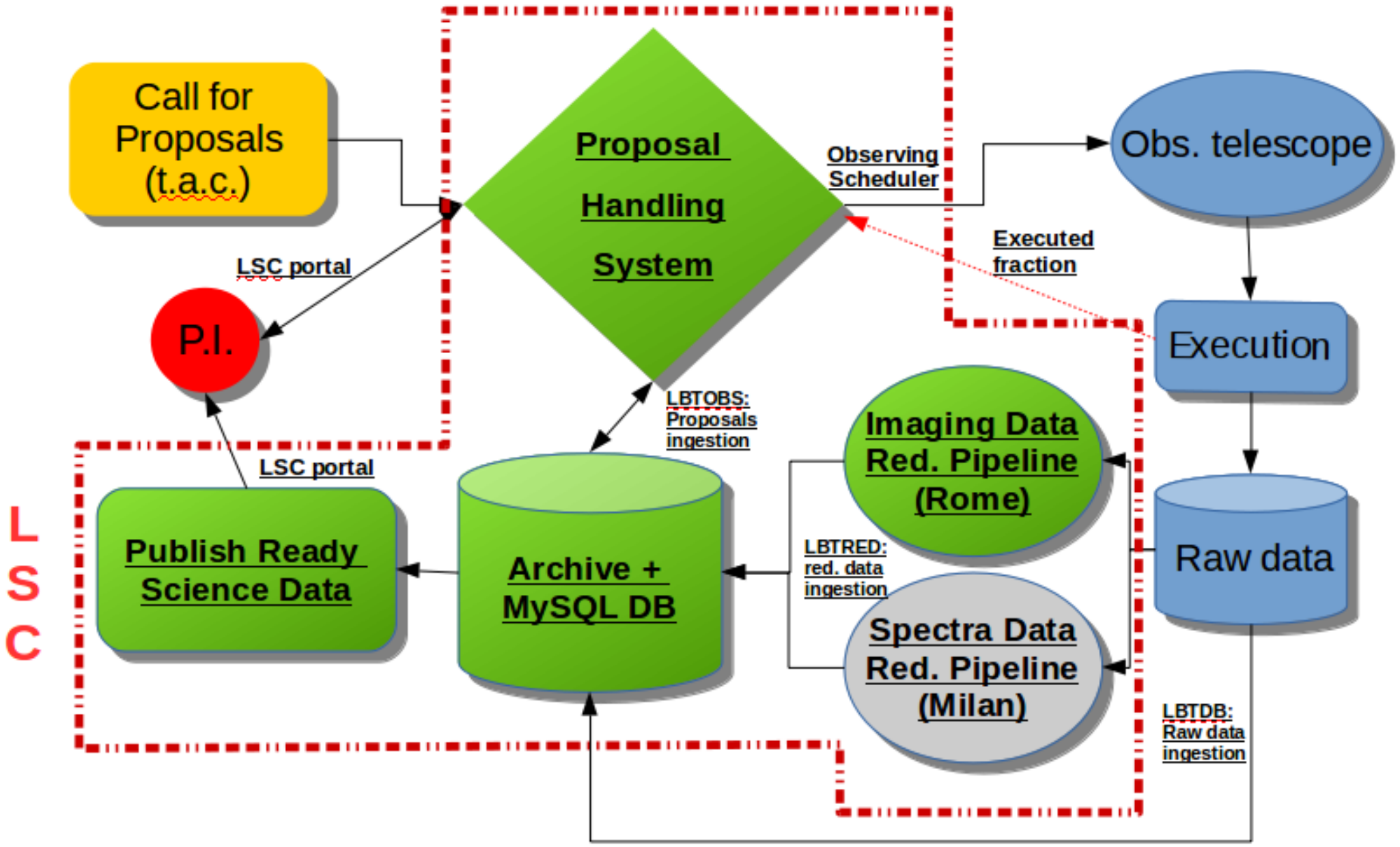
LBT: from data to users
The archive of the scientific products @ OAR

Authors: Diego Paris, Vincenzo Testa, Stefano Gallozzi, Adriano Fontana

LBT Science Center

- Service to support the italian community in the exploitation of LBT observations (since 2007):
  - Preparation and collection of proposals (in collaboration with LBTO) and storage in the LSC archive
  - Support to the observers before and during observations (OB storage, finding charts, visibility plots,etc.)
  - Notification to the PIs of raw and reduced data availabilty
  - Service data reduction with *ad-hoc* pipelines
  - Distribution of reduced data to PIs
  - Support to the “customer” from the proposal to the publication

LBT Italian Data Lifecycle



LSC ARCHIVE

- 3 MySQL DBs:
- LBTOBS: stores the information concerning the scheduled observing programs (observing runs, observability of the targets, observing blocks)
- LBTDB: Raw data and metadata
- LBTRED: Reduced science-ready data and metadata

Data Flow

all raw data

TUCSON Archive

designed and powered by IA2

American raw data

Italian raw data

German raw data

LBT partner

LBT partner

LBT partner

Imaging Data reduction (LSC-OA Roma)

Spectroscopic Data reduction (IASF-Milano)

"Reduced" images

~1 day

"Reduced" Spectra

~2-4 weeks

PI

~2-4 weeks

PROPOSAL HANDLING SYSTEM

- Every year the LBT Italian Coordination Facility (R. Speziali) announces a new Call for Italian proposals at LBT.
- In collaboration with LBTO and making use of the PIT, proposals are submitted.
- Since the current year (2019) proposals are submitted anonymously to avoid gender bias
- The TAC evaluates and ranks the proposals
- The LSC proposal handling system stores all the information (obs. run) into the LBTOBS DB

PROPOSAL HANDLING SYSTEM

- LBTO defines the schedule optimizing as much as possible the execution of the programs.
- The Pis of programs scheduled for execution are contacted by the Italian Team to produce and submit the needed information (OB, finding charts, masks)
- Making use of the LSC portal the Pis can check the status of their observing runs http://lsc.oa-roma.inaf.it

SERVICE DATA REDUCTION

LSC

LBT Imaging Reduction Facility
@ OAR

- **V. Testa, D. Paris, S. Gallozzi**

LBT Spectroscopic Reduction Facility
@ IASF-Milano

- **B. Garilli, A. Gargiulo, L. Cassarà, M. Fumana**

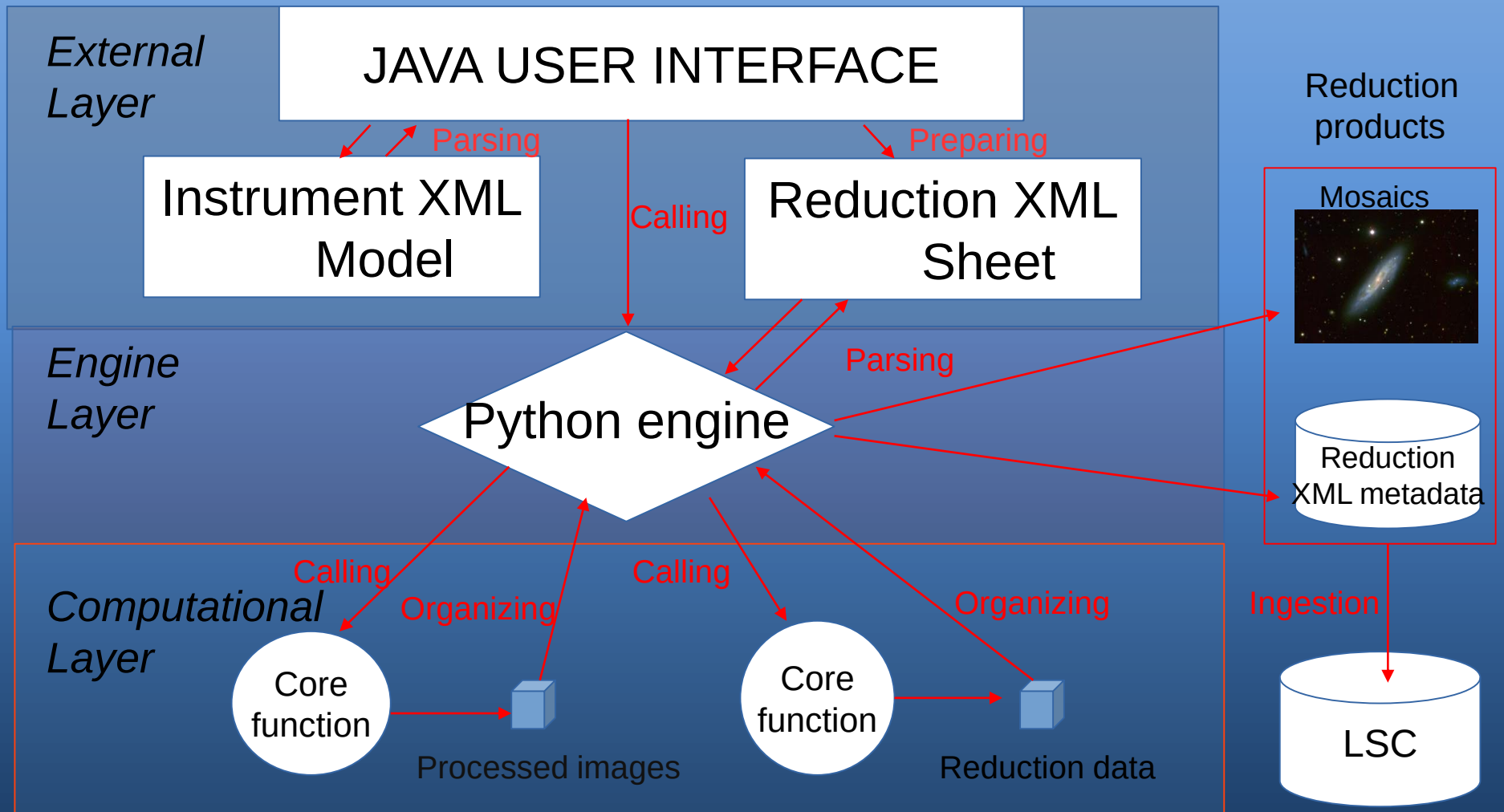
LBC Optical Pipeline

LUCI, LMIRCam
IR Pipeline

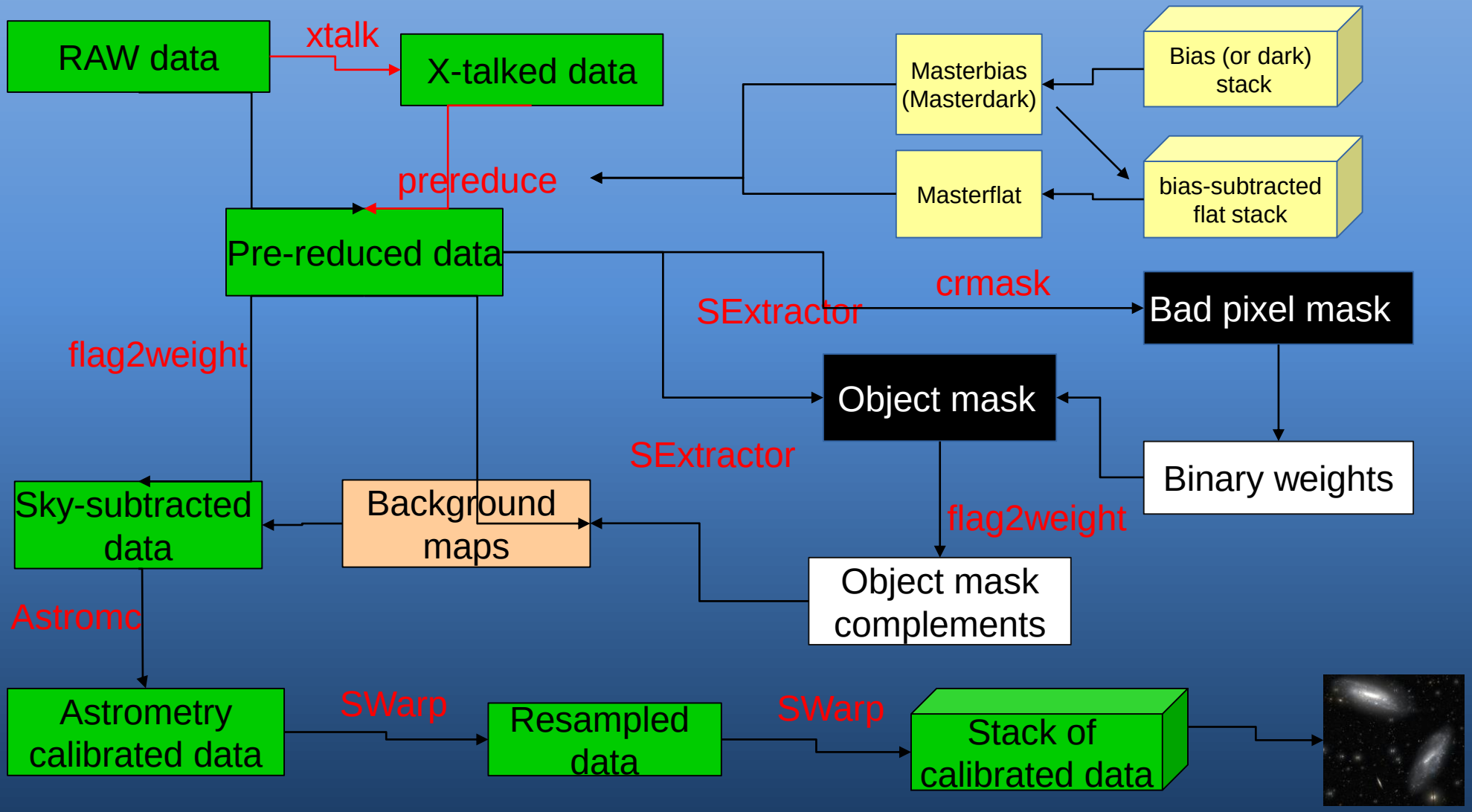
MODS Spectra

LUCI Spectra

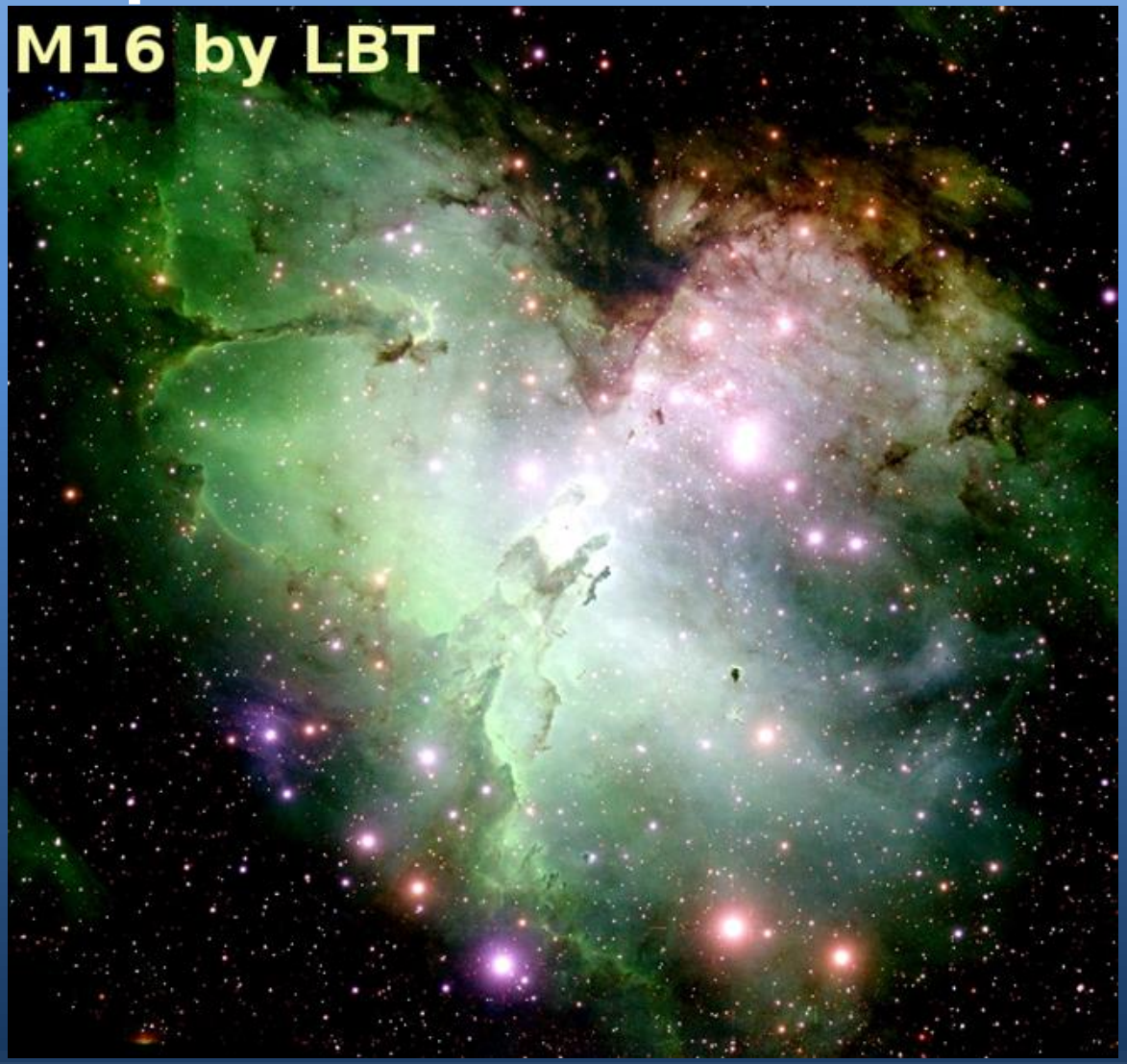
Imaging Pipeline: three-layers architecture

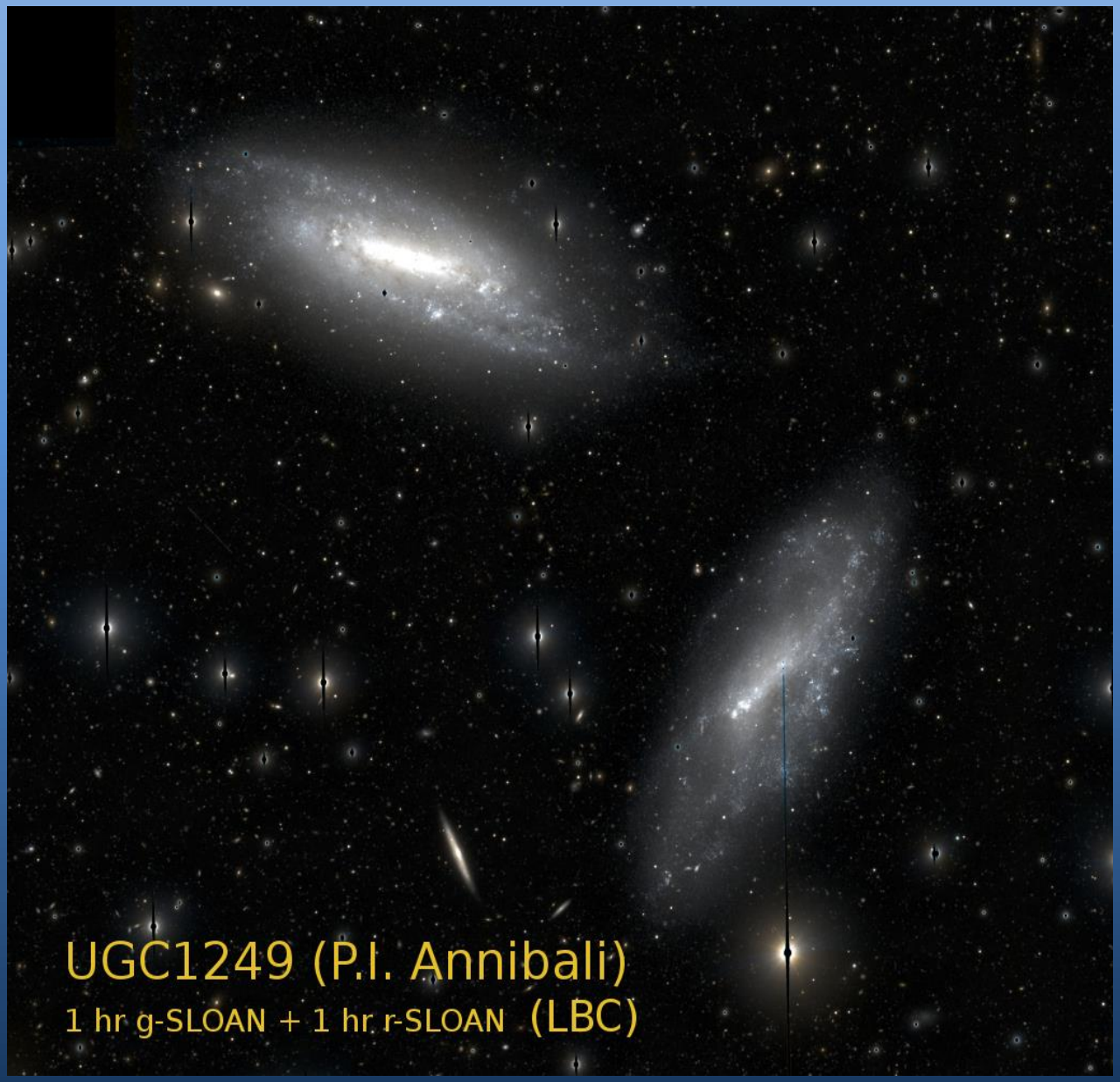


IMAGING PIPELINE WORKFLOW



M16: g-sloan (B), r-sloan (B+R), i-sloan (R)
PI: D. Thompson, 10 m each filter




UGC1249 (P.I. Annibali)
1 hr g-SLOAN + 1 hr r-SLOAN (LBC)

IMAGING PIPELINE PERFORMANCE

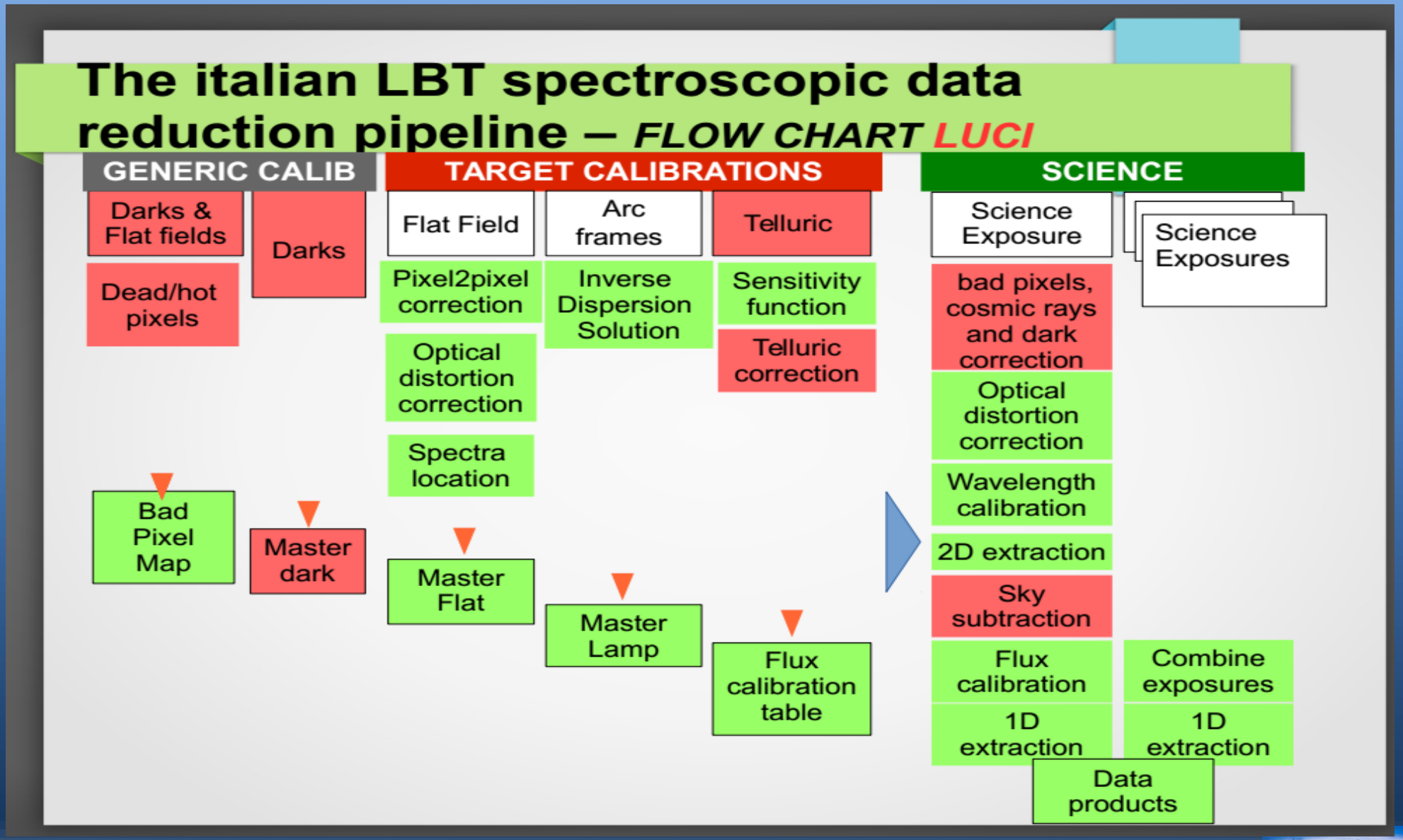
- LBC dataset, 15 raw images ~ 1.23 GB*
- Time consuming: 1.75 hr. Rate ~ 0.7 GB/hr

- LUCI dataset, 36 images ~ 0.61 GB*
- Time consuming: 0.47 hr. Rate ~ 1.3 GB/hr

- * without considering calibrations

GNU-parallel “embarassing parallelization” – serial parallelization, factor ~8 gain

SPECTROSCOPIC PIPELINE



The LSC Portal

The Exposure Time Calculator

Exposure Time Calculator

Osservatorio Astronomico di Roma
Monte Porzio Catone

LBC Home

Simulation PARAMETERS

ETC Version v.1.0 (2011-03-23)

Input, *Generic Parameters:*
- Filter = **LBCBlue_B.ecf** (Total Efficiency)
- Moon Phase = **0** (days)
- Airmass = **1.3**
- Sky AB mag = **22.58** (AB mag/arcsec^2)
[**22.64** Vega mag/arcsec^2] airmass=0
- Magnitude Correction = **0.12** (mag)
- Flat Field Accuracy = **0.005**

Input, *Photometric Parameters:*
- Simulation Type = **star**
- Seeing = **0.8** (arcsec)
- Photometric Aperure = **2.4** (arcsec)

Output, *Object Parameters:*
- Number of Exposures = **15**
- Single Exposure Time = **100** (s)
- Total Exposure Time = **1500** (s)
- Total Observing Time = **1950** (s)
- Total AB Magnitude = **26.48** (AB mag)
[**26.55** Vega mag]
- Signal to Noise Ratio = **5.0**
- Flux of the Source = **3845.31** (ADU)

Output, *Image Parameters:*
- Magnitude of Saturation = **17.31** (AB ma)
[**17.38** Vega mag]
- Mag/arcsec^2 = **27.44** (AB mag)
[**27.51** Vega mag]
- Zeropoint = **35.56** (AB mag)
[**35.62** Vega mag]
- Zeropoint(1 s exposure) = **27.62** (AB mag)
[**27.69** Vega mag]
- Single Exposure Background = **786.49** (ADU/pixel)
- Simulation Max = **11965.80** (ADU)
- Sextractor Background = **11640.80** (ADU/pixel)
- Sextractor RMS = **86.52** (ADU)
- Cut-Levels = **[11467.76; 12225.36]** ([min; max])

download

back

Exposure Time Calculator

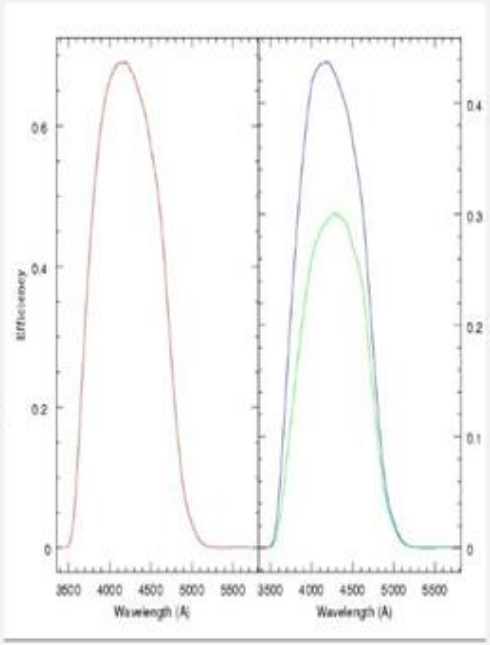
Osservatorio Astronomico di Roma
Monte Porzio Catone

LBC Home

Total Efficiency:

- Date = 2011-03-23
- Filter = LBCBlue_B.ecf
- Airmass = 1.3

Filter Efficiency.
Total Efficiency in vacuum.
Total Efficiency at 1.3 airmass.



back

LBT Observing Scheduler hosted by LSC Data Centre

LBT Observing Run

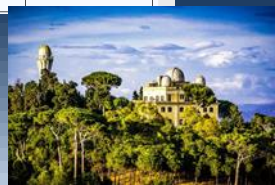
ProposalID: all | MaxSeeing:
Observing RunID: all | MaxAirmass:
Instrument-Modality: all | MaxMoonIll:
Target: all | AssignedPriority: all
P.I.: all | Min Votation:
Exec.Fraction: none | Min Assigned Hrs:
connect fields using Logical AND or using Logical OR
only approved all proposals LBT-Semester: 2019_2020

Cone Search
Right Ascention: [deg]
Declination: [deg]
Search Radius: [armin]

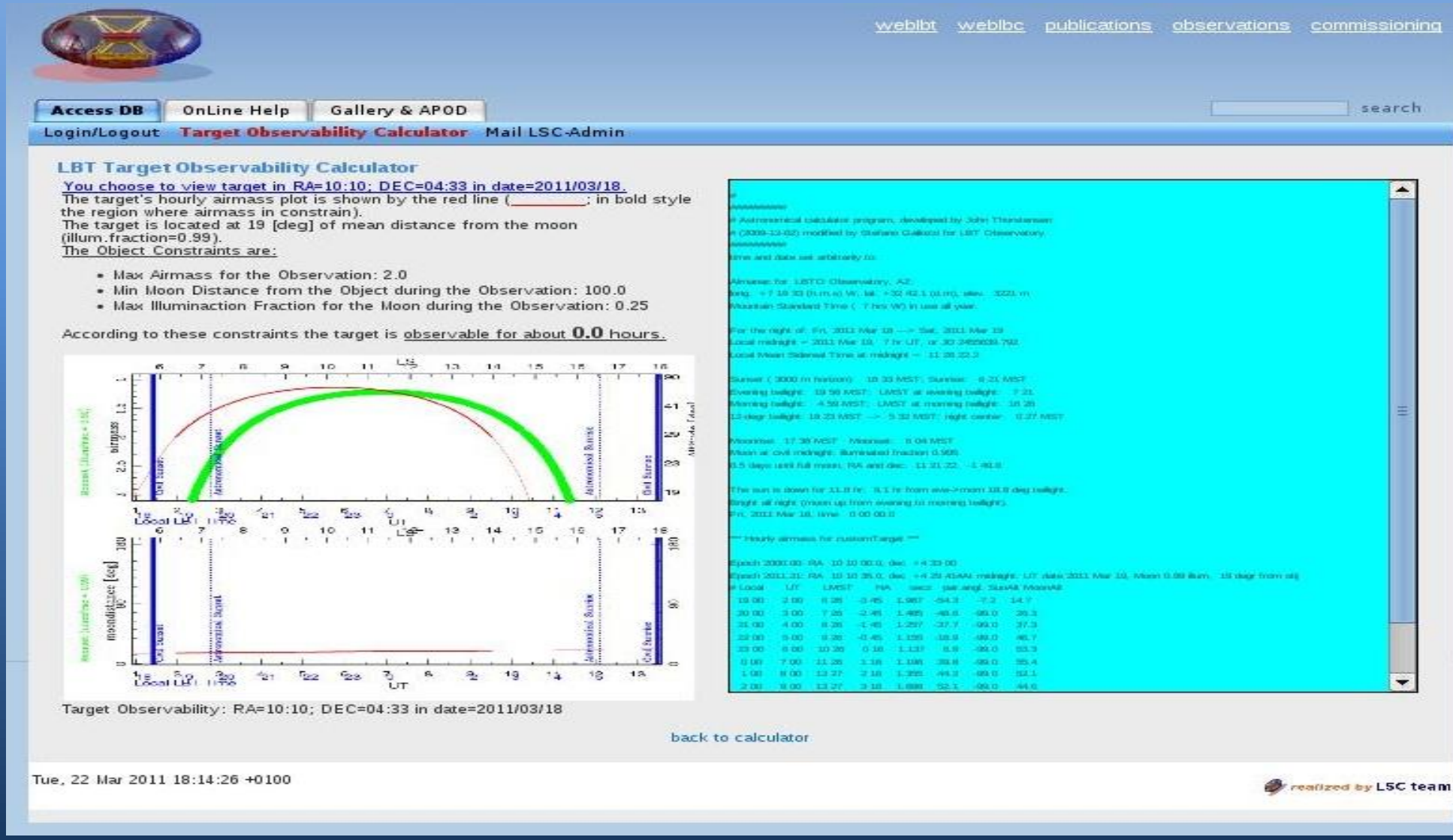
search list reset data reset sorting

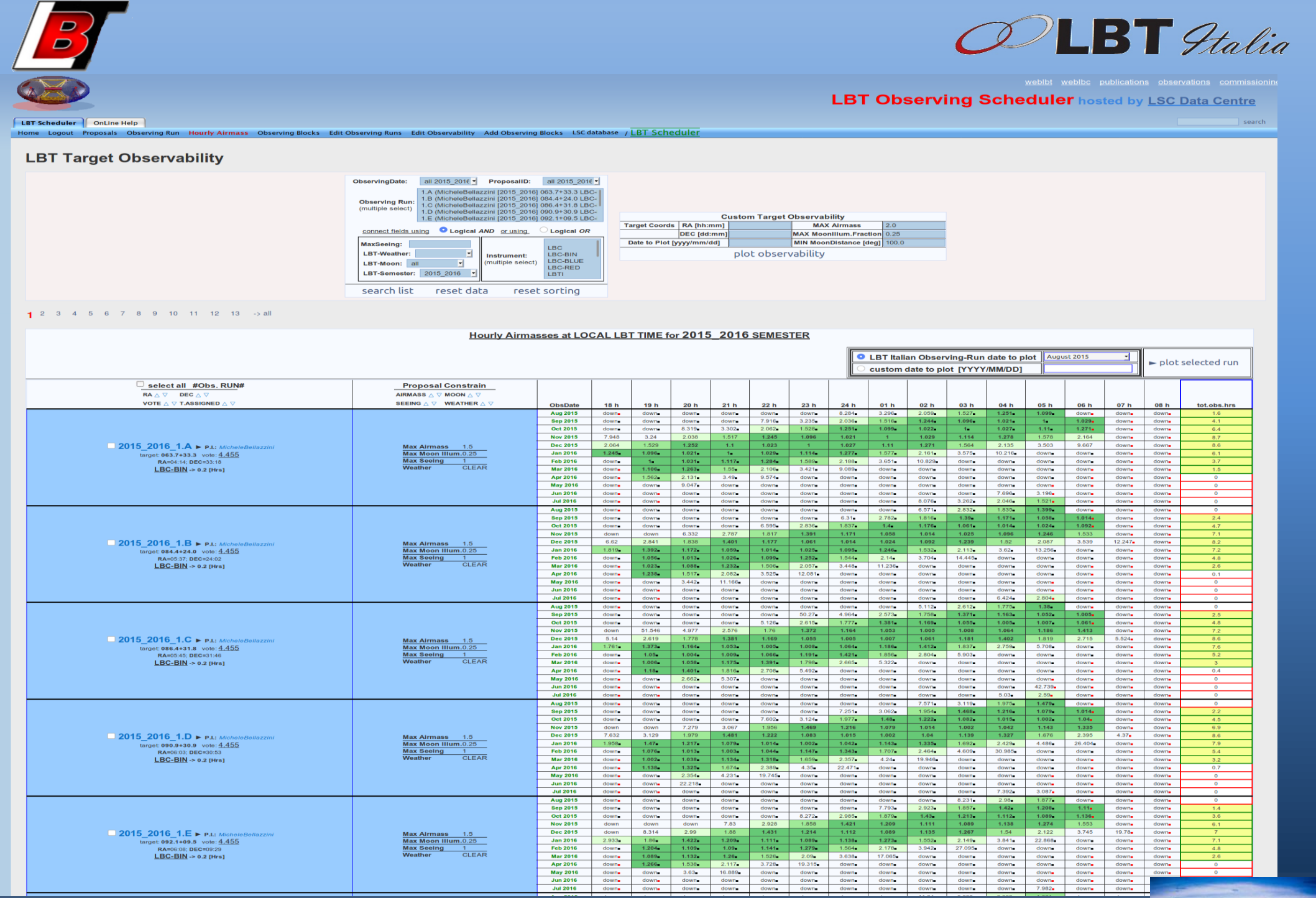
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 -> all

SEMESTER . PROPID △ ▽ RUN △ ▽	P.I._NAME (INSTITUTE)	TARGET (CATEGORY)	RA△ ▽	DEC△ ▽	INSTRUMENT△ ▽	TIME [hrs] PROP△ ▽/RUN△ ▽	PRIORITY△ ▽	GRADE△ ▽ (CLASS)	MAX SEEING△ ▽ [arsec]	MAX AIRMASS△ ▽
2019_2020 . 3 A accepted	CeciliaLazzoni ((OA - PD) Osservatorio di Padova)	DH Tau →change C →change	04:29:41.558 →change	26:32:58.268 →change	LBTI-DA →change	1.5 →change / 1.5 →change	0 →change	0 →change →change	0.8 →change	1.6 →change
2019_2020 . 4 J17 accepted	EmanueleNardini ((OA - FI) Osservatorio di Arcetri)	SDSS J115911.5 →change B →change	11:59:11.531 →change	31:34:27.243 →change	LUCI-LS-SL →change	11.0E →change / 0.33 →change	0 →change	0 →change →change	1 →change	1.4 →change
2019_2020 . 4 J18 accepted	EmanueleNardini ((OA - FI) Osservatorio di Arcetri)	SDSS J120144.3 →change B →change	12:01:44.365 →change	01:16:11.739 →change	LUCI-LS-SL →change	11.0E →change / 0.27 →change	0 →change	0 →change →change	1 →change	1.4 →change
2019_2020 . 4 J19 accepted	EmanueleNardini ((OA - FI) Osservatorio di Arcetri)	SDSS J122017.0 →change B →change	12:20:17.072 →change	45:49:41.106 →change	LUCI-LS-SL →change	11.0E →change / 0.42 →change	0 →change	0 →change →change	1 →change	1.4 →change
2019_2020 . 4 J20 accepted	EmanueleNardini ((OA - FI) Osservatorio di Arcetri)	SDSS J122518.6 →change B →change	12:25:18.661 →change	48:31:16.186 →change	LUCI-LS-SL →change	11.0E →change / 0.58 →change	0 →change	0 →change →change	1 →change	1.4 →change
2019_2020 . 4 J21 accepted	EmanueleNardini ((OA - FI) Osservatorio di Arcetri)	SDSS J124640.3 →change B →change	12:46:40.370 →change	11:13:02.901 →change	LUCI-LS-SL →change	11.0E →change / 0.67 →change	0 →change	0 →change →change	1 →change	1.4 →change
2019_2020 . 4 J22 accepted	EmanueleNardini ((OA - FI) Osservatorio di Arcetri)	SDSS J124637.0 →change B →change	12:46:37.061 →change	26:25:00.308 →change	LUCI-LS-SL →change	11.0E →change / 0.33 →change	0 →change	0 →change →change	1 →change	1.4 →change
2019_2020 . 4 J23 accepted	EmanueleNardini ((OA - FI) Osservatorio di Arcetri)	SDSS J140747.2 →change B →change	14:07:47.234 →change	64:54:19.917 →change	LUCI-LS-SL →change	11.0E →change / 0.3 →change	0 →change	0 →change →change	1 →change	1.4 →change



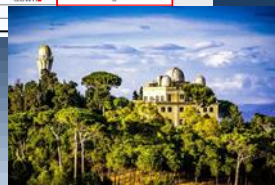
The Target Observability Calculator





19 June 2019

INAF Science Archives & the Big Data Challenge



LBT Italia

weblbt weblbc publications observations commissioning

Access DB | OnLine Help | Gallery & APOD

search

Home Logout User Preferences Issue Tracks Reduction Status LBC Wiki User Mailbox Target Observability Calculator LSC database / LBT Scheduler

LSC Data Centre Image Repository

Database: Reduced Fields Target: Seeing(<=): Back (<=):
Instr./Channel: ALL Obstype: ALL Tot.ExpoTime: Proprietary: All Data
Filter/Grating: ALL ObsDate: n.Exposures: P.I. Name: All

Cone Search:
RA [deg]: DEC [deg]: Radius [arcmin]:

search data reset all reset sorting

Select Field to Show:
obstype, description, channel, filter, totExpoTime, p.i.Name, proposal, filename, dateObs, n.RawFiles, RA, DEC, airmass, seeing/fwhm, background, elongation

L.S.C. credits (Data Reduction & Analysis): LBT Imaging Data Center _AT_ Oss.Astronomico di Roma staff | LBT Spectroscopic Reduction Center _AT_ IASF-Milano staff

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64

#ID#	Target	Obstype	Instr./Channel	Filter/Grating	Tot Expo (sec)	Seeing/FWHM (arsec/pxls)	Thumb./Plots	Reduction Details	Snapshot
n/a 2429	B19	MOSAIC	MODS1B	Clear / G400L	1800	0 / 0	no image	view	no image
n/a 2430	B19	ARCH	MODS1B	Clear / G400L	1800	0 / 0	no image	view	no image
n/a 2427	B19	MOSAIC	MODS1R	Clear / G670L	1800	0 / 0	no image	view	no image
n/a 2428	B19	ARCH	MODS1R	Clear / G670L	1800	0 / 0	no image	view	no image
n/a 2453	B193	SPECTRUM	MODS1B	Clear / G400L	1800	0 / 0	no image	view	no image
n/a 2454	B193	ARCH	MODS1B	Clear / G400L	1800	0 / 0	no image	view	no image
n/a 2451	B193	SPECTRUM	MODS1R	Clear / G670L	1800	0 / 0	no image	view	no image
n/a 2452	B193	ARCH	MODS1R	Clear / G670L	1800	0 / 0	no image	view	no image
n/a 2461	B224	SPECTRUM	MODS1B	Clear / G400L	1800	0 / 0	no image	view	no image
n/a 2462	B224	ARCH	MODS1B	Clear / G400L	1800	0 / 0	no image	view	no image
n/a 2459	B224	SPECTRUM	MODS1R	Clear / G670L	1800	0 / 0	no image	view	no image
n/a 2460	B224	ARCH	MODS1R	Clear / G670L	1800	0 / 0	no image	view	no image
n/a 2473	B311	SPECTRUM	MODS1B	Clear / G400L	3600	0 / 0	no image	view	no image
n/a 2474	B311	ARCH	MODS1B	Clear / G400L	3600	0 / 0	no image	view	no image
n/a 2471	B311	SPECTRUM	MODS1R	Clear / G670L	3600	0 / 0	no image	view	no image
n/a 2472	B311	ARCH	MODS1R	Clear / G670L	3600	0 / 0	no image	view	no image
n/a 2477	B386	SPECTRUM	MODS1B	Clear / G400L	2700	0 / 0	no image	view	no image
n/a 2478	B386	ARCH	MODS1B	Clear / G400L	2700	0 / 0	no image	view	no image
n/a 2475	B386	SPECTRUM	MODS1R	Clear / G670L	2700	0 / 0	no image	view	no image
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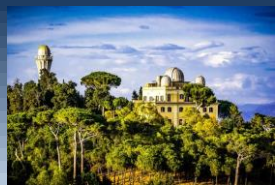
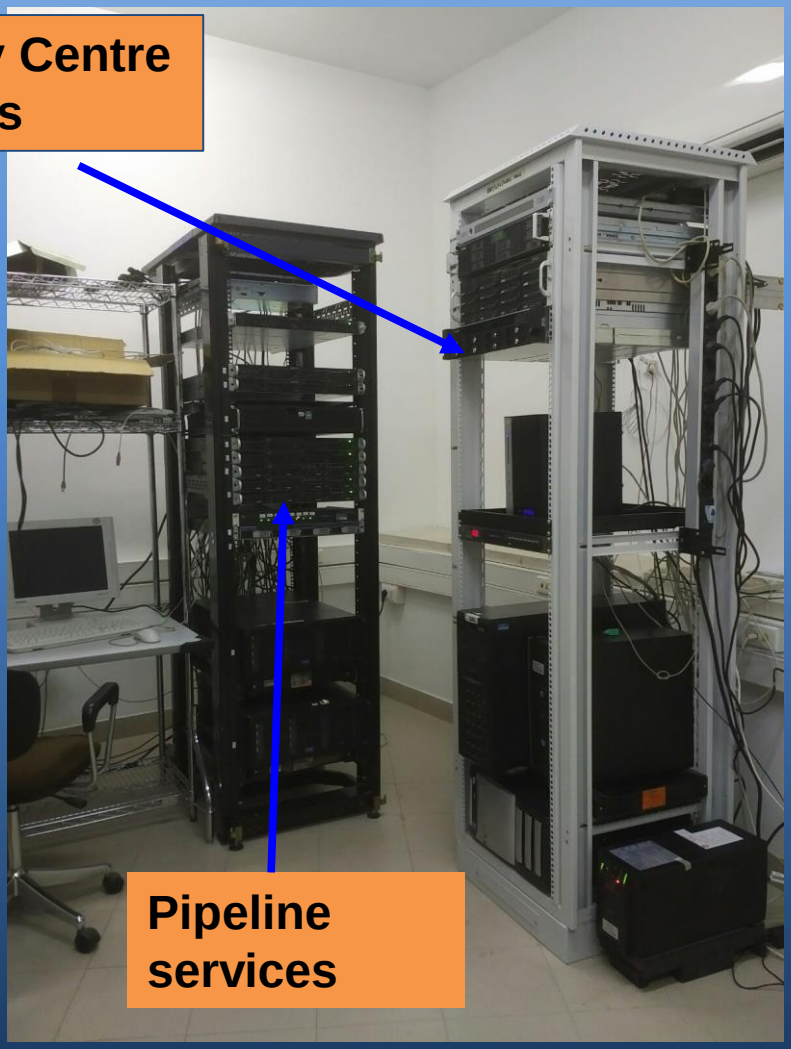


LSC System Architecture

- WEB-based service built on a LAMP architecture
- Three DBs: LBTDB, LBTRED, LBTOBS
- Total LBTDB size: about 4 TB of raw data
- Total n. of Pis who have used the service: about 30
- Total LBTRED size: about 700 Gb of reduced data
- N. proposal ingested: about 450 (last decade)

LSC System Architecture

LBT Survey Centre services



Pipeline services

LESSONS LEARNED AND FINAL CONSIDERATIONS

- Last Call for Proposals expired last May, 17th and the TAC is going to evaluate them
- Got good suggestions from users and some of them already implemented
- Don’t hesitate to ask for help, we do our best to satisfy our “customers” (despite manpower)