GRBs at GTC

GTC Science Operation Status

Antonio Cabrera Lavers
GTC Support Astronomer

Galaxies meet GRBs at Cabo de Gata (23-27 September 2013)

GTC Telescope

GTC Telescope

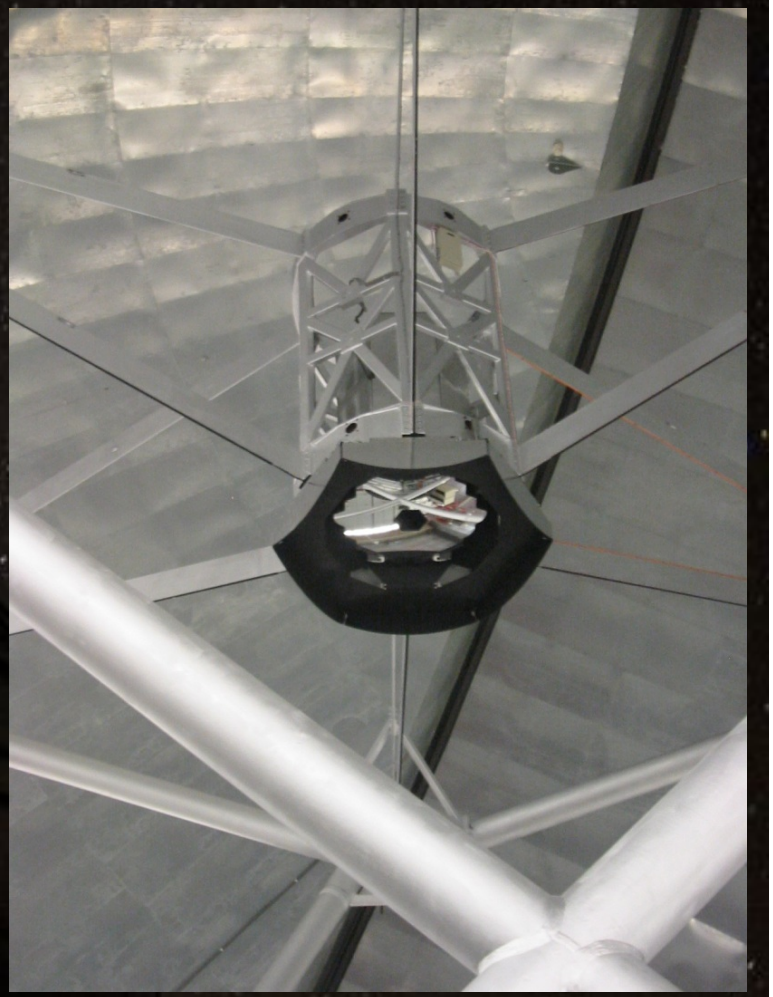
Accomplishments

- Pointing: 2" RMS
- Tracking: 2"/hour
- Guiding: 0.1"
- M1 reflectivity ~85%
- Offsets: 0.2"
- Image quality seeing limited
- M2 chopper working
- Operational efficiency improvements

GTC Telescope

Developments

- Dome aperture
- Reliability
- Tuning of chopping quality
- Routine phasing of M1 segments
- Fast guiding
- Non-sidereal tracking
- Optical model improvements
- Data handling / FITS headers



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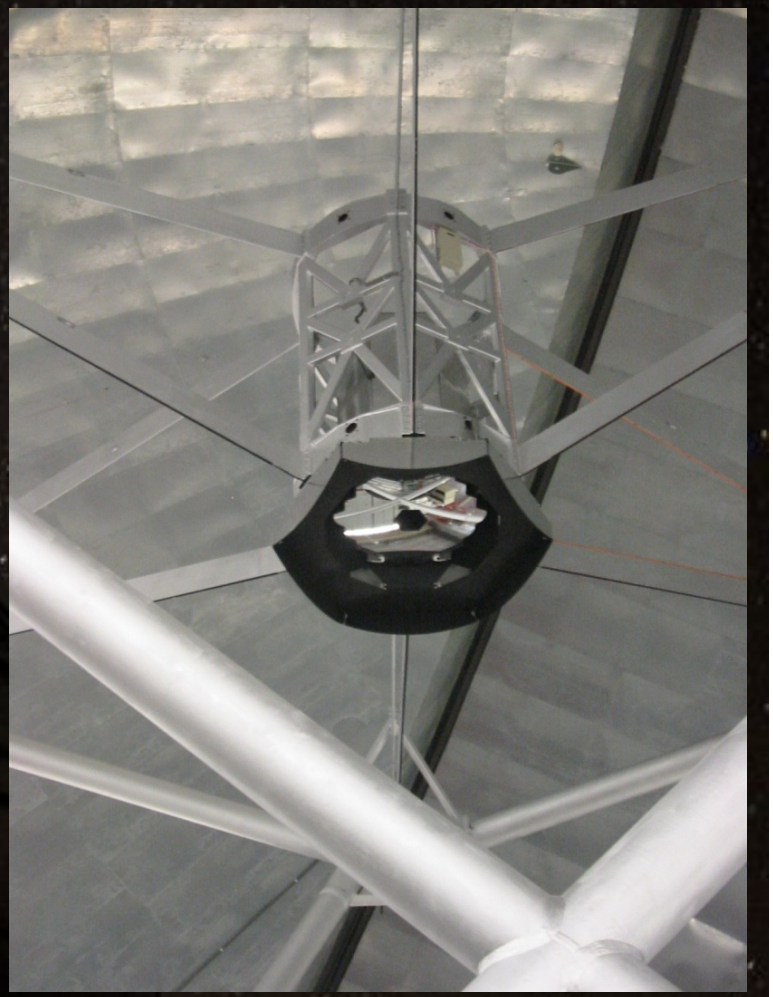
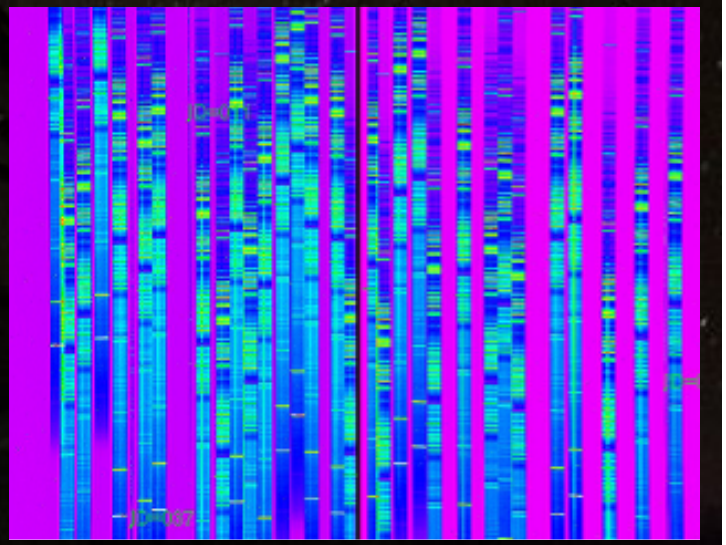


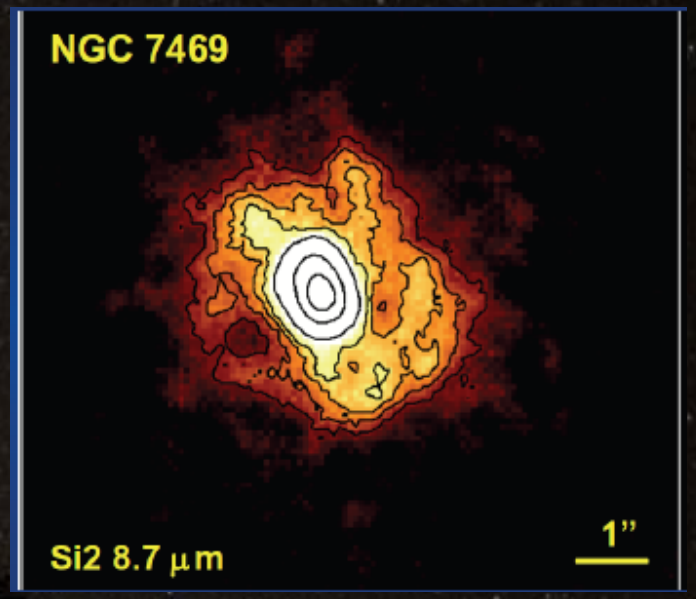
OSIRIS
(Optical imaging and spectroscopy)

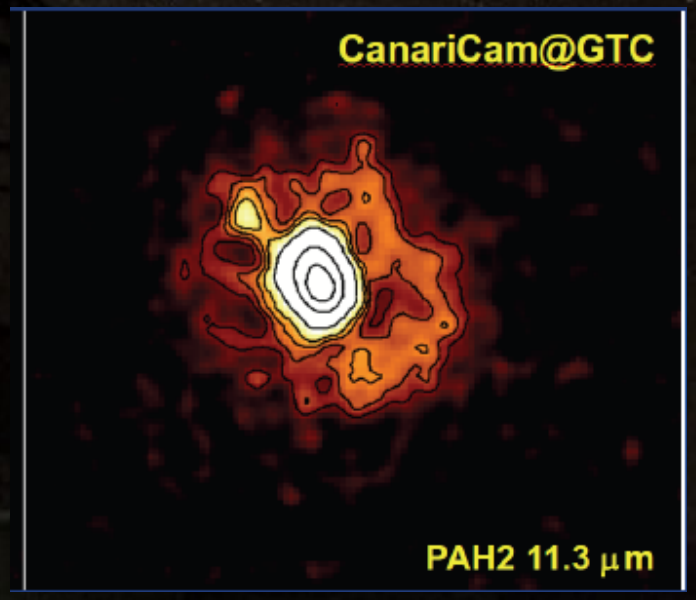
- Broad Band imaging (ugriz) and medium band filters (SHARDs).
- Blue and Red Tunable filters: (λ=450–934 nm, $\Delta\lambda$=0.5-2.0 nm).
- Long Slit Spectroscopy (R=300-2500).
- High speed modes (Frame Transfer and Fast Photometry).
- MOS (available from S14A!).



Canaricam
(mid-IR imaging + spectroscopy)

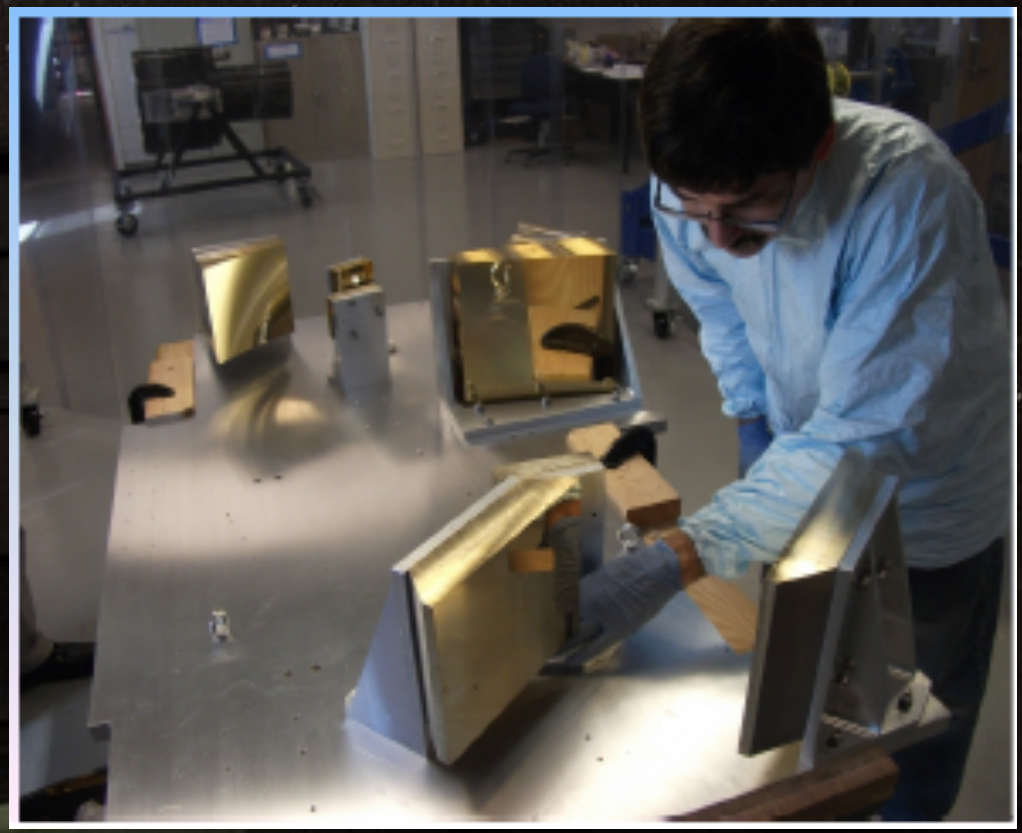
- MIR imaging in 8-20 μm (Broad Band and Narrow Band filters).
- Low resolution spectroscopy (at 10 and 20 μm).
- Imaging polarimetry mode.
- Spectropolarimetry mode (being commissioned).
- Coronography (pendent).
- High resolution spectroscopy (optional).





Instrumentation forward look

- Preparing the folded-Cassegrain stations.
- CIRCE: near – IR imaging (+ possible spectroscopy).
  - 3.4 arcmin field.
  - Visiting instrument.
  - Possibly becoming available in 2014.

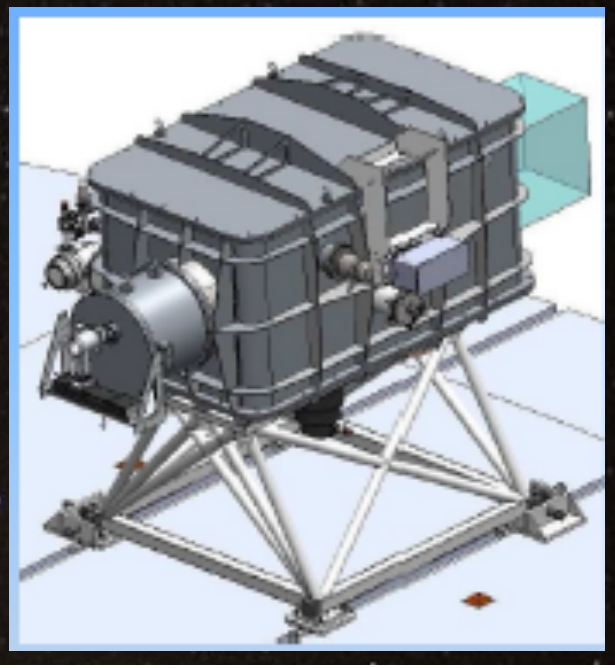


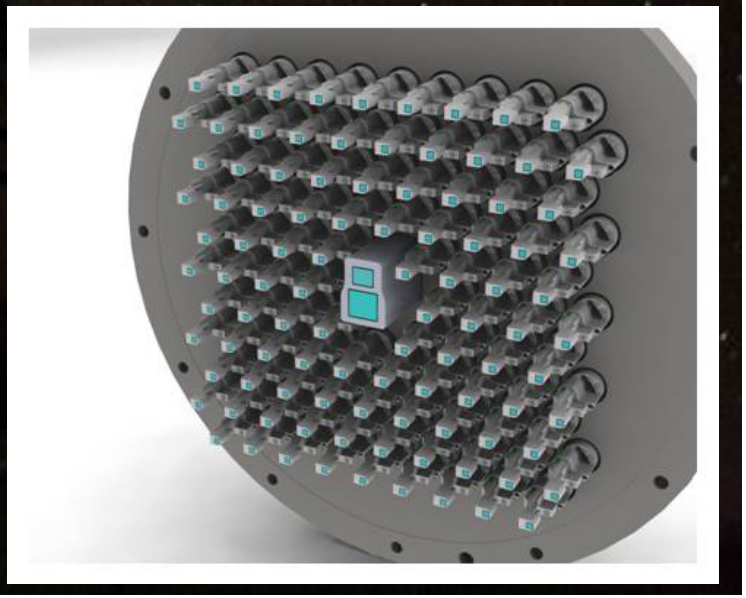
Instrumentation forward look

- **EMIR**: near – IR imaging + multi-object spectroscopy.
  - 50 cold, configurable slits.
  - 6 arcmin field.
  - R ≈ 4000.
  - Available not earlier
  - Work-horse on GTC.

Instrumentation forward look

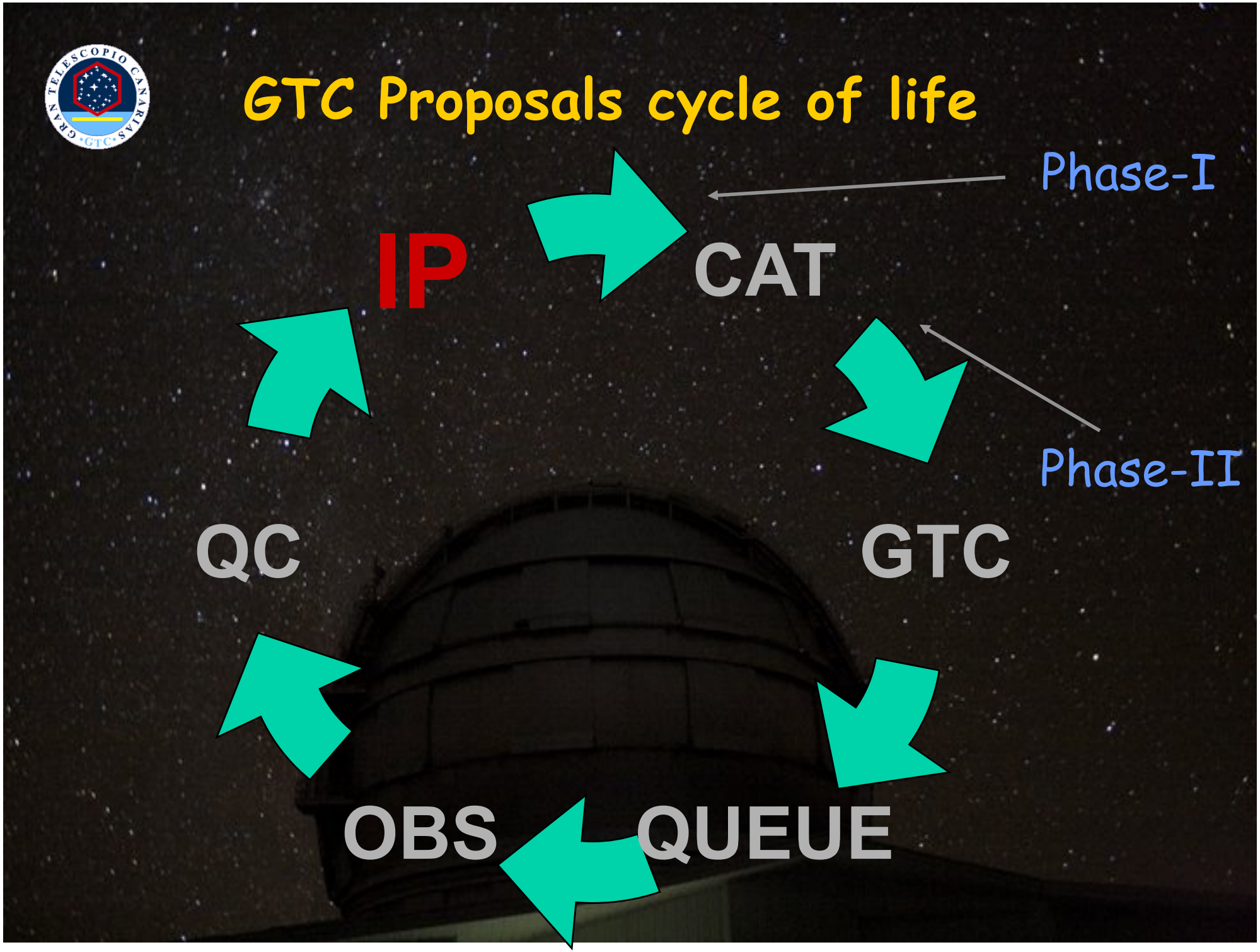
- GTCAO + FRIDA
  - Diffraction limited operation.
  - Near-IR imaging + integral-field spectroscopy.
  - 2016?
- Under study for folded Cass foci:
  - MEGARA: Multi-object + integral field spectrograph for the optical; R= 5000 to 2000.
  - MIRADAS: Multi-object spectrograph for the near-IR; R=20000.





GTC Operation Team

- Night operation team: 7 SA + 6 TO. Support Astronomer + Operator at night; no technical support. Low-cost model; match expectations.
- 75-80 % time for science, 20-25 % commissioning.
- 90 % observations queue mode, 10% visitor mode (mostly dynamic queue schedulling).


GTC Proposals cycle of life
Phase-I
IP
CAT
Phase-II
QC
GTC
OBS
QUEUE

Queue mode operation (I)

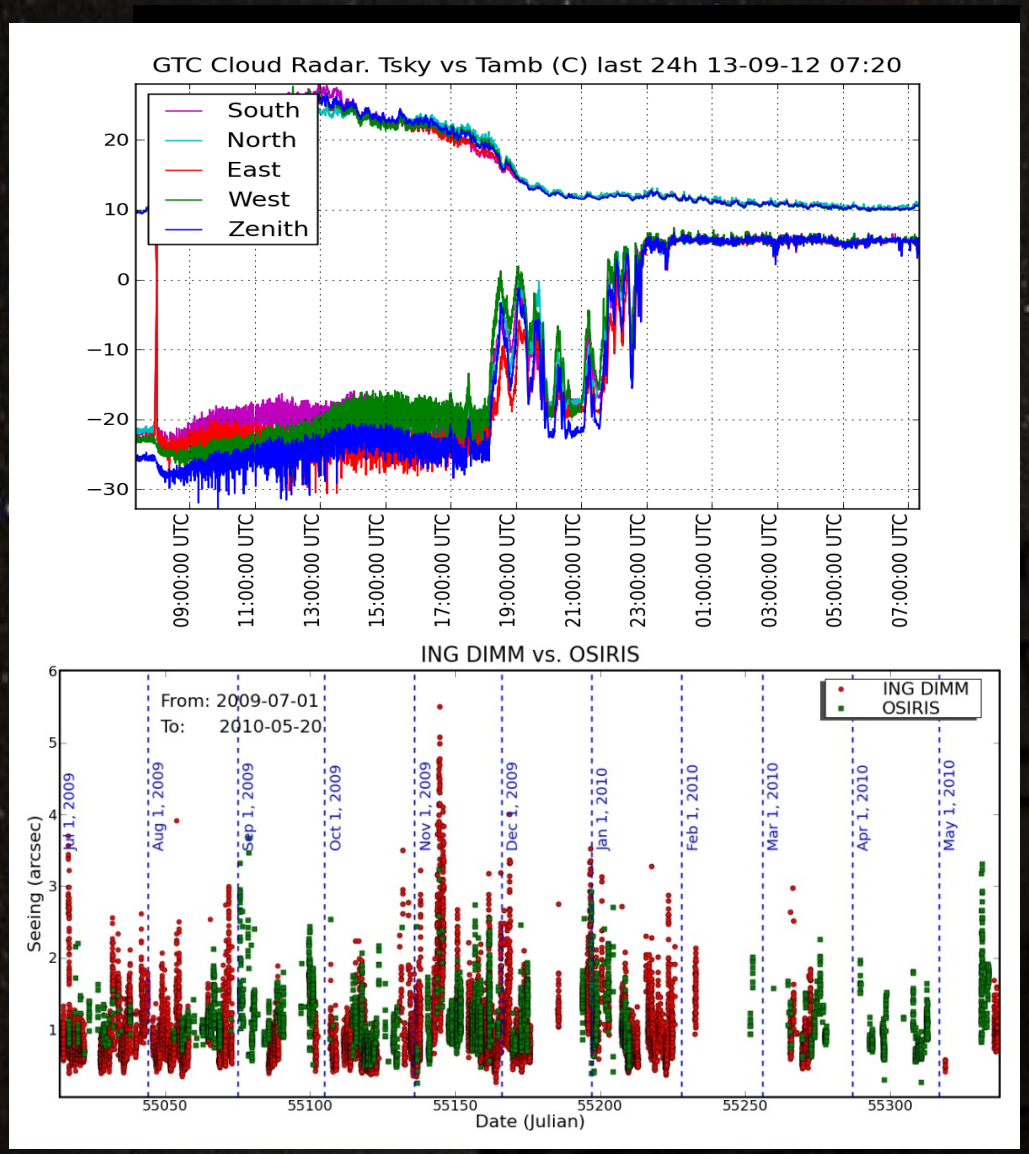
QUEUE OBSERVING PLAN

date: 26 - 30 September 2012

propsals marked in green: of highest priority; yellow: OBs need locking and/or approval; orange: possible technical problem; red: of some special interest

OSIRIS	OSIRIS	OSIRIS	OSIRIS	OSIRIS	OSIRIS	OSIRIS	OSIRIS	OSIRIS	OSIRIS	OSIRIS
Sky:	Dark & seeing < 0.9"									
prior	&rank	proposal	OB#	mode	RA/DEC	seeing	moon	sky	hours	notes
A	n.a.	GTC2012-11ESO	1-8,21-33,35-41	BB+TF	13h+47	1.0	dark	clear	72	f680,f694,f709; IPA 240.54
A	n.a.	GTC2005-10ESO	15-41,52-74,76-81	BB	range	0.9	dark	clear	3	U517,U534,U568,U585
A	n.a.	GTC2018-10ESO	130,38,2,8,9,10,11,12,151-164,76,77,78,8	IMAG	12h+62	0.8	D/G	clear	50	IPA 105.54
A	n.a.	GTC2-10BGOS	ONLY: 33,34,40-45 (CALIB !!)	TF	14h+52	0.9	D/G	clear	90	OTELO; IPA150.54
A	1/2	GTC1-IACFLO	7	BB	2h-4	0.9	dark	phot	8	U883
A	4/4	GTC4-FLO	1,2,3,4	LS	range	0.9	dark	clear	4.6	R2500U,R2500R
B	6/6	GTC3-MEX	1,2,3,4,5	BB	4h+32	0.9	dark	phot	5	
Sky:	Dark & seeing > 0.9"									
prior	&rank	proposal	OB#	mode	RA/DEC	seeing	moon	sky	hours	notes
A	1/2	GTC3-IACMEX	1,2	TF	4h+2	1.2	dark	phot	12	f666,f680,f902,f910
A	9/47	GTC52	1-21	LS	10h+2	1.2	dark	spec	21	R2500I
A	2/6	GTC5-MEX	1,2,3,4	LS	10h+70	1.2	dark	spec	6	R1000B
A	11/47	GTC69	1,2,3,4,5,6,7,8,9,10,11,12	TF	23,7,9h	1.2	dark	clear	12	f858
A	18/47	GTC48	10,13,14,15,17-26: Separate OBs in time	BB	1h+30	1.2	dark	clear	12	
A	3/6	GTC4-MEX	1,2,3,4	LS	24h-26	1.2	dark	spec	4	R1000B
B	33/47	GTC35	1,2,3,4,5,6,7,8,9,10	LS	10h+2	1.2	dark	phot	12	R300B
Sky:	Grey & seeing < 0.9"									
prior	&rank	proposal	OB#	mode	RA/DEC	seeing	moon	sky	hours	notes
A	2/47	GTC72	1	TF	9h+33	0.9	grey	clear	2	
A	5/47	GTC33	2,3,4,6,8,9	TF	23h, 0h	0.9	grey	clear	7.2	
A	2/4	GTC5-FLO	14	BB	23 to 2h	0.9	grey	phot	7.4	
A	16/47	GTC6	1,3,4,5,6	LS+TF	7h, 19h	0.9	grey	spec	5.5	R2500U,V,I
A	3/4	GTC1-FLO	4,5	LS	8h, 22h	0.9	B/G	clear	5.5	R2000B
B	30/47	GTC7	1,2,3,4,5,7,9,11,13,15,17,19,21	TF	range	0.9	grey	clear	15	f657,f666,f680,f694,f709,f723
B	31/47	GTC59	Target-of-Opportunity		TBD	0.9	grey	spec	5	
B	34/47	GTC20	18,19,5,6,7,8,9,17,20,21,23,10,11,24	BB	2h-4	0.9	grey	spec	28	U883,U913,U941
B	37/47	GTC39	3,4,5,6,8,9,11,12,15-22	LS	range	0.9	grey	spec	4	R500R
Sky:	Grey & seeing > 0.9"									
prior	&rank	proposal	OB#	mode	RA/DEC	seeing	moon	sky	hours	notes
A	n.a.	GTC2002-12ESO	5-16,19-68,70,72-80	TF	10h-10	1.0	grey	clear	90	f754/f770
A	1/6	GTC12-MEX	1,2,3,4,5,6,7	LS	5h+2	1.2	grey	spec	7	R500R
A	13/47	GTC64	1,2,3,5,6	LS	range	any	grey	spec	9	R1000B
A	17/47	GTC21	1-14	LS	5h-5	1.2	grey	spec	9.6	R300R

Queue mode operation (II)



GTC Sky Camera / Seeing and cloud monitor

Queue mode operation (III)

Target definition for Observing Block: GTC2-11BIACFLO_0003

Target Name: 296 — Observing Priority: 1

		HH:MM:SS.SS		(-)DD:MM:SS.S
Coordinates (J2000):	RA	01:33:36.14	DEC	30:47:55.1
Proper motion (mas/yr)	RA		DEC	

Non Sidereal Target ☐ (Note: RA,DEC required anyway)

Slit width 1.0 — Slit Position angle -39 (write 999 for parallactic angle)

Acquisition image

-Filter-	Exptime (s)	Readout Mode
g	10	200 kHz

Through slit image

-Filter-	Exptime (s)	Readout Mode	Blind Offset (arcsec) (RA -- DEC)	
g	20	200 kHz		

Configure as many templates as needed:

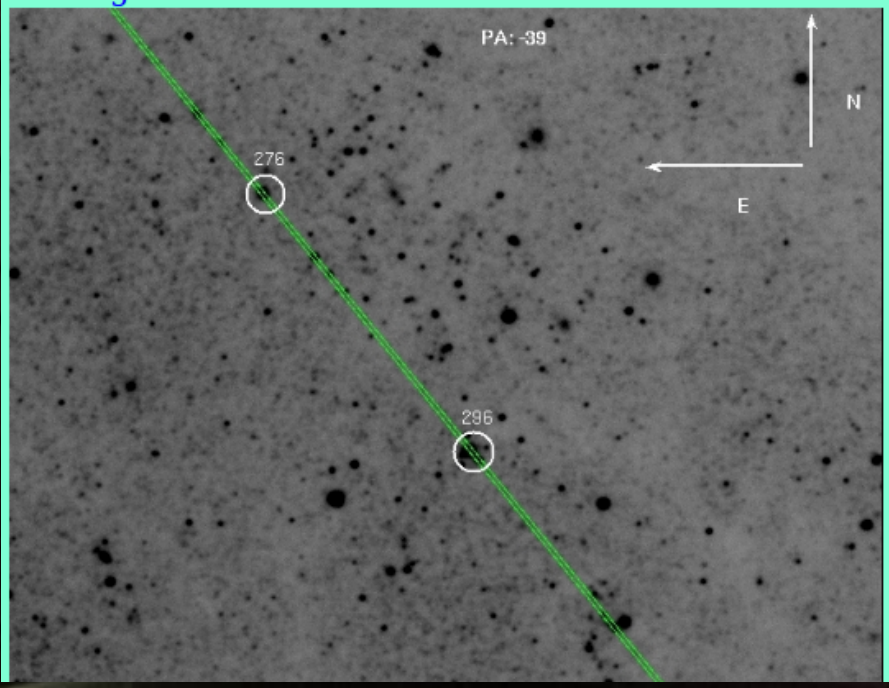
-Grism-	-Exptime- (s)	-N exp-	-Readout Mode-	-Binning-	-offsets- (arcsec)
R2500V	1200	1	100 kHz	2X2	
none			100 kHz	2X2	
none			100 kHz	2X2	
none			100 kHz	2X2	

README FILE SUMMARY

The purpose is to perform a detailed spectroscopic analysis of star clusters in M33 to obtain high velocity precision never observe before.

All the finding charts were taking at KPNO 4m telescope in filter V.

Finding chart associated to this OB



GTC Phase II tool

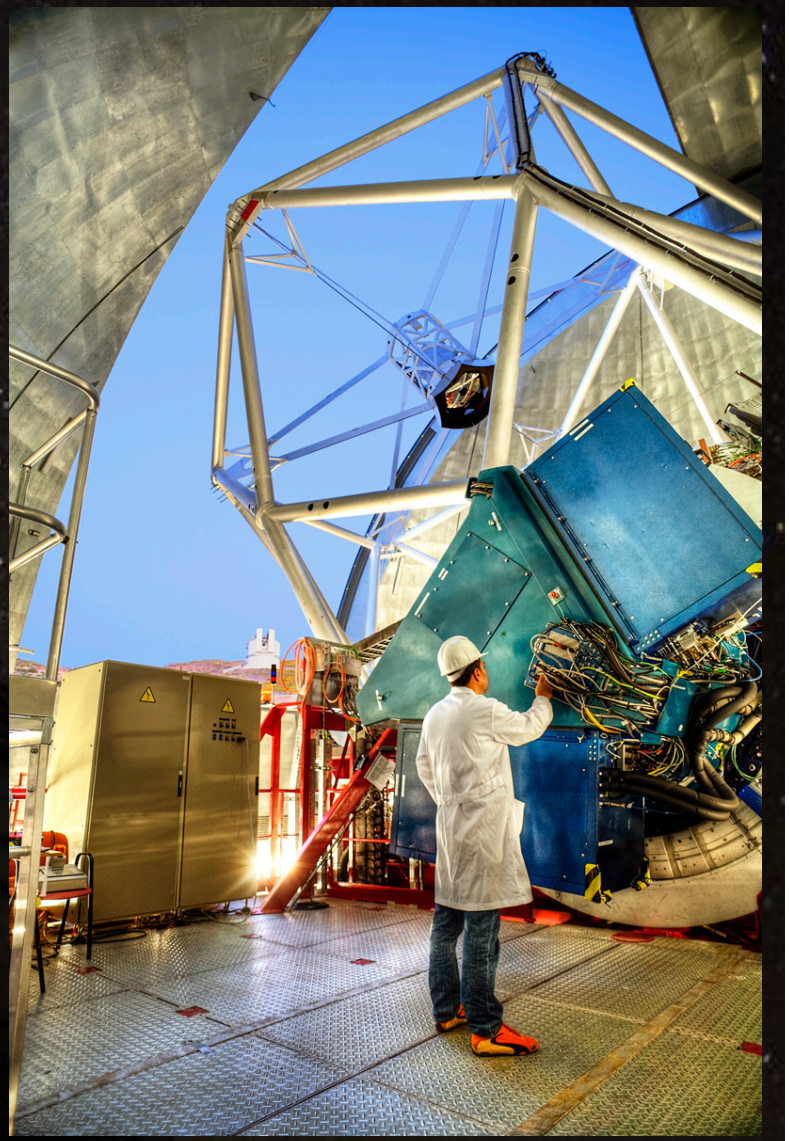
GRBs at GTC (ToO policy)

- ToO observations will be carried out respecting the observing conditions approved by the TAC (PI can adapt these, but observation has to be accommodated to the executing queue).
- ToO observations for a given night must be activated by e-mail to gtc_too@gtc.iac.es, with all relevant information for the observation.
- It's also possible to contact the GTC support astronomer directly during the night at the telescope, but this should be an exception.
- ToO override requests only take priority over programs of lower scientific ranking (queue mode).
- A program scheduled in visitor mode always takes priority, but it can be overridden by a ToO of higher scientific ranking.
- In case of a direct conflict between two ToO requests then these are dealt with on a first-come-first-serve basis

http://www.gtc.iac.es/observing/observing.php#Targets_of_Opportunity

GTC time usage

- < 10% technical losses (goal 2%).
- > 3900 observing hours delivered (900 for ESO-GTC programs).
- Over 190 programs 100% completed with conditions guaranteed.
- Time balance between stake-holders ESP-FLO-MEX-ITP is correct.
- 19 ToO programs observed to date (14 completed, and the rest nearly completed).
- 134 h delivered for ToO data (from 140 h total allocated time, 95% success!!!). Also, 62/90 h from ESOGTC programs.
- 80 GTC papers to date, 20 coming from ToO data (25% of total).



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