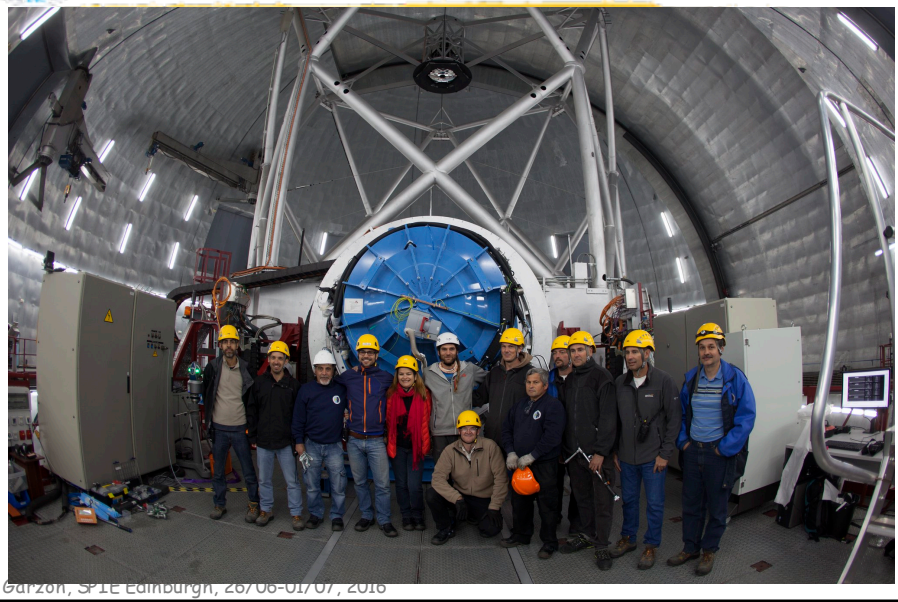
- EMIR is a NIR Imager and multi-object spectrograph, which will be a common user instrument for GTC

Spectral Range	0.9-2.5μm[1.1-2.5μm]	MOS mode	
Top priority	MOS in K band	FOV	6,7x4 arcmin (55 slitlets)
Spectral Resol.	5000,4250,4000 (JHK) ~1000 HK + YJ	Sensitivity	K~20.1 in 2h @ S/N=5 (continuum)
Spectral coverage	1 single window/exp.		1.4×10^{-18} erg/s/cm^2/Å @ S/N=5 (line)
Detector	HAWAI2 2048^2	Image mode	
Plate Scale	0.2 arcsec/px	FOV	6.7x6.7 arcmin
Image quality	θ_{80} < 0.3 arcsec	Sensitivity	K~22.8 in 1h @ S/N=5 in 0.6 arcsec aperture

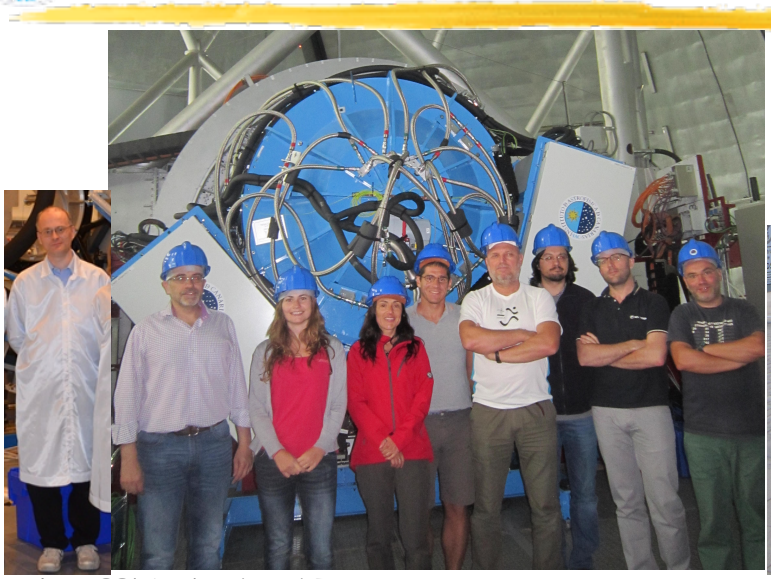
EMIR TEAM (now)

- IAC:
  - M. Barreto
  - N. Castro (Cog.)
  - P. Fernández
  - M. Insausti (Cog.)
  - E. Joven
  - P. López
  - E. Manjavacas (Cog.)
  - A. Mato
  - M. Miluzzio (Cog.)
  - M. Núñez
  - H. Moreno
  - J. Patrón
  - J.L. Rasilla
  - P. Redondo
  - J. Rosich
- UCM:
  - N. Cardiel (Cog. +)
  - J. Gallego
  - S. Pascual (Cog. +)
- LAM
  - R. Grange
  - C. Gry
  - L. Martin
- LATT
  - E. Bourrec
  - R. Pelló
- Sci. Team
- Externals
  - P. Hammersley (ESO, ST, Cog. +)
  - J. Molgó (GTC, Cog. +)
  - C. González (IoA, Cog.+)

The integration team

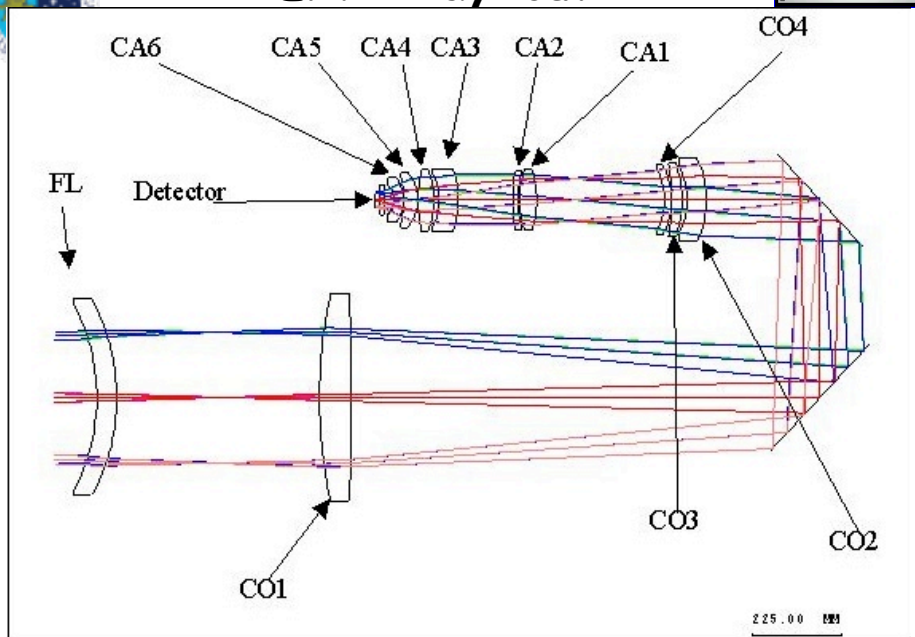


The commissinioning team

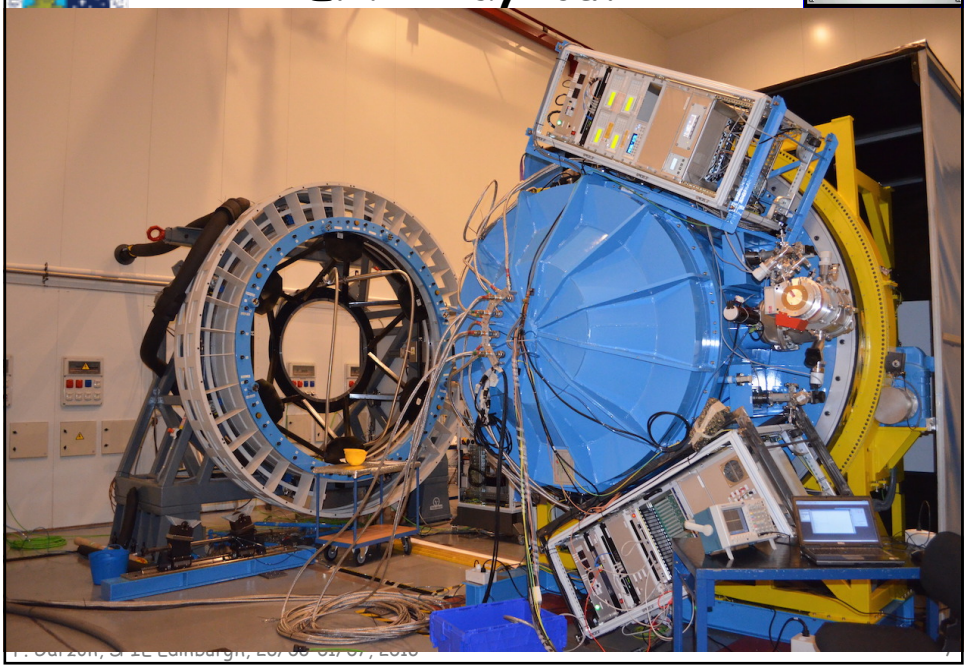




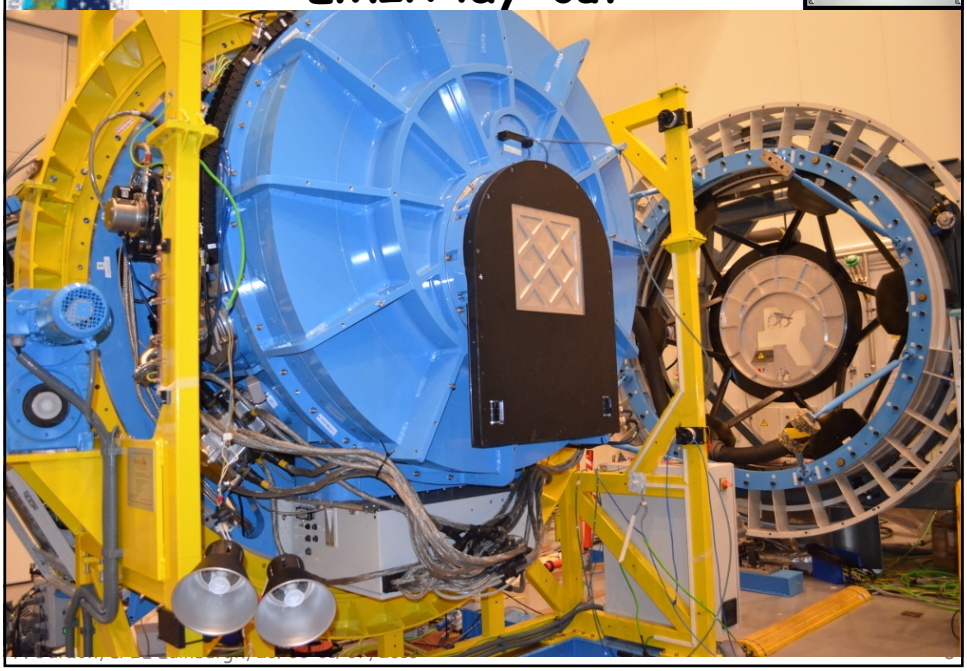
EMIR lay-out



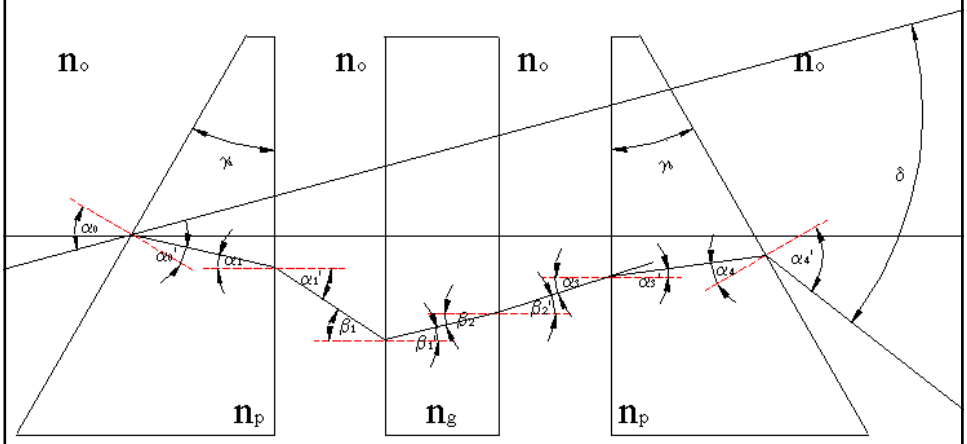
EMIR lay-out



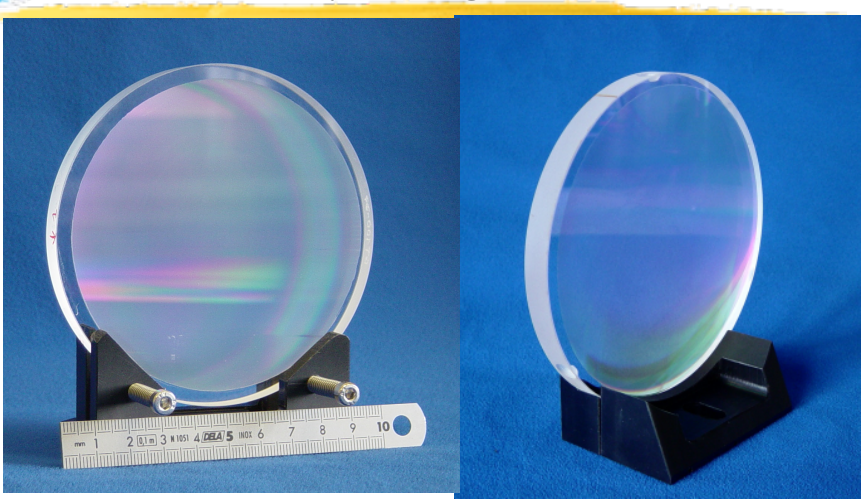
EMIR lay-out



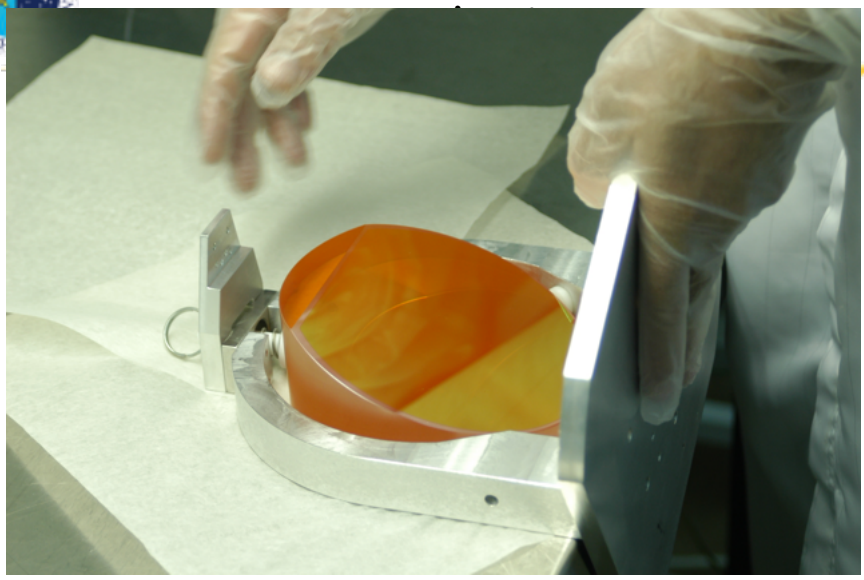
Dispersive element: pseudogrism



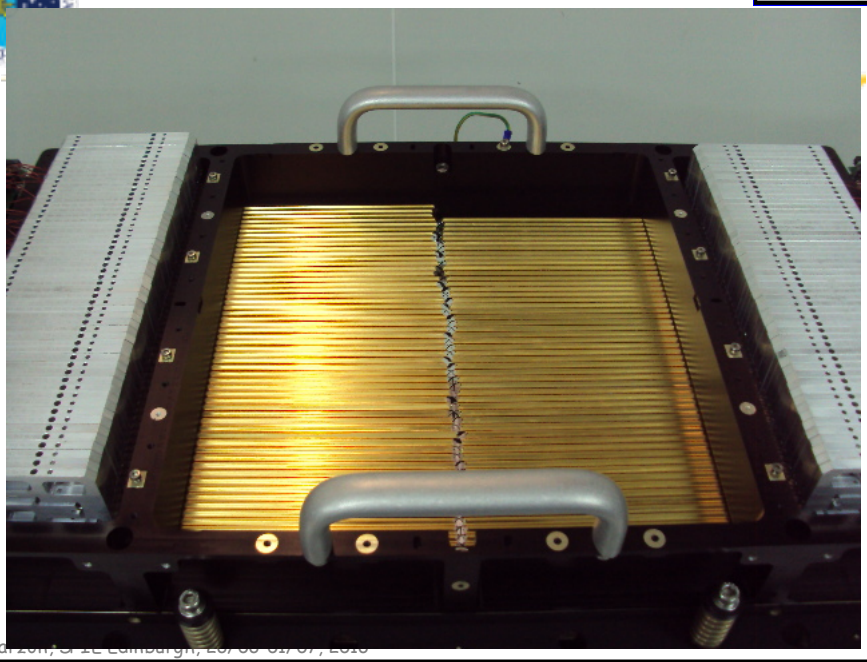
Dispersive element: pseudogrism



Dispersive element:



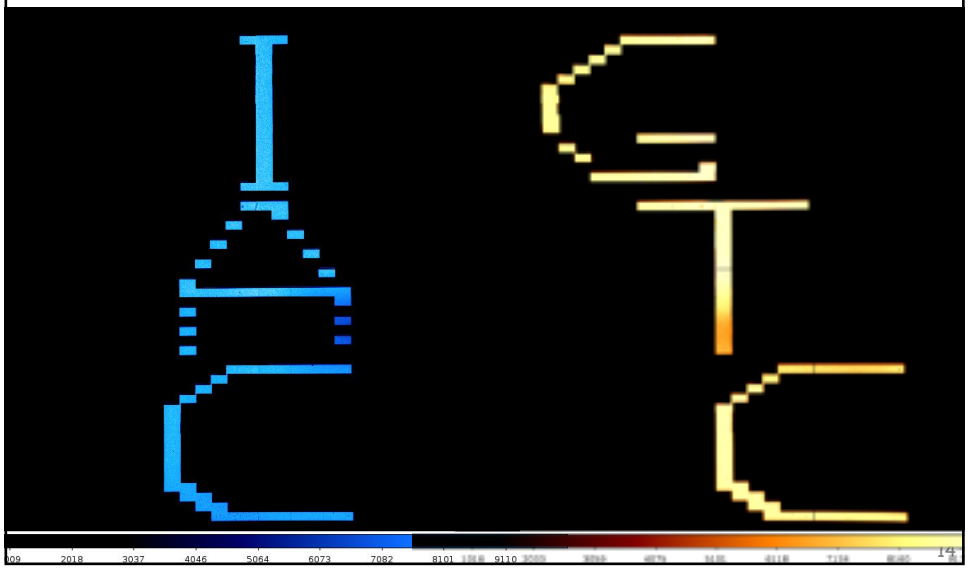
CSU



Mechanisms: CSU

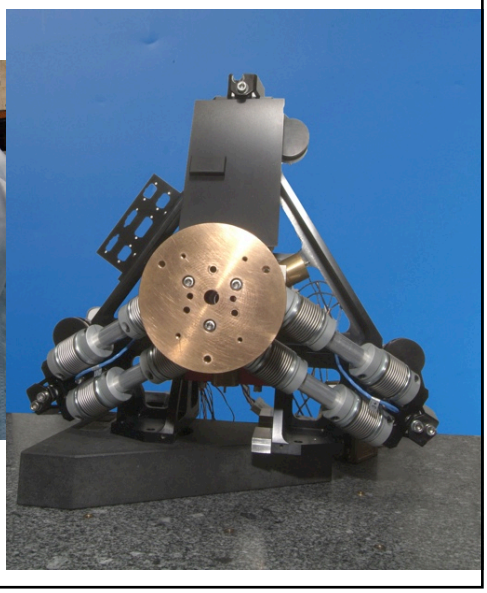
- Slits can be positioned in steps of ~7µm
  - nominal slit width of 3pxs. ~ 500µm
- DRP can detect slit positions at 0.15px level (to be improved)
- Unit stable and repeatable

Mechanisms: CSU



Mechanisms: DTU





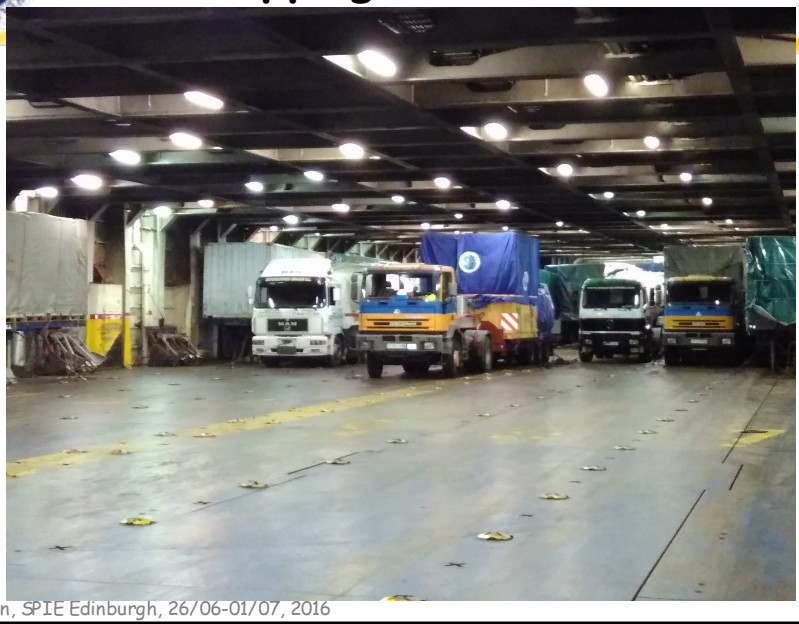
Mechanisms: DTU

- Travel:
  - $(XY)_{DTU}$= ± 400 µm
  - Z_{DTU} =±2 mm
- Accuracy / Repeatability
  - Fine mode:
    - $(XY)_{DTU}$ < 0.5 µm (for 2.4µm tr.) / < 1µm
  - Raw mode
    - $(XY)_{DTU}$ < 6 µm (for 74µm tr.) / < 9µm
  - Z_{DTU} < 5 µm / < 5µm

Shipping to GTC



Shipping to GTC



Shipping to GTC



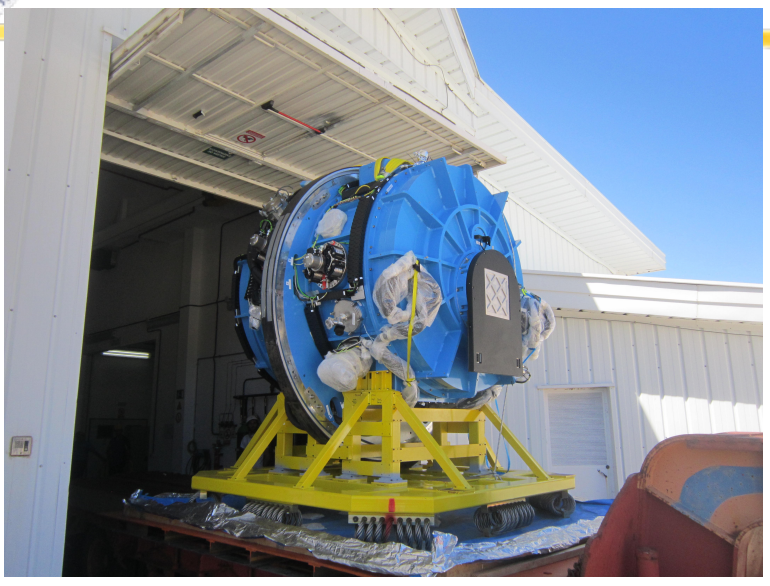
Shipping to GTC



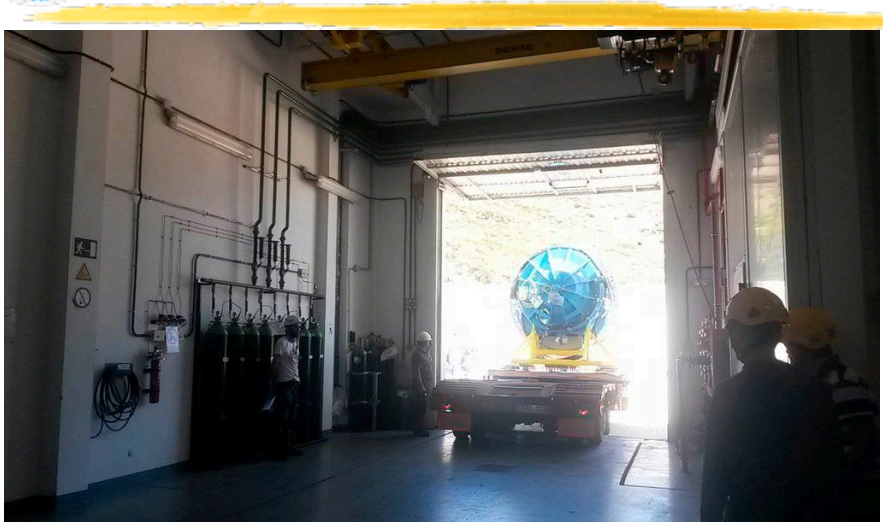
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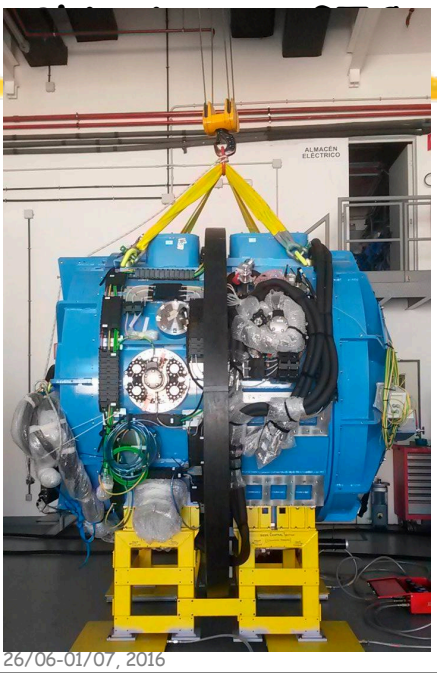


Shipping to GTC

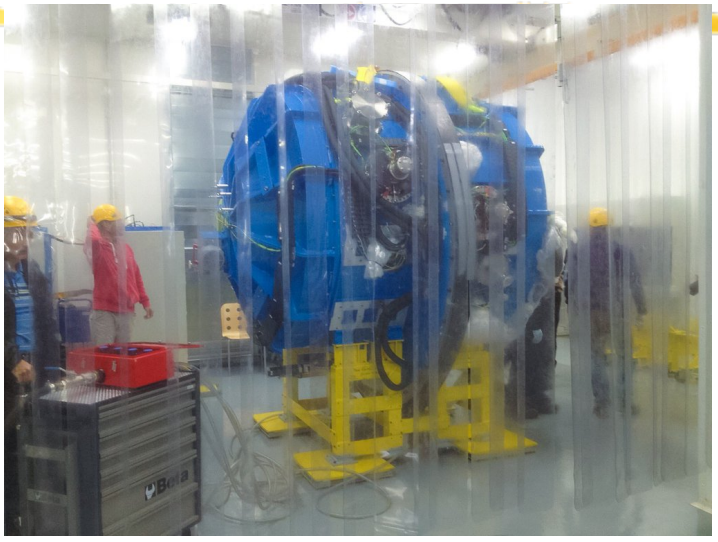


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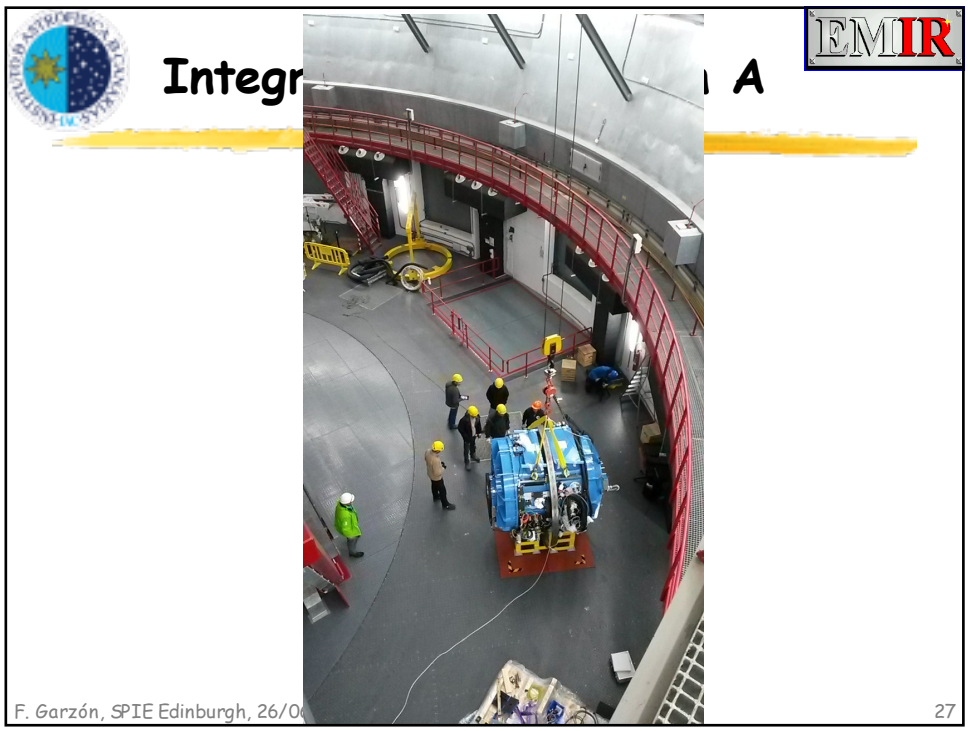


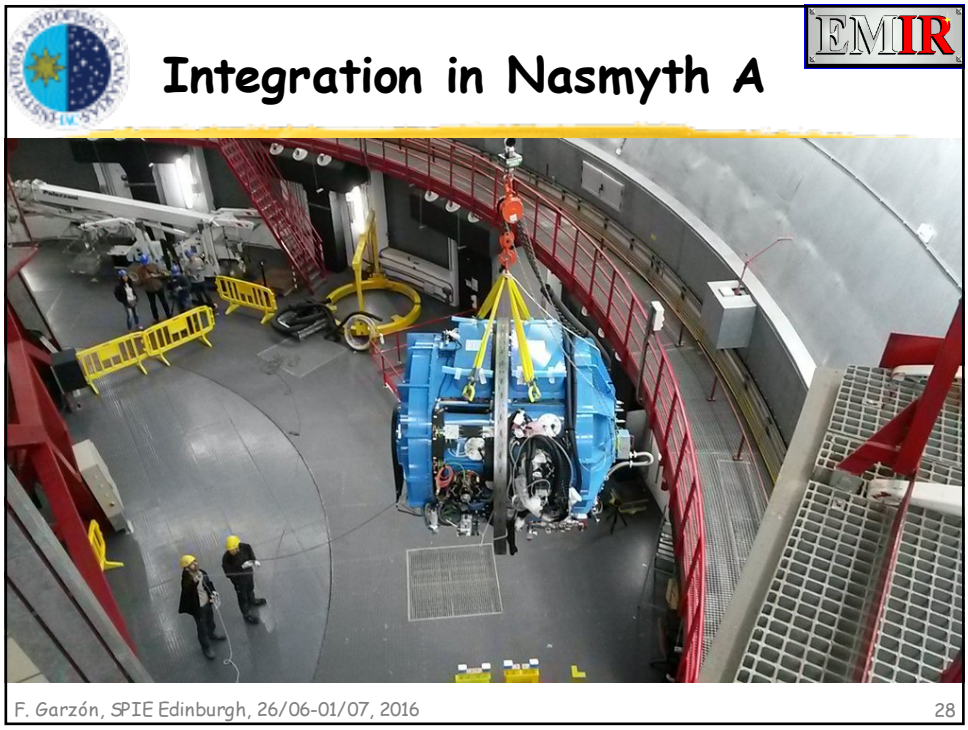
Shipping to GTC



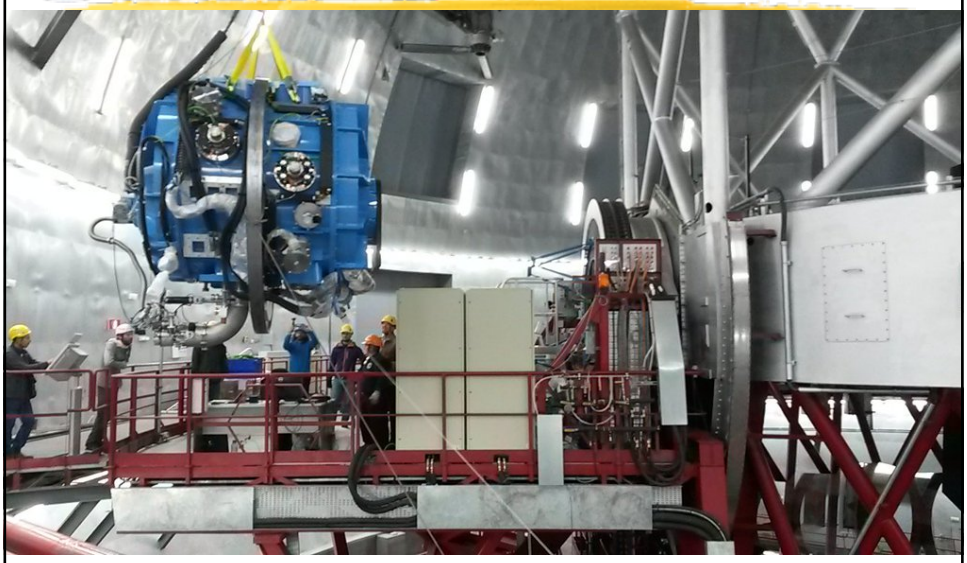
Integration in Nasmyth A



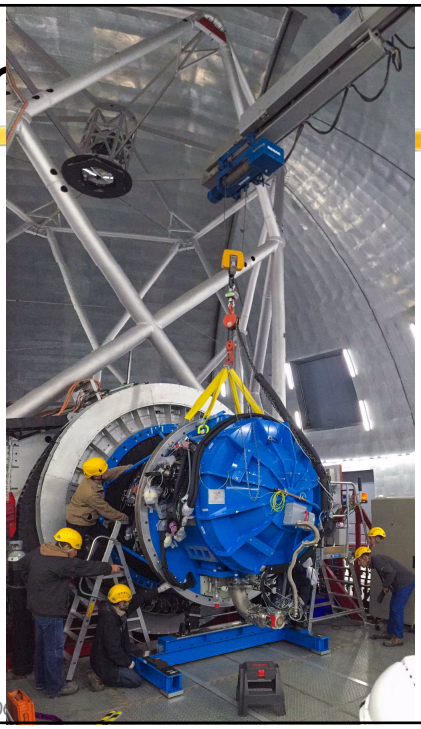

Integr
A
EMIR
F. Garzón, SPIE Edinburgh, 26/0
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Integration in Nasmyth A
EMIR
F. Garzón, SPIE Edinburgh, 26/06-01/07, 2016
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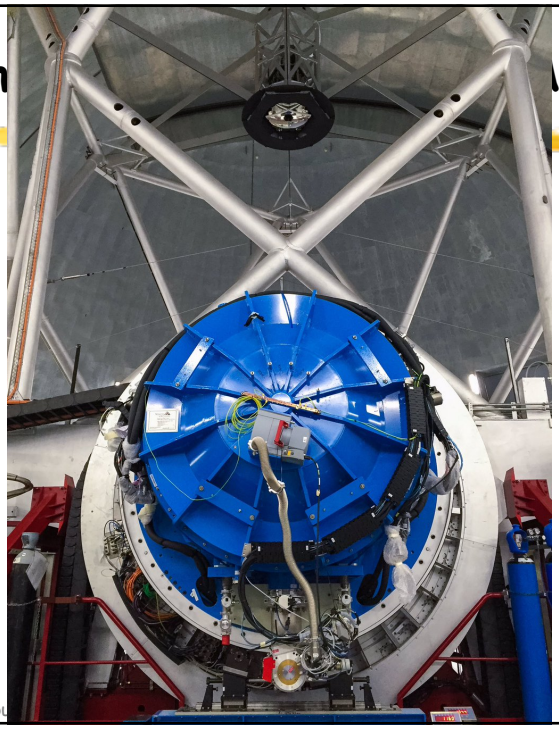
Integration in Nasmyth A



Integr A



In



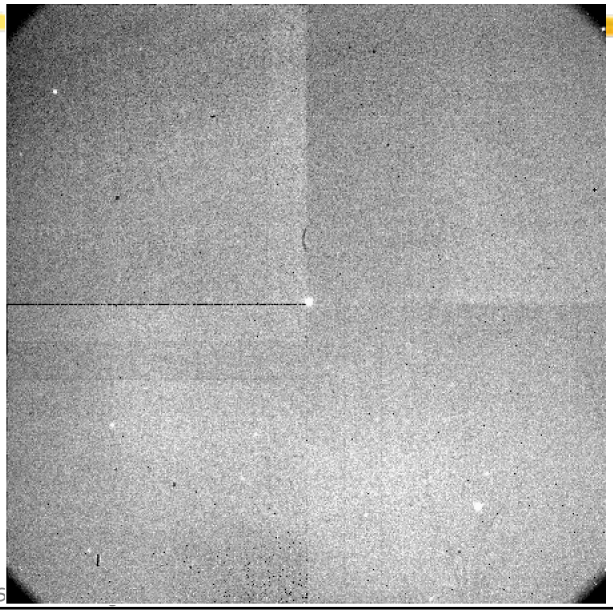
EMIR

Last 30 days resumé

EMIR

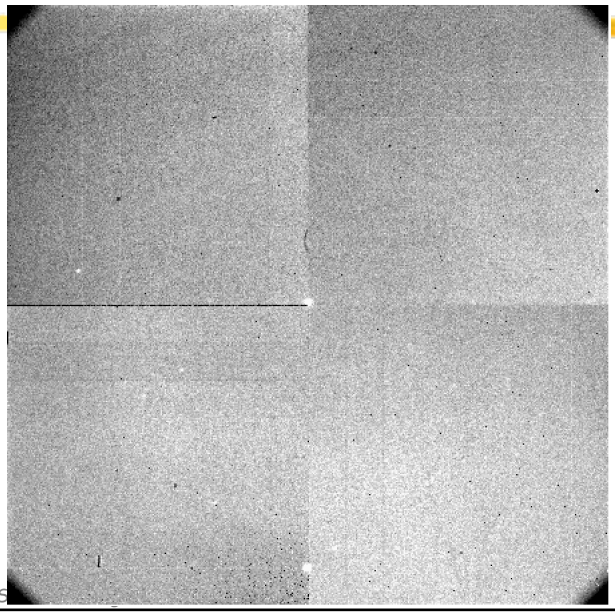
- May, 20th: EMIR arrives to the GTC
- May, 23th : integration beguin
- June, 2nd: lifted to Nasmyth platform
- June, 13th: start of comm1

Some results



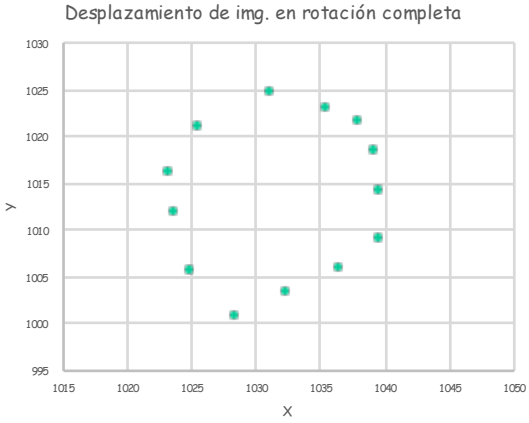
1st image

Some results



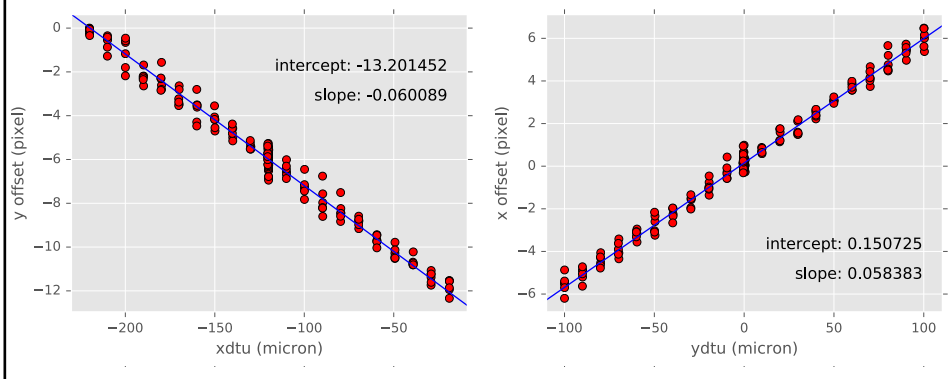
2nd image
IPA + 30°

Some results

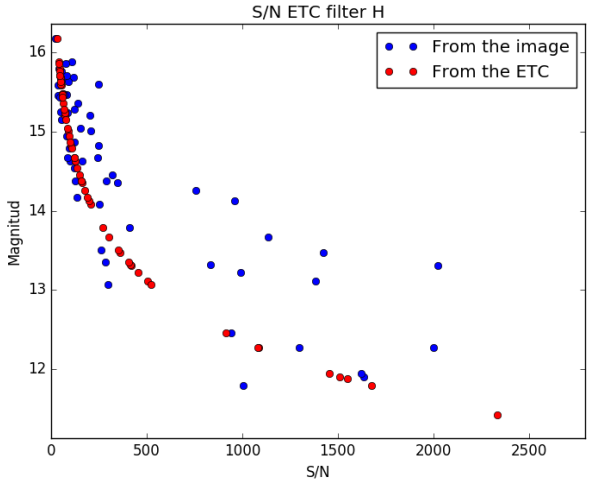


- This correction will be incorporated to the GTC pointing model.

DTU calibration

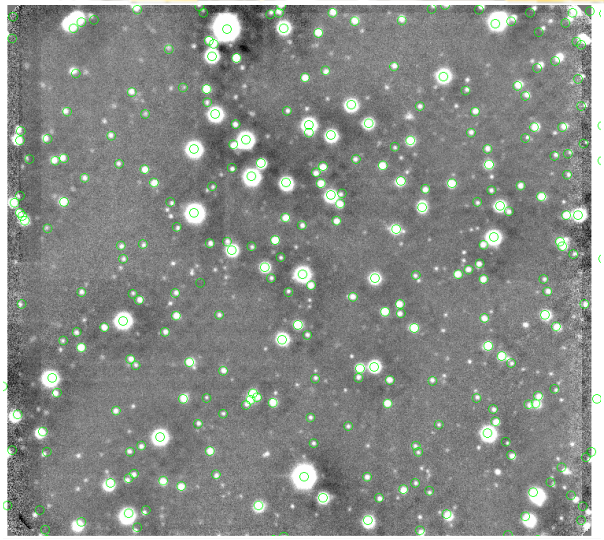


Some results



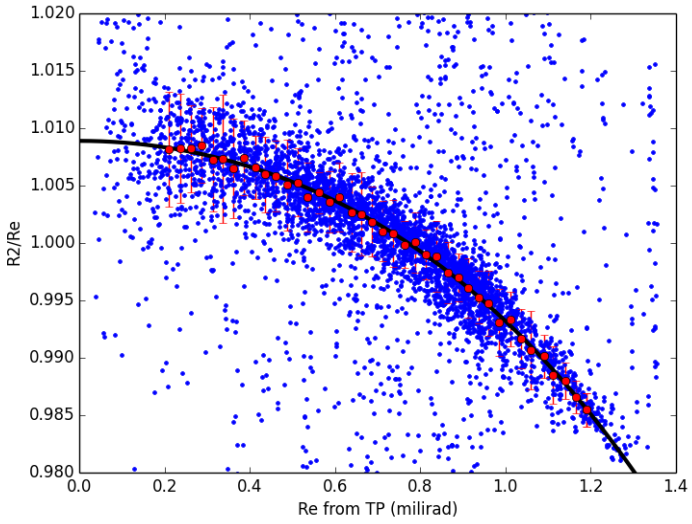
Some results

Astrometry:
6811 vs 2MASS

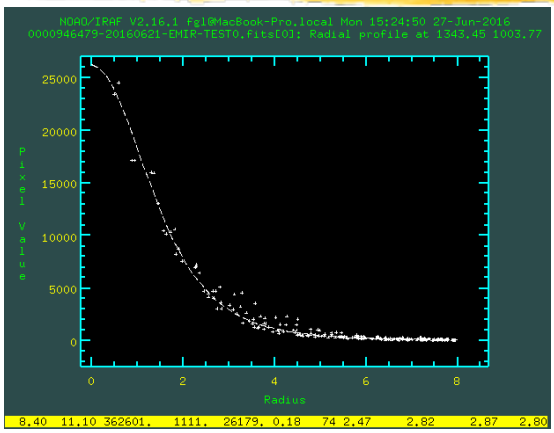


Some results

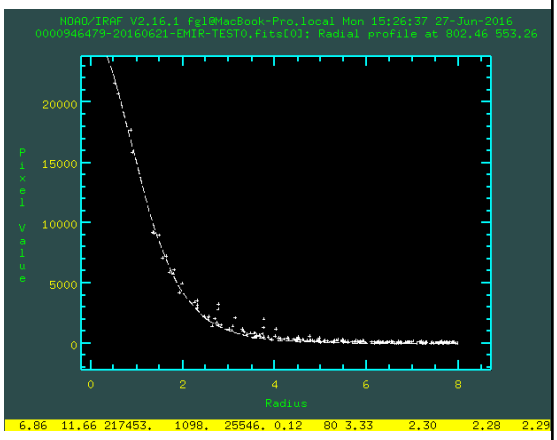
Astrometry:
Radial distortion



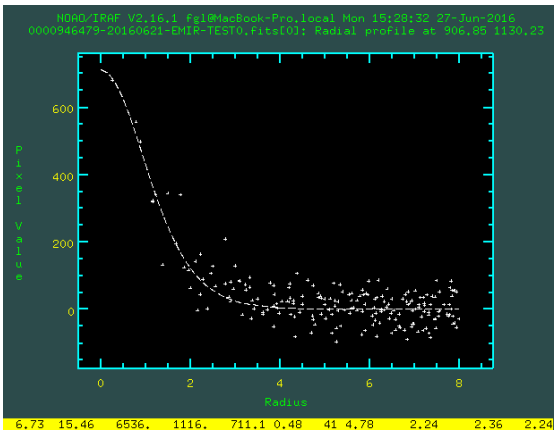
Some results



Some results



Some results



Detector performances

- GAIN: 4±0.47 e-/adu
- RON: 5.23 adu, 1 read ➜ 14.66 e^-, ramp*10
- DC: 0.09 adu/s ➜ 0.36 e^-/s
- Linear Range (<1%): 45571±727 adu
- Saturation (>5%): 46077±682 adu
- Cosmetic:
  - Bad pixels: 0.05%
  - Hot pixels: 1.11%

Some results

- Zero Points JHKs:
  - ZP_J=25,14±0,17
  - ZP_H=25,26±0,21
  - ZP_{Ks}=24,81±0,33
- Plate scale: 0.1945arcseg/px.
  - Geom. Dist. < 1.5%
- Pupil properly aligned w/o vignetting
  - Recalibration of the Grism Wheel positions
- Procedures for SKY & FLATS set
  - Dark flat problematic at GTC
  - SKY w & w/o sky frames
- Main observing mode sequences established

Some pictures

NGC6811



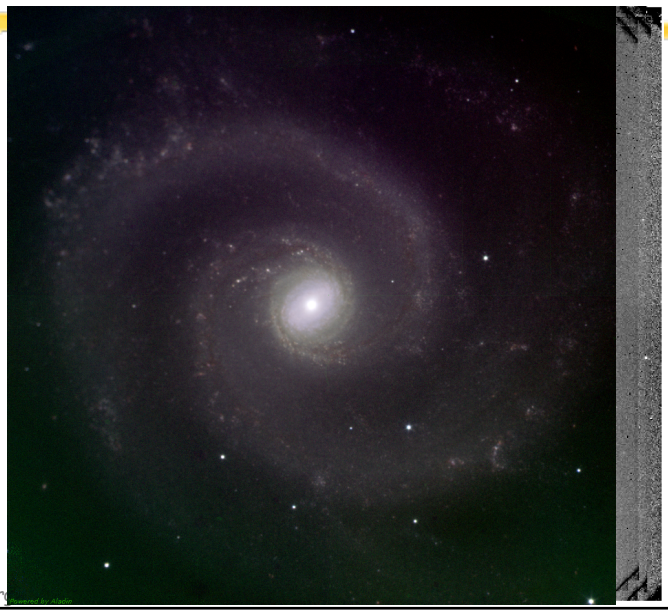
Some pictures

M57-Lyra

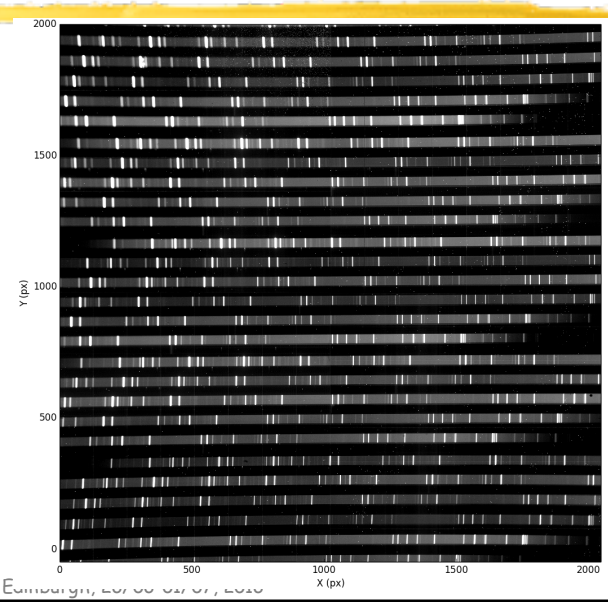


Some pictures

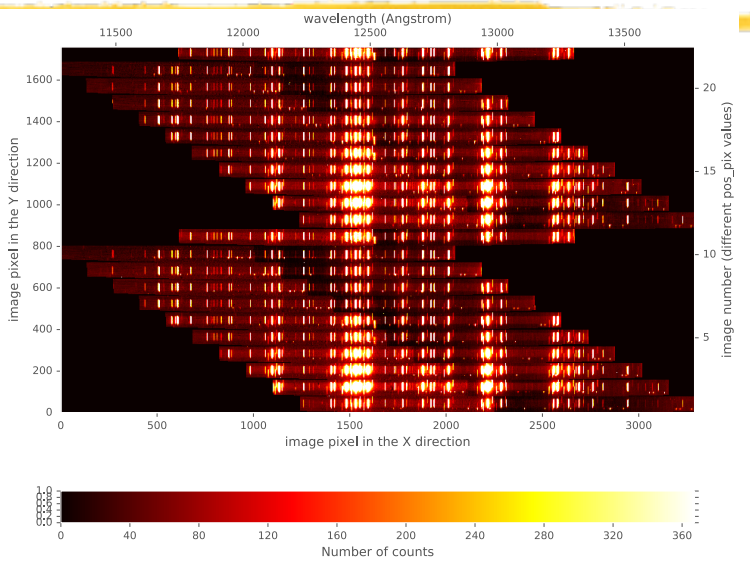
M51



Spectral Arc



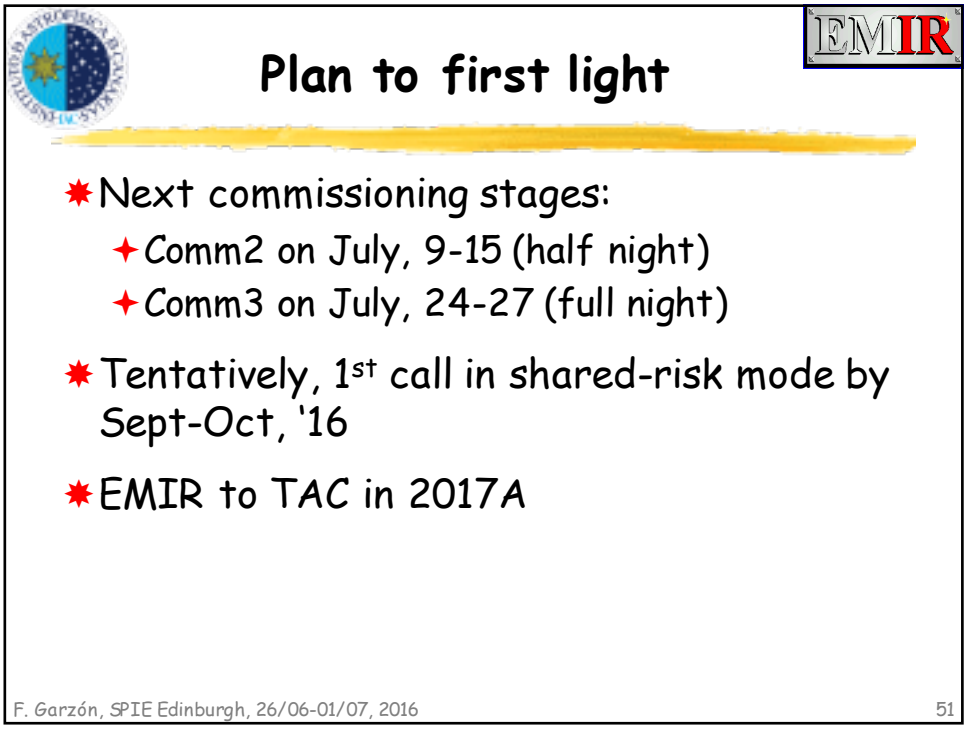
Spectral Arc



Arc, Grism J, slits 3 and 4 in 11 positions

Obs. Modes for early times

- Images
  - STARE+DITHERED
    - SKY frames
    - SKY from img. Frames
  - MOSAIC
- Spectroscopy
  - LS: 5 slit positions, 4 width each + wide slit for flux calibration
  - MOS
    - 2/3 slitlets joined per position


EMIR
Plan to first light
Next commissioning stages:
Comm2 on July, 9-15 (half night)
Comm3 on July, 24-27 (full night)
Tentatively, 1st call in shared-risk mode by Sept-Oct, '16
EMIR to TAC in 2017A
F. Garzón, SPIE Edinburgh, 26/06-01/07, 2016
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