

# The 10.4m Gran Telescopio CANARIAS Instrumentation Capabilities



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## GTC Description

The Gran Telescopio CANARIAS (GTC), is currently the largest and one of the most advanced optical and infra-red telescopes in the world. Its primary mirror consists of 36 individual hexagonal segments that together act as a single mirror. The light collecting mirror surface area of GTC is equivalent to that of a **telescope with a 10.4m diameter single monolithic mirror**. Thanks to its huge collecting area and advanced engineering the GTC classes amongst the best performing telescopes for astronomical research.

**GTC is producing science in a routinely manner since 2009**, but at the same time enhancing its capabilities with the continuous advent of new instruments at the facility. This contribution summarizes the current status of the night operation of the 10.4 m GTC and describe GTC short and medium term instrumentation plan in the period 2020-2025.

## GTC science operation in numbers

- GTC started science operations on 1<sup>st</sup> March 2009.
- Up to 7 different instruments have been used in operation to date.
- 15,000+ observing hours delivered to date (1800 h / year), including 1098 h for ESO/GTC and > 1000 h of GT.
- 770+ programs 100% completed with conditions guaranteed.
- Observatory overheads decreased to <1 %.
- 4-5 % technical losses.

## GTC instrumental plan

- Call for next generation instruments (2025+) is still open.
- 5 proposals received to date.
- First scientific evaluation by GTC STAC on April 2019 recommended to define an external panel of experts to review these proposals, in a wider context of the strategic role of GTC from 2025 onwards.
- Process is presently stalled due to the lack of funding commitment from Canarian Government.

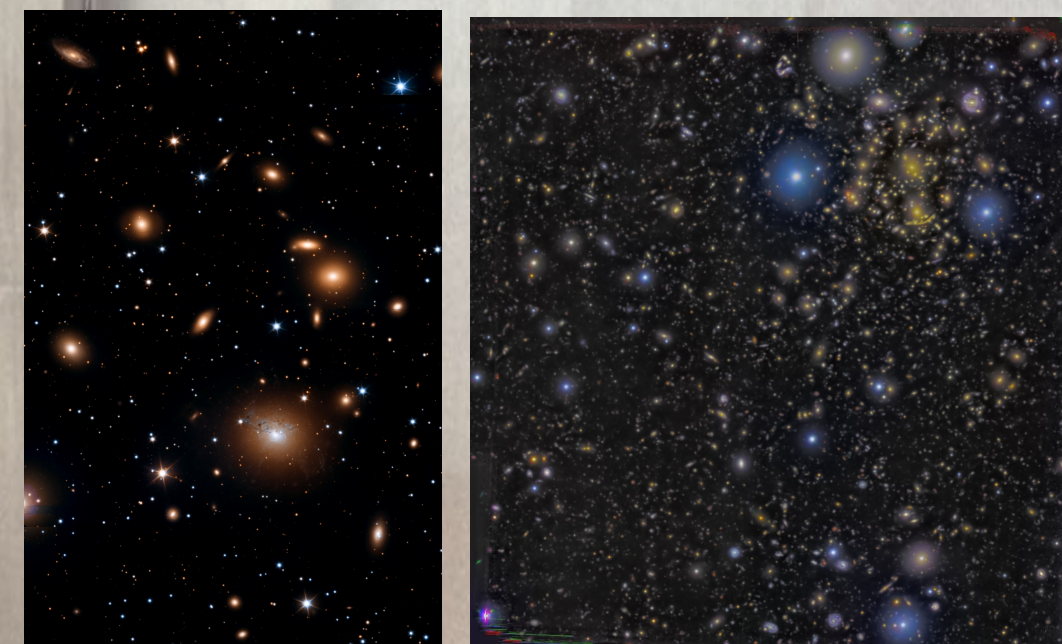
## GTC currently available instrumentation

[www.gtc.iac.es/instruments](http://www.gtc.iac.es/instruments)

### OSIRIS imager and multi-object spectrograph



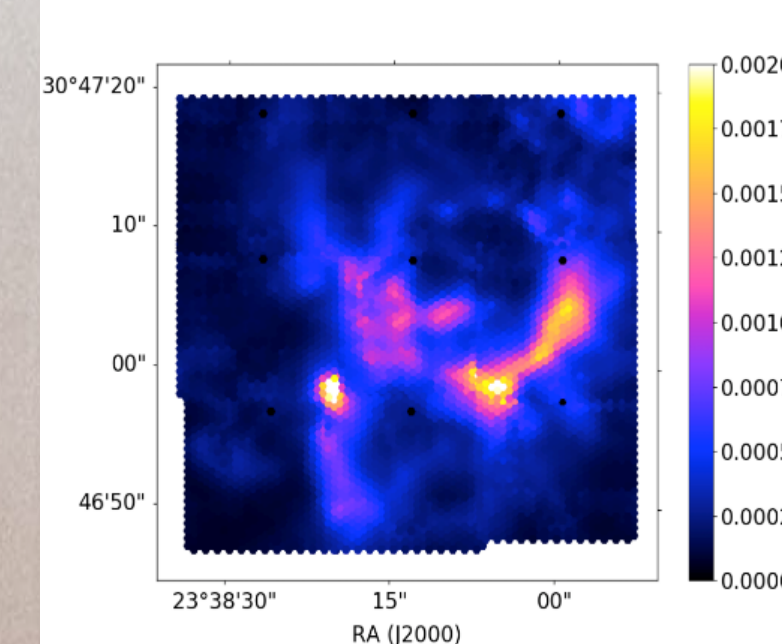
Spectral Range	0.36-1.00 $\mu\text{m}$
Detector	2 x Marconi 2k x 4k
Plate Scale	0.125 arcsec pix <sup>-1</sup>
Field of view	7.8 x 7.8 arcmin <sup>2</sup>
Imaging modes	broad/medium band, TFs, fast photometry
Spectroscopic modes	long-slit, mask MOS
Spectral resolution	300 to 2500



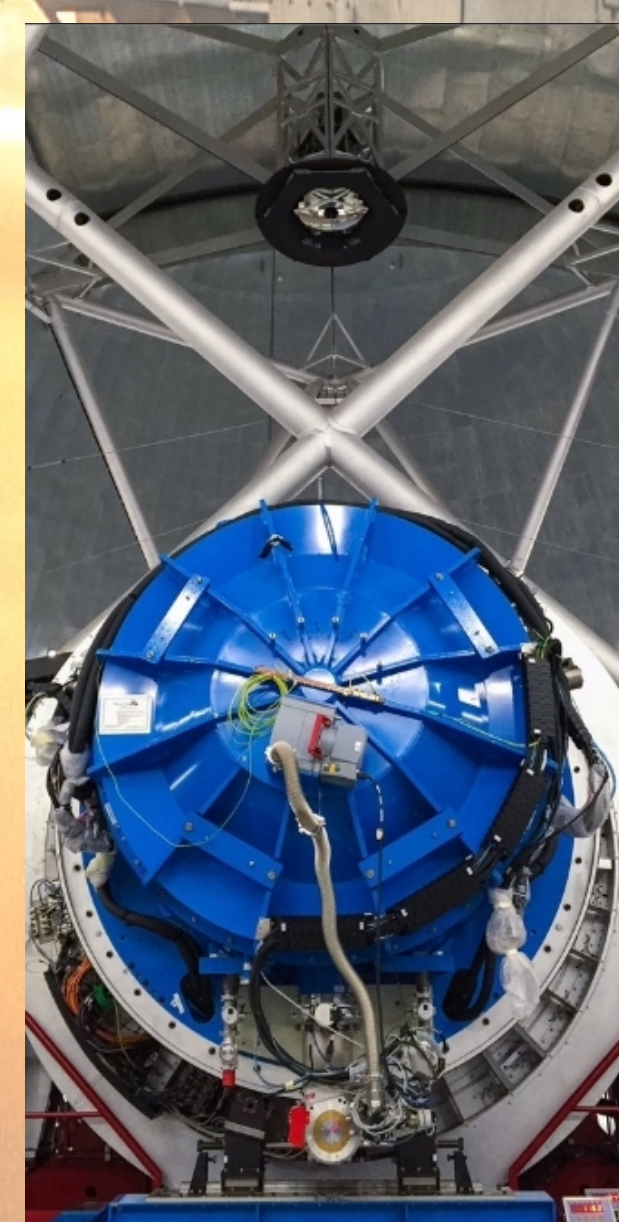
### MEGARA optical medium-res multi-object spectrograph



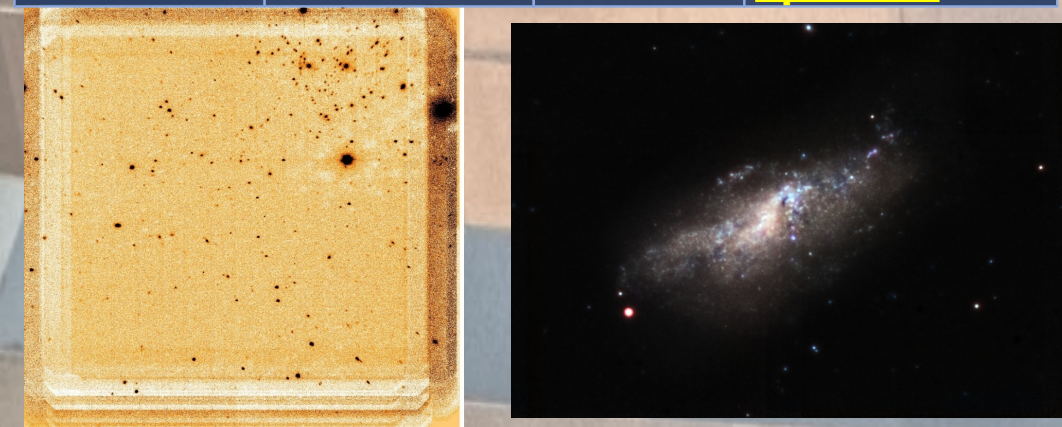
Spectral range	0.365-1.00 $\mu\text{m}$
Detector	E2V CCD231-84-1-E74
IFU field of view	12.5 x 11.3 arcsec <sup>2</sup>
IFU spaxel size	0.62 arcsec
MOS	92 x 7-fiber mini-IFUs
MOS field of view	3.5 x 3.5 arcmin <sup>2</sup>
Spectral resolution	6000 to 20000
# of spectra	650



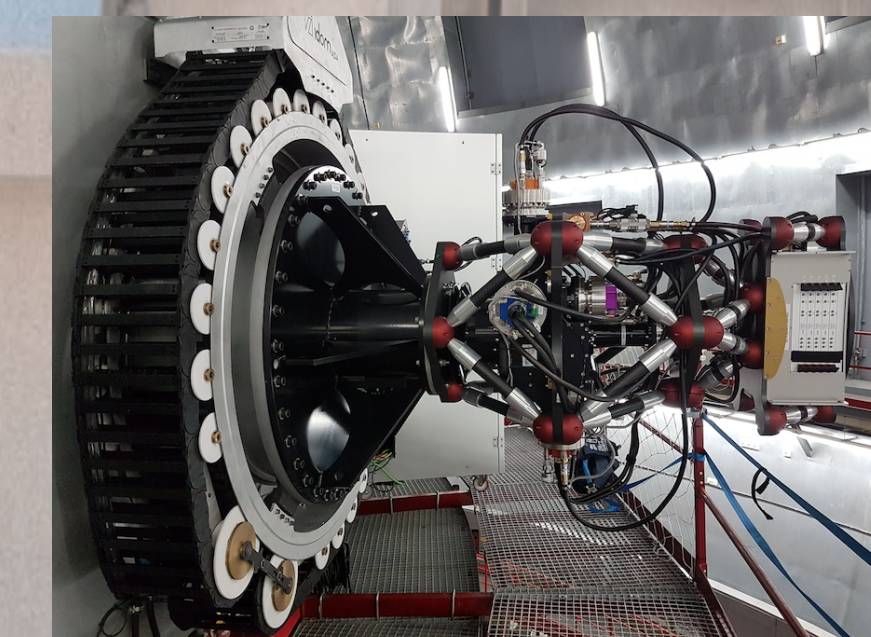
### EMIR NIR imager and multi-object spectrograph



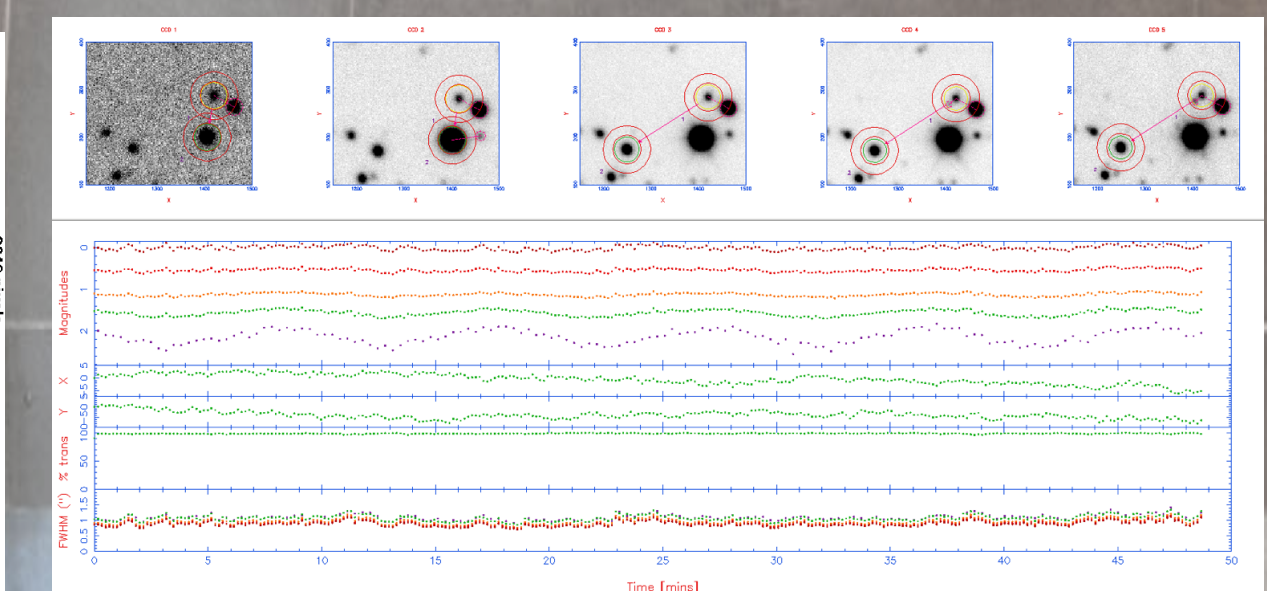
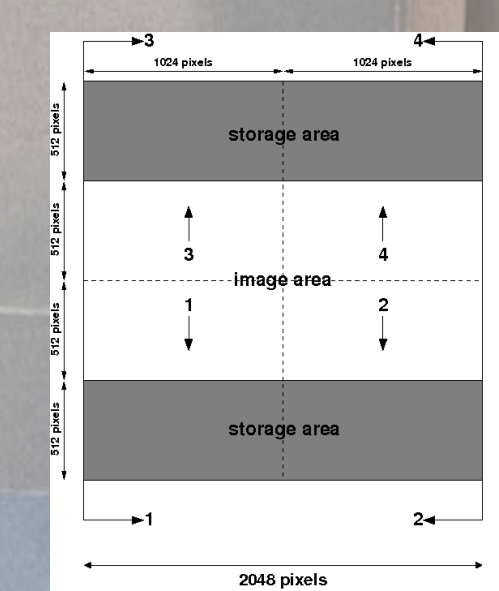
Spectral Range	0.9-2.5 $\mu\text{m}$ [1.1-2.5 $\mu\text{m}$ ]	MOS mode
Detector	HAWAII2 2048 <sup>2</sup>	F.O.V.
Spectral resolution	1000 (YJ, HK) 5000, 4250, 4000 (JHK)	F.O.V.
Spectral coverage	1 single window/exp.	Sensitivity
Imaging modes	Broad/narrow w band	Imaging mode
Plate Scale	0.2 arcsec pix <sup>-1</sup>	F.O.V.
Image quality	$\theta_{80} < 0.3$ arcsec	Sensitivity



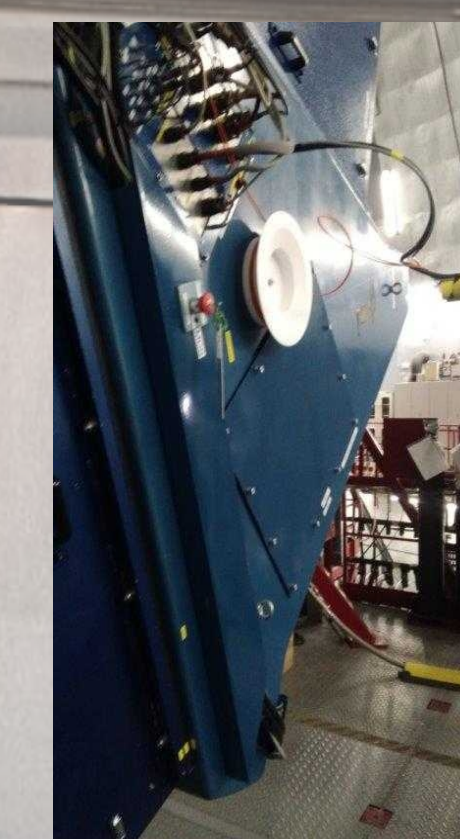
### HiPERCAM: optical fast speed imager



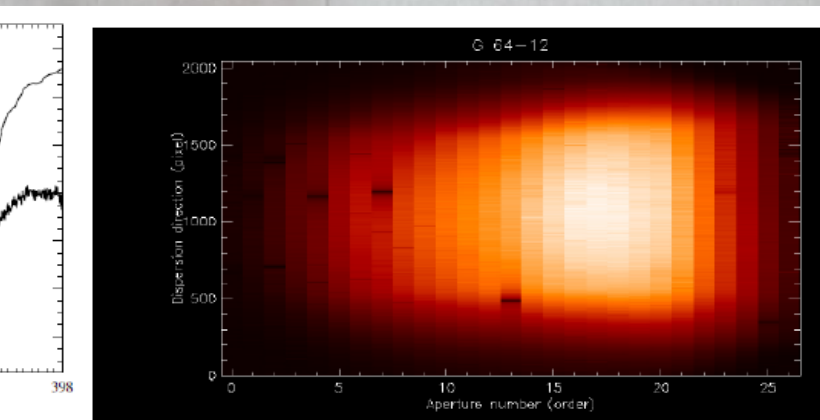
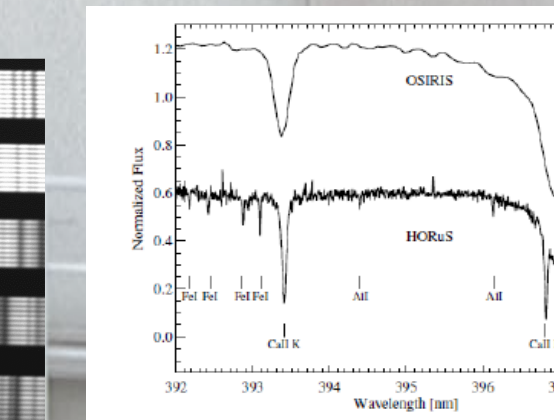
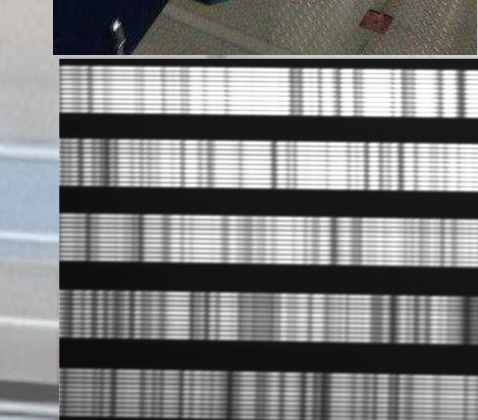
Optical range	u, g, r, i, z simultaneously
Detector dark current	100e <sup>-</sup> /pix/hr
IFU field of view	2.8 x 1.4 arcsec <sup>2</sup>
Plate scale	0.081"/pixel
Readout noise	4.5e <sup>-</sup> at 263kHz
Highest frame rate	>1050 Hz



### HORuS: High Optical Resolution Spectrograph



Spectral Range	0.38-0.69 $\mu\text{m}$
Detector	4096 x 4096 Fairchild CCD486 BI
IFU Field of view	2.3 x 2.3 arcsec <sup>2</sup>
Fiber size	0.75 arcsec
Spectral Resolution	25000



GTC instrumentation timeline (updated 01/08/2020)

