Accelerating Your LSST Research: A Complete Guide to IDAC-BR Services



Julia Gschwend – LSST LATAM 2026 – São Paulo

Outline

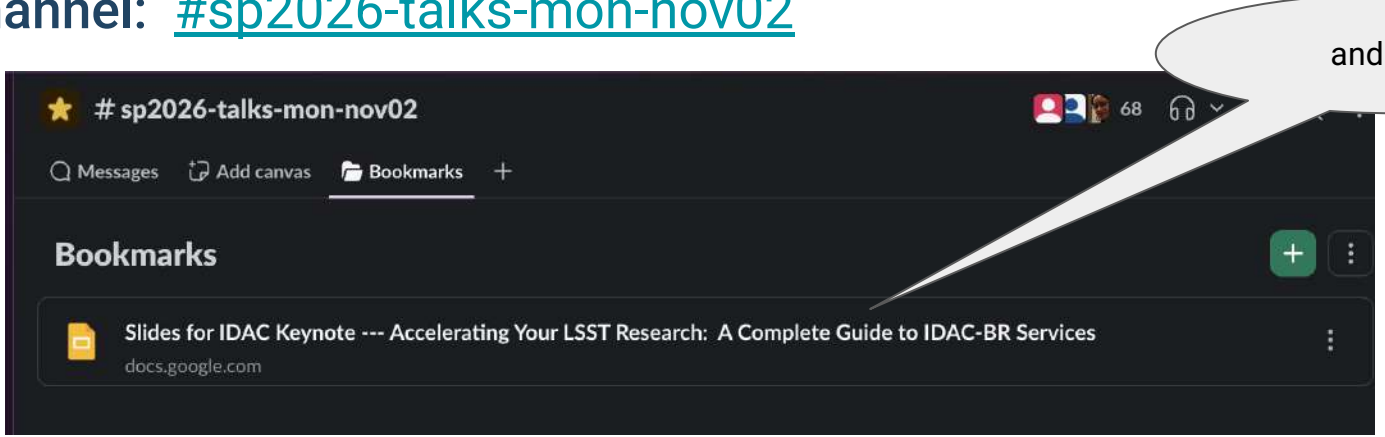
- Intro and context
  - Brazil in LSST / BRA-LIN
  - IDAC-BR characteristics
  - IDAC-BR vs. CCAD-Astro
  - IDAC Apps on LSP
  - User support
  - Access to information (docs/data)
- General purpose applications:
  - Access to catalog data – JupyterHub, User Query, TAP Service, LSDB,
  - Access to image data – Sky Viewer, Target Viewer, Cutout Service*
  - Advanced resources – Open OnDemand
- Science-driven applications:
  - Photometric Redshifts – PZ Server
  - Solar System – Occultation Prediction Database
  - Galaxy Clusters – Cluster Analysis and Visualization as a Service (CAnVAS)
- Closing remarks
  - Future services
  - Invitation to IDAC tutorials
  - Summary and contact info

These slides contain many useful links. Please find them:



Here (soon)

Slack channel: #sp2026-talks-mon-nov02



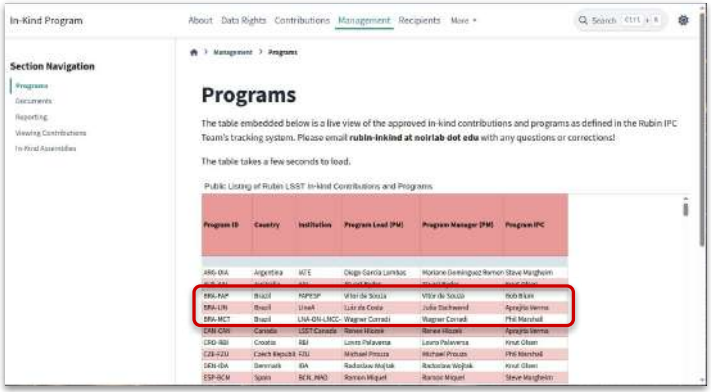
and here!



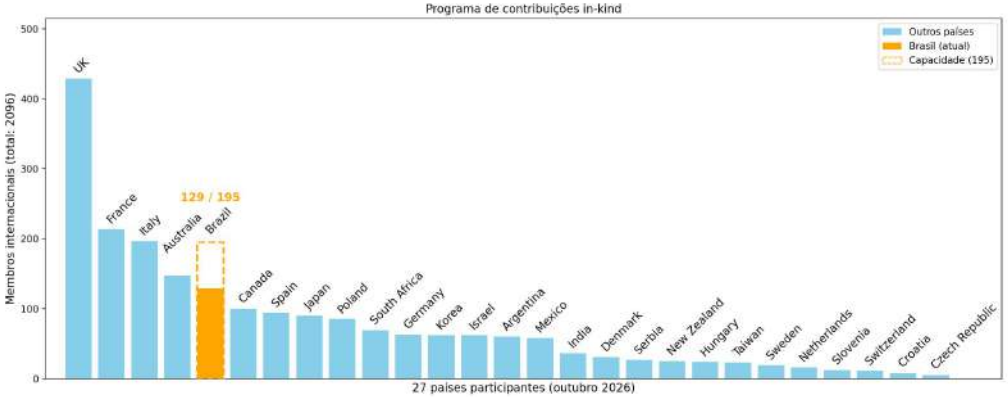
Introduction

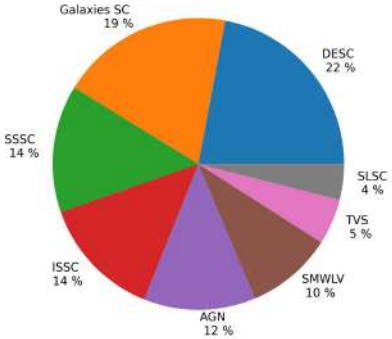
Rubin Observatory international in-kind program

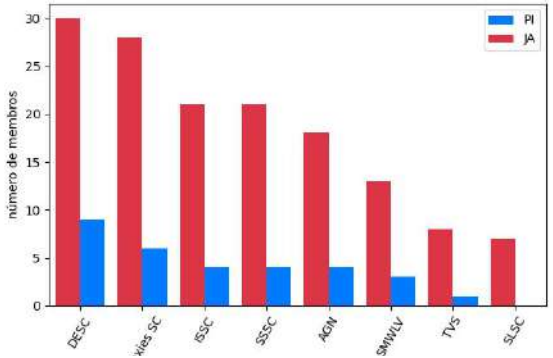
3 BR in-kind programs: 195 positions with data rights



https://in-kind-program.lsst.io/management/programs.html



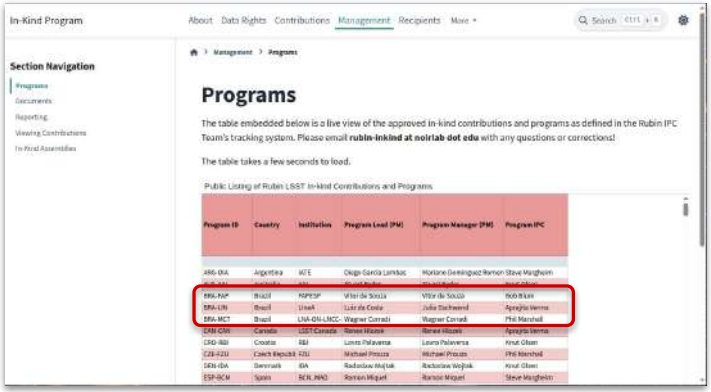




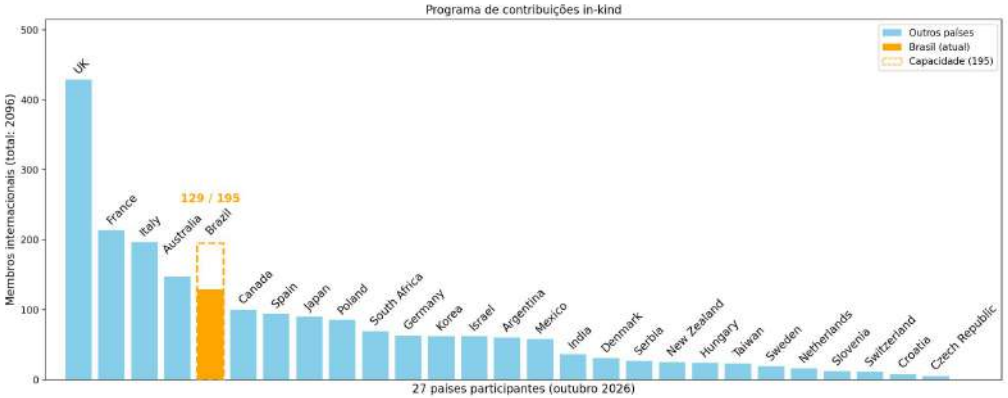
Rubin Observatory international in-kind program

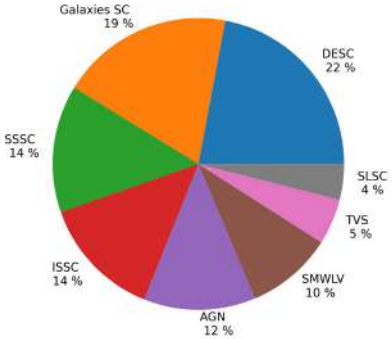
3 BR in-kind programs: 195 positions with data rights

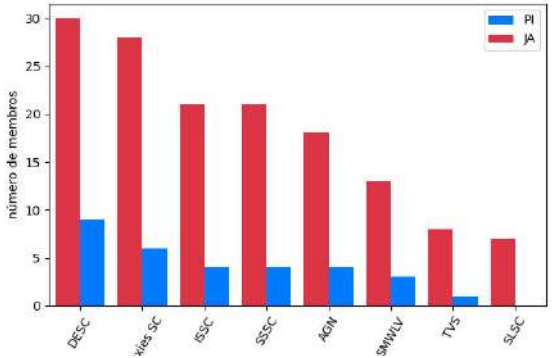
Round table on
Friday 12:00



https://in-kind-program.lsst.io/management/programs.html







The Rubin data and computing ecosystem



Data Access Centers	Chile, US
Full Independent DACs	Canada, UK
Lite Independent DACs	Argentina, Australia, Brazil, Canada, Denmark, Japan (x2), Mexico, Poland, Slovenia, Spain, South Korea
Scientific Processing Center	Croatia
Data Facilities	France, UK, US

- ~13 Independent Data Access Centers (IDACs)
- Most in-kind computing centers are "Lite", scoped to store a subset of data
- Geographical distribution is a challenge and opportunity
- Strengths will be the unique capabilities, datasets, and expertise that they can offer
- Use cases are important to understand how resources may be effectively used

Glossary & Acronyms

créditos slide: Aprajita Verma - LSST PCW 2023

The IDAC-BR

IDAC-Lite Requirements

- 20 Gbps network
- 500 TB database PostgreSQL
- 5 PB storage
- 500 cores
- Kubernetes cluster (JupyterHub)
- (2+1) annual data releases
- Equipment refreshes - always under warranty

Extra-resources

- + Storage space
- HPC Cluster (18M CPU-hours/yr)
- GPUs planned for 2027

Cont. lead: Carlos Adean



IDAC-BR Data products

Level 1 (Prompt)

- Alert streams
- Nightly releases

Level 2 (Data Release)

- LSST Data products (DPs and DRs)
- IDAC-BR in-kind advanced data products (e.g., photo-z)
- External public datasets (including LSDB @LIneA)

Level 3 (user-generated)

- Produced by the Community, e.g., Galaxy Cluster catalogs, Globular Cluster catalogs, SN candidate catalogs, Stellar Occultation Predictions, other photo-zs beyond the in-kind products, etc

The "*next-to-data*" paradigm

Github org.: [linea-it]

Apps — Jupyter notebook, Sky Viewer, Target Viewer, User Query, PZ Server, Solar System Portal, Occultation Prediction Database, etc

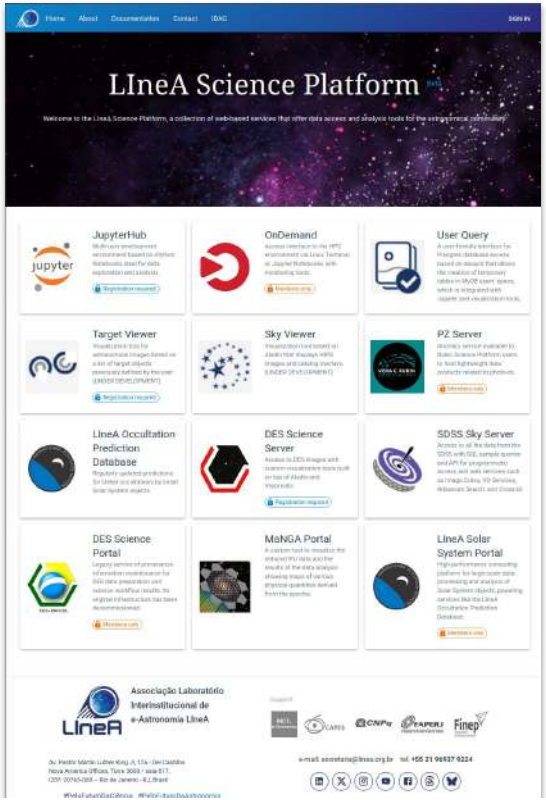
Support — Jupyter Hub, LSDB, Aladin, Daiquiri, Grafana, Nifi, TAP Service, etc.

Base — Rucio, Docker, Slurm, K8S, PostgreSQL, LDAP, etc.

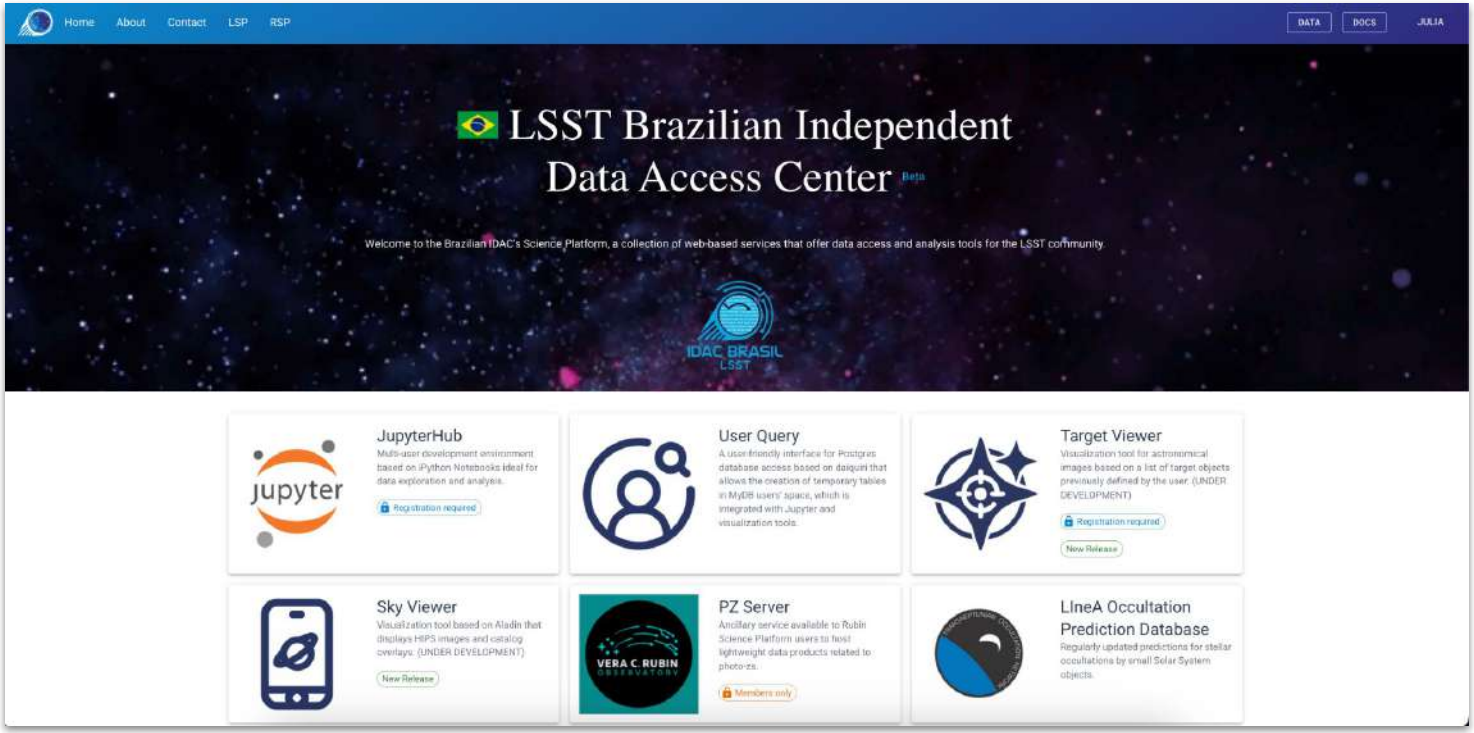
Data (L1, L2, L3)

Storage | Processing

LSP: A collection of services

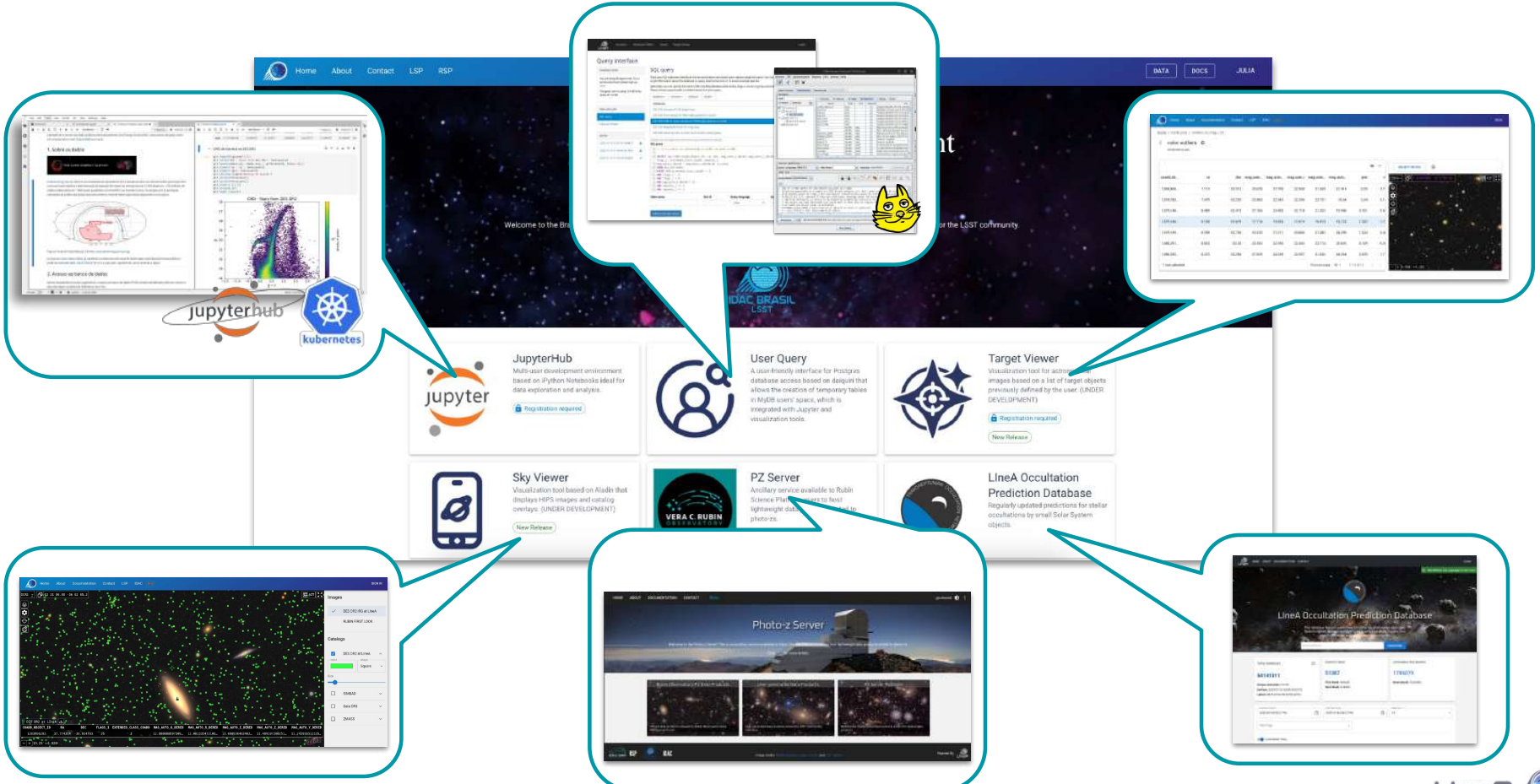


The IDAC-BR apps on LIneA Science Platform (LSP)



scienceplatform.linea.org.br/idac

The IDAC-BR apps on LIneA Science Platform (LSP)



IDAC-BR vs. CCAD-Astro (Center for the Curation and Analysis of Astronomical Data)

scienceplatform.linea.org.br/idac





IDAC-BR vs. CCAD-Astro (Center for the Curation and Analysis of Astronomical Data)





LSST and **public** data integrated to visualization, exploration, and HPC tools, available for the **Rubin/LSST Community**

LSST data after the embargo period

Public data integrated to visualization, exploration, and HPC tools, available for the **Brazilian Community**

LIneA

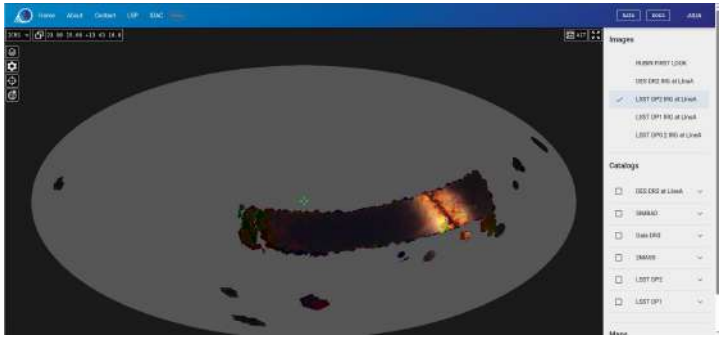
IDAC-BR vs. CCAD-Astro

Users' identity management system

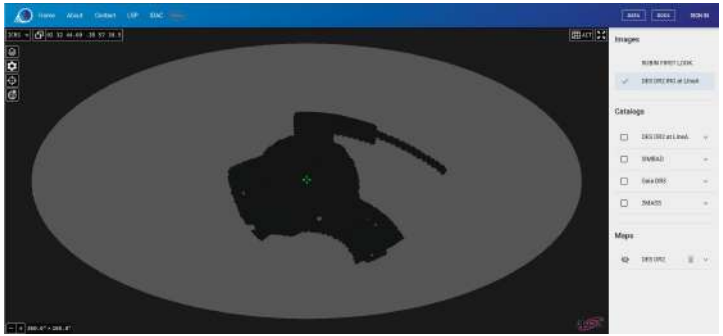


CILogon + COmanage

IDAC BRASIL
LSST



CCAD
CENTRO DE CURADORIA
E ANÁLISE DE DADOS

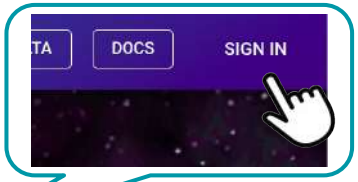


LIneA

Authentication & Authorization system integrated to RSP

Accessing for the first time:

go to
scienceplatform.linea.org.br/idac







enter your RSP credentials







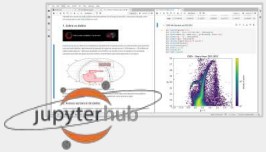
complete your registry at LIneA

Once registered at LIneA, just use your RSP credentials!



User registry requirements overview

in-kind contributions



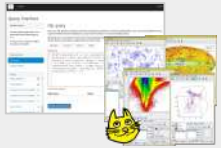
JupyterHub

- Registry required to access embargoed data (register here, but using the same RSP account)



LSST PZ Server

- Restricted to DRH
- No registration required! (direct access with your RSP account)



User Query/ TAP Service



Sky Viewer/ Target Viewer

- Open access to public data
- Registry required to access embargoed data (register here, but using the same RSP account)

extra resources



Occultation Prediction Database

- Open to public
- User registry is optional (required only for the subscription service)



LSDB @LIneA

- Open access to public data
- Restricted access to embargoed data





OPEN OnDemand + jupyter

HPC cluster

- Restricted access (projects evaluated by internal committee)
- Access to original parquet catalogs and FITS images
- Access to HATS collections (public and private)

User support

Full instructions:
https://docs.linea.org.br/en/lsst_registration.html

Tutorial today!

3:10 pm – Registration at LIneA/IDAC
3:40 pm – Solar System services



14:00 – 14:30	Rubin Plenary	**Rubin's community science resources for learning and support**	**Melissa Graham**
14:30 – 15:00	IDAC Keynote	**Accelerating Your LSST Research: A Complete Guide to IDAC-BR Services**	**Julia Gschwend**
15:10 – 16:30	Tutorial	**Tutorial I: Sagui – From Multiband Images to Resolved Galaxy Physics: Photometric Cubes, SED-aware Segmentation**	Andressa Wille & Rafael S. de Souza
		Tutorial II: IDAC-BR I – Registration and Access to the HPC Environment (30 min)	Nubia Garcia & Carlos Adea
		Tutorial III: IDAC-BR V – Solar System Science (60 min)	Rodrigo Carlos Boufleur
16:30 – 17:00	Break		Coffee break
17:00 – 17:30	Rubin Plenary	**Education & Public Outreach**	**Fernanda Urrutia**
17:30 – 17:45	Contributed talk	Rubin Difference Detectives – Zooniverse project for the ML reliability model for Rubin	Tatiana Acero Cuellar

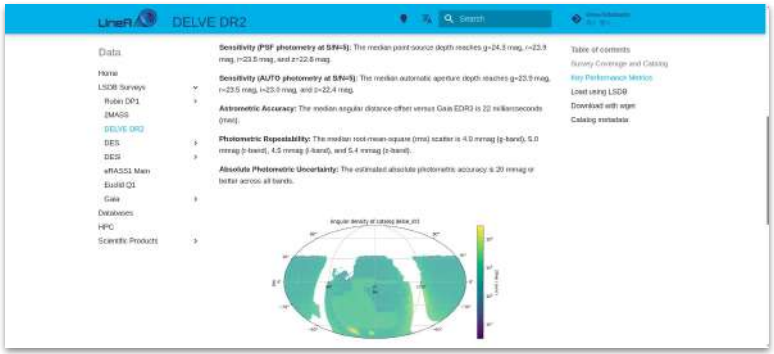
Still need help? Contact us!
helpdesk@linea.org.br

Documentation (PT-BR / EN / ES)

docs.linea.org.br/
user manuals for all services

data.linea.org.br/
how to access datasets available





+15 training courses in Google Classroom
helpdesk email (helpdesk@linea.org.br) and office hours on demand

Quick tour on the IDAC-BR Apps

Come to the tutorials along the
week to see the details!

IDAC Tutorials

- MONDAY 15:10 - User registration support **- public**
- MONDAY 15:40 - Tools for Solar System Science **- public**

- TUESDAY 15:10 - Access to DP2 (and other) Catalogs **- public**

- WEDNESDAY 15:10 - DP2 (and other) Images visualization **- public**

- THURSDAY 15:10 - Photo-z Server - restricted to data rights holders

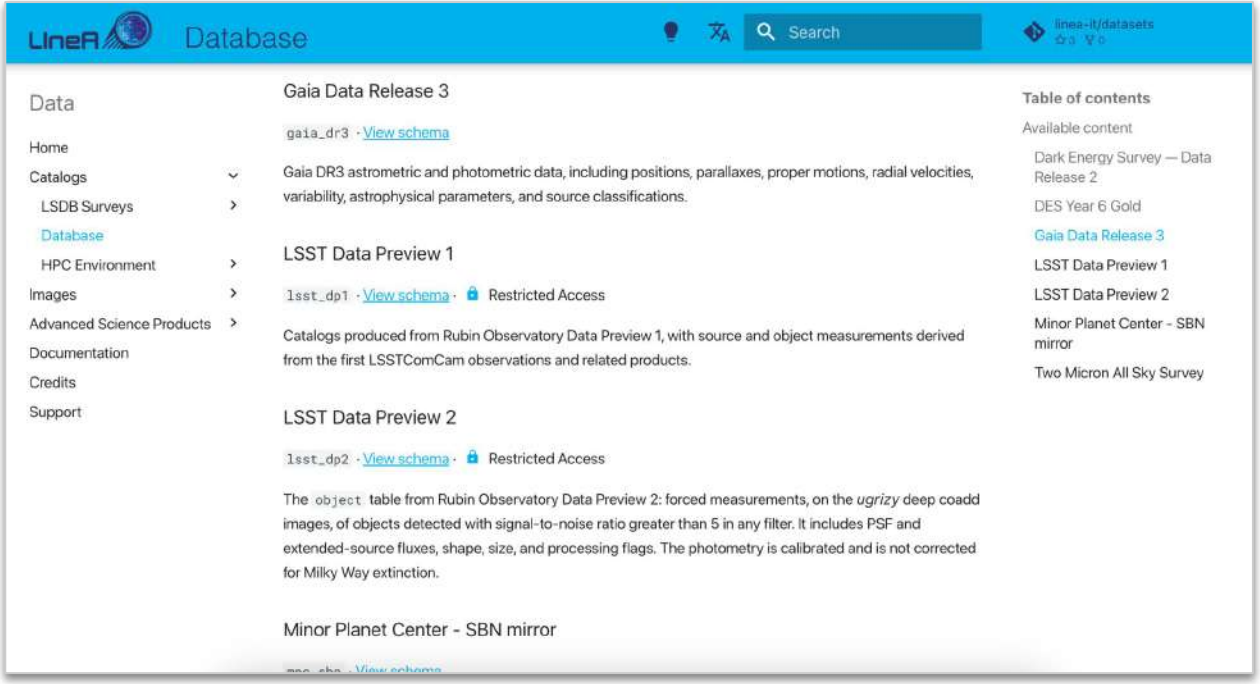
- FRIDAY 15:10 - How to Use the HPC Cluster **- public**



General purpose applications

I - Catalog data

data.linea.org.br > catalogs

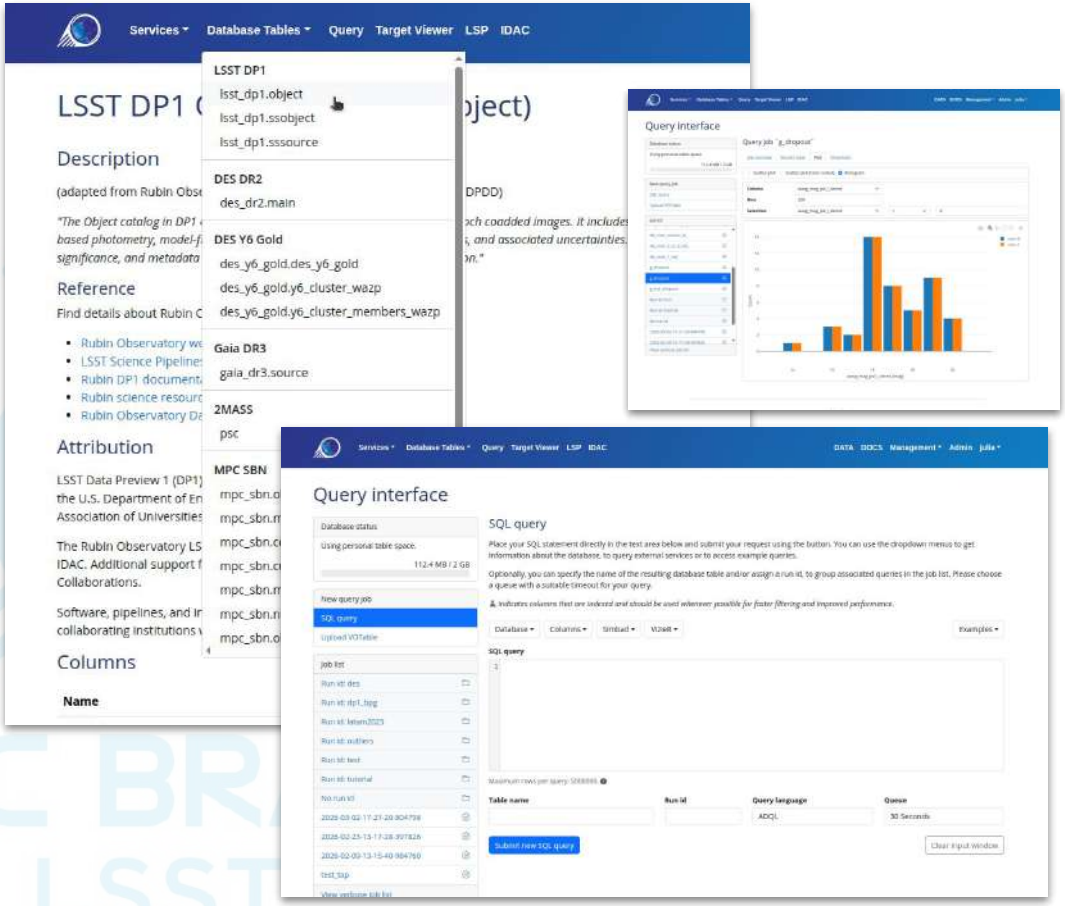


Survey / release	LSDB	Database	HPC	HiPS Catalog
2MASS PSC				
COSMO DC2	-	-		-
DELVE DR2		-		-
DES DR2 Main				
DES DR2 Y6 Gold				
DESI DR1		-		-
eRASS1 Main		-		-
Euclid Q1		-		-
Gaia DR3 Source				-
GALEX		-		
HSC		-		-
LSST DP0.1	-	-		-
LSST DP0.2	-			-
LSST DP1				
LSST DP2				
LSST DR1-DR11				
MPC	-		-	-
Pan-STARRS		-		-
S-PLUS		-		-
SDSS DR7		-		-
SkyMapper		-		-
TESS		-		-
TNS		-		-
VSX		-		-
WISE		-		-
ZTF		-		-

User Query

userquery.linea.org.br

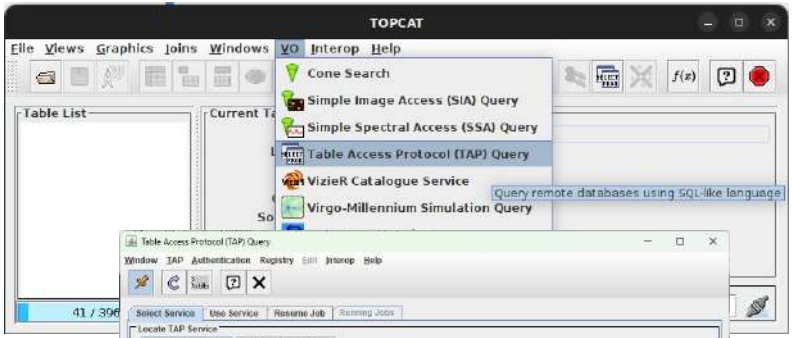
- Open access to public data
- Registry required to access embargoed data
- Optimal for exploratory data analysis
- Support to SQL and ADQL
- Based on *daiquiri* software (same as Gaia DR tool)
- MyDB space for query results
  - quota: 2.0 GB
- Upload tool (VOTable)
- Basic catalog visualization tool
- Integrated to Target Viewer

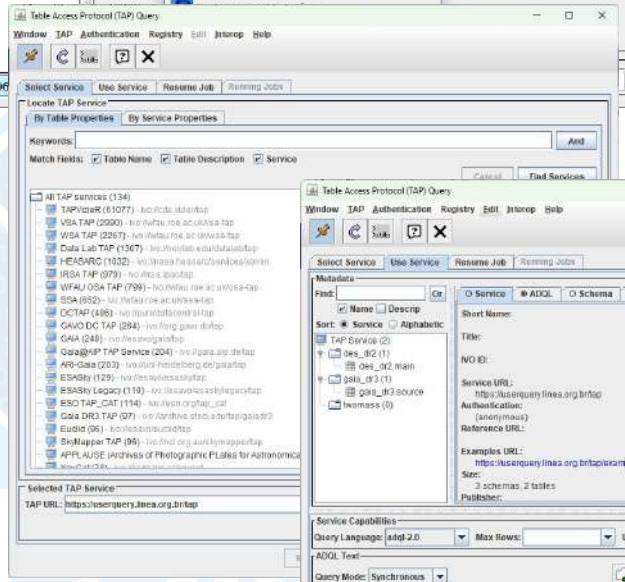


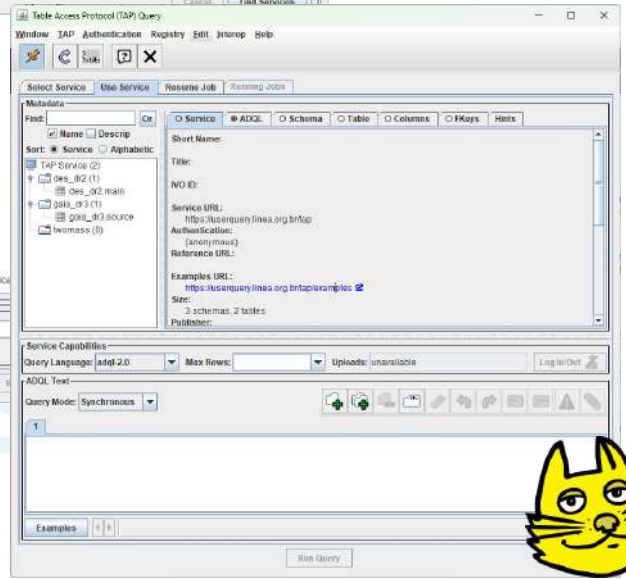
TAP Service
PyVO & TOPCAT



- IVOA standards
- Support to SQL and ADQL
- API token for embargoed data access








```python
import pyvo
import requests

# LIneA TAP endpoint
url = "https://userquery.linea.org.br/tap"

# Your API token (get it from User Query → API Token)
token = "Token YOUR_TOKEN_HERE"

# Create authenticated session
session = requests.Session()
session.headers["Authorization"] = token

# Connect to TAP service
tap = pyvo.dal.TAPService(url, session=session)

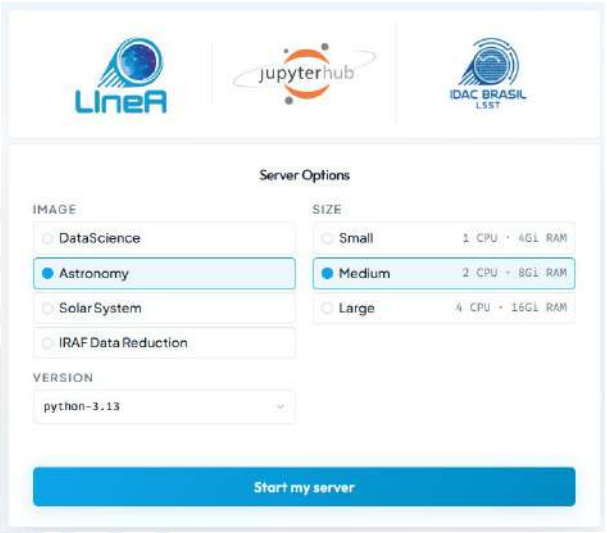
# Run query
query = "SELECT TOP 100 ra, dec, mag_auto_g FROM des_dr2.main"
result = tap.run_sync(query)

# Convert to table and display
table = result.to_table()
print(table)
```

JupyterHub

jupyter.linea.org.br/





- Register with RSP account to access embargoed data
- Optimal for exploratory data analysis
- Pre-setup Python envs
- 3-size containers (up to 4 CPU/16Gi RAM)
- $HOME quota: 35 GB soft / 40 GB hard (grace period: 7 days)
- Catalog access
  - TAP Service (LSST + public data)




```
import pyvo
import requests
```

```
tap_session = requests.Session()
tap_url = "https://userquery.linea.org.br/tap"
tap_service = pyvo.dal.TAPService(tap_url, session=tap_session)
```

```
query = "SELECT TOP 10 * FROM gaia_dr3.gaia_source"
result = tap_service.search(query)
```

  - LSDB (external public data)



LSDB

```
import lsdb
lsdb.open_catalog('https://linea.data.lsdb.io/hats/gaia_dr3')
```


LIneA

JupyterHub

jupyter.linea.org.br/

- Pre-installed default environments
- Customized user environments



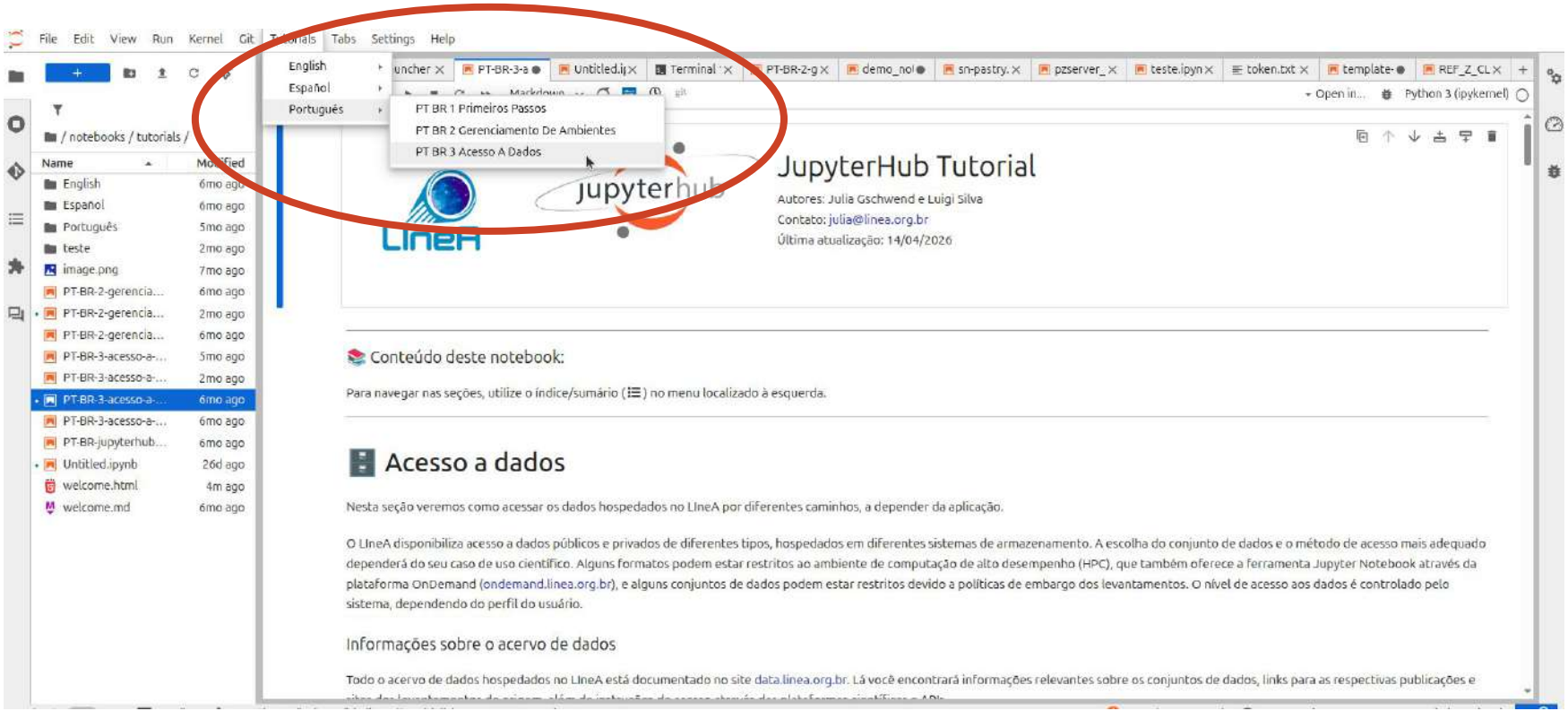


Category	Library	Purpose	Doc
Data Science	NumPy	Numerical operations and multidimensional arrays.	doc
	SciPy	Advanced scientific functions and numerical methods.	doc
	Pandas	Table analysis and data manipulation.	doc
	Matplotlib	2D/3D scientific visualization.	doc
	Seaborn	High-level statistical visualizations.	doc
	scikit-image	Image processing.	doc
	scikit-learn	Machine learning and predictive models.	doc
	Dask	Parallelization and distributed computing.	doc
Interactive Visualization	Bokeh	Interactive web visualizations.	doc
	HoloViews	Declarative visualization of scientific data.	doc
	hvPlot	Unified visualization API for pandas/xarray.	doc
	Datashader	Efficient rendering of large data volumes.	doc

Category	Library	Purpose	Doc
Astronomy	Astropy	Core astronomical tools.	doc
	Astroquery	Queries to online astronomical archives and catalogs.	doc
	Healpy	HEALPix map manipulation.	doc
	Photutils	Photometry and source detection.	doc
	Regions	Sky region manipulation.	doc
	Dustmaps	Unified interface for multiple Milky Way reddening maps.	doc
	Reproject	Reprojection of astronomical images.	doc
	HATS	Structure and metadata for large catalogs.	doc
	HATS Import	Conversion of catalogs to HATS format.	doc
	LSDB	Scalable analysis of HATS catalogs.	doc
	PyVO	Access to VO services (TAP, SIA, SSA).	doc
Jupyter	IPykernel	Python kernel for notebook execution.	doc

JupyterHub

jupyter.linea.org.br/

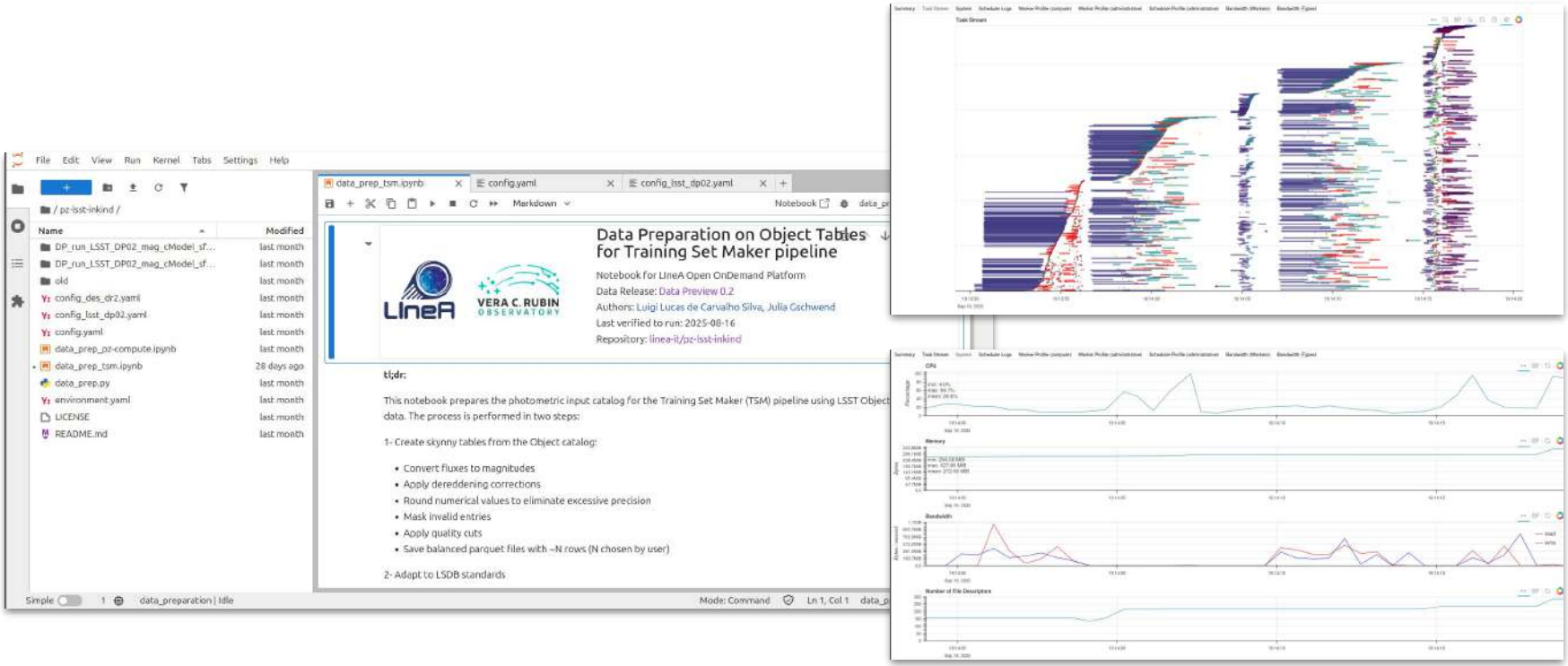


JupyterLab Open OnDemand

ondemand.linea.org.br/

User Manual

OPEN OnDemand + jupyter



LineA

JupyterLab Open OnDemand

ondemand.linea.org.br/

- Open do BPG-LSST
- Restricted access for Rubin Community in general (projects evaluated by internal committee)
- Jupyter Lab + Shell Terminal integrated to Apollo cluster
- Optimal for data-intensive processes, big data analysis and visualization
- Quota (grace period: 7 days):
  - $HOME: 35 GB soft / 40 GB hard →long term storage
  - $SCRATCH: 35 GB soft / 40 GB hard → temporary storage for test results
  - $SCRIPTS: 10 GB soft / 12 GB hard → codes, scripts, git repositories, etc
- Catalog access
  - Original Parquet files from LSST DM pipelines
  - LSDB (LSST + public data)

```
$DATA/lsst/dp1/
    ├── primary
    │   ├── catalogs
    │   │   ├── object
    │   │   │   └── object_xxxxx_...xxx.parq # (29 files)
    │   │   ├── ss_object
    │   │   │   └── ss_object_...xxx.parq
    │   │   └── ss_source
    │   │       └── ss_source_...xxx.parq
    │   ├── images
    │   └── maps
    └── secondary
        ├── catalogs
        │   ├── hips  # (HiPS catalog structure)
        │   └── object_collection # (LSDB HATS structure)
        └── images
            └── hips # (HiPS image structure)
```

```python
import os
import lsdb

dp1_base = os.environ.get("DP1_HATS")

catalog_path = os.path.join(dp1_base, "object_collection")

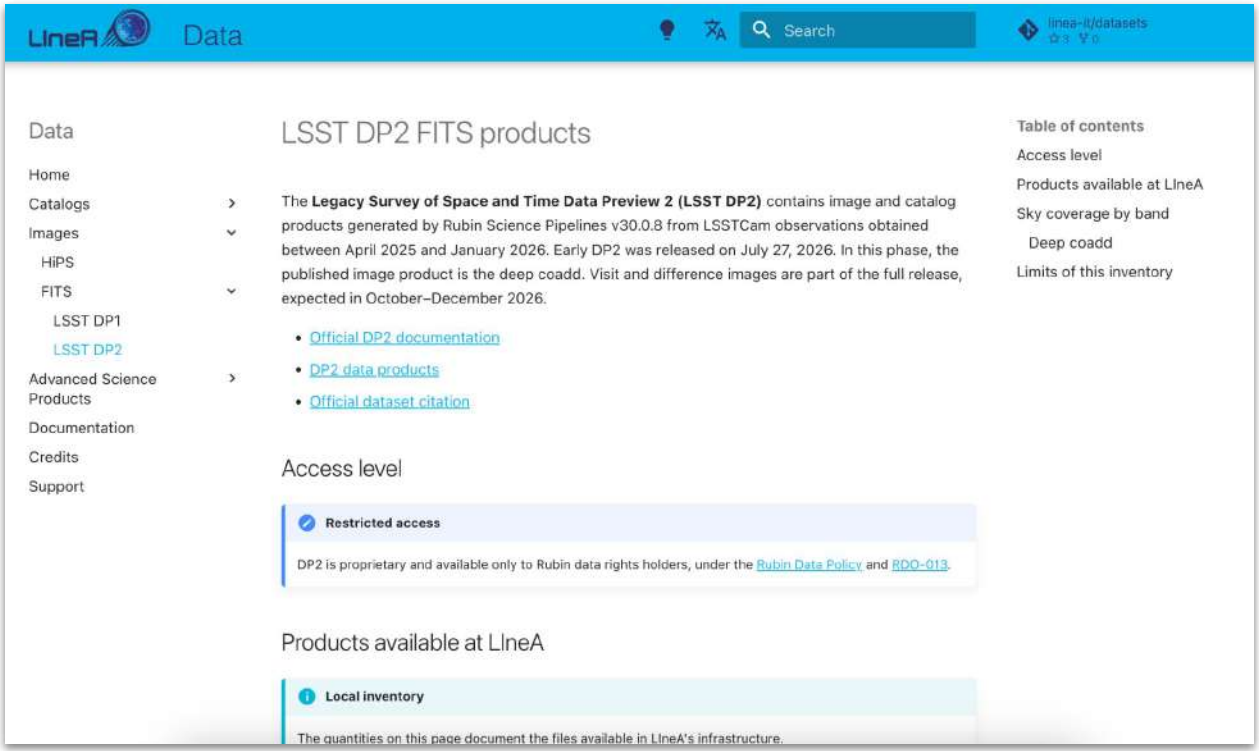
cat = lsdb.open_catalog(catalog_path)
```

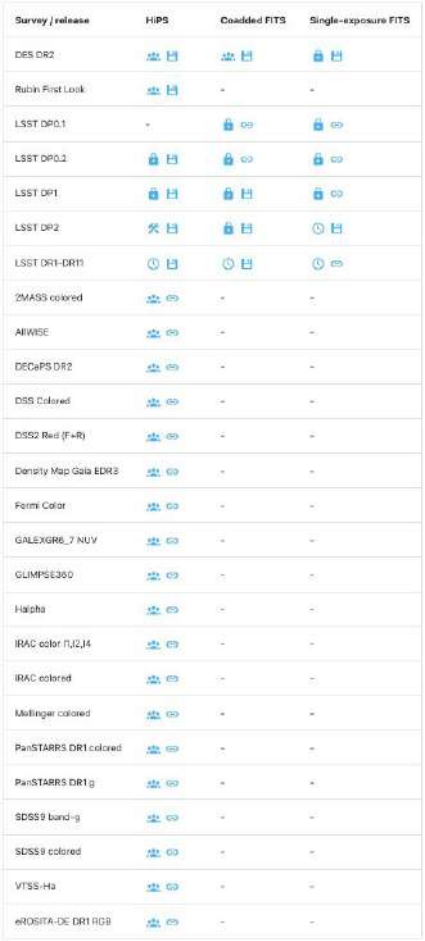


General purpose applications

II - Image data

data.linea.org.br > images

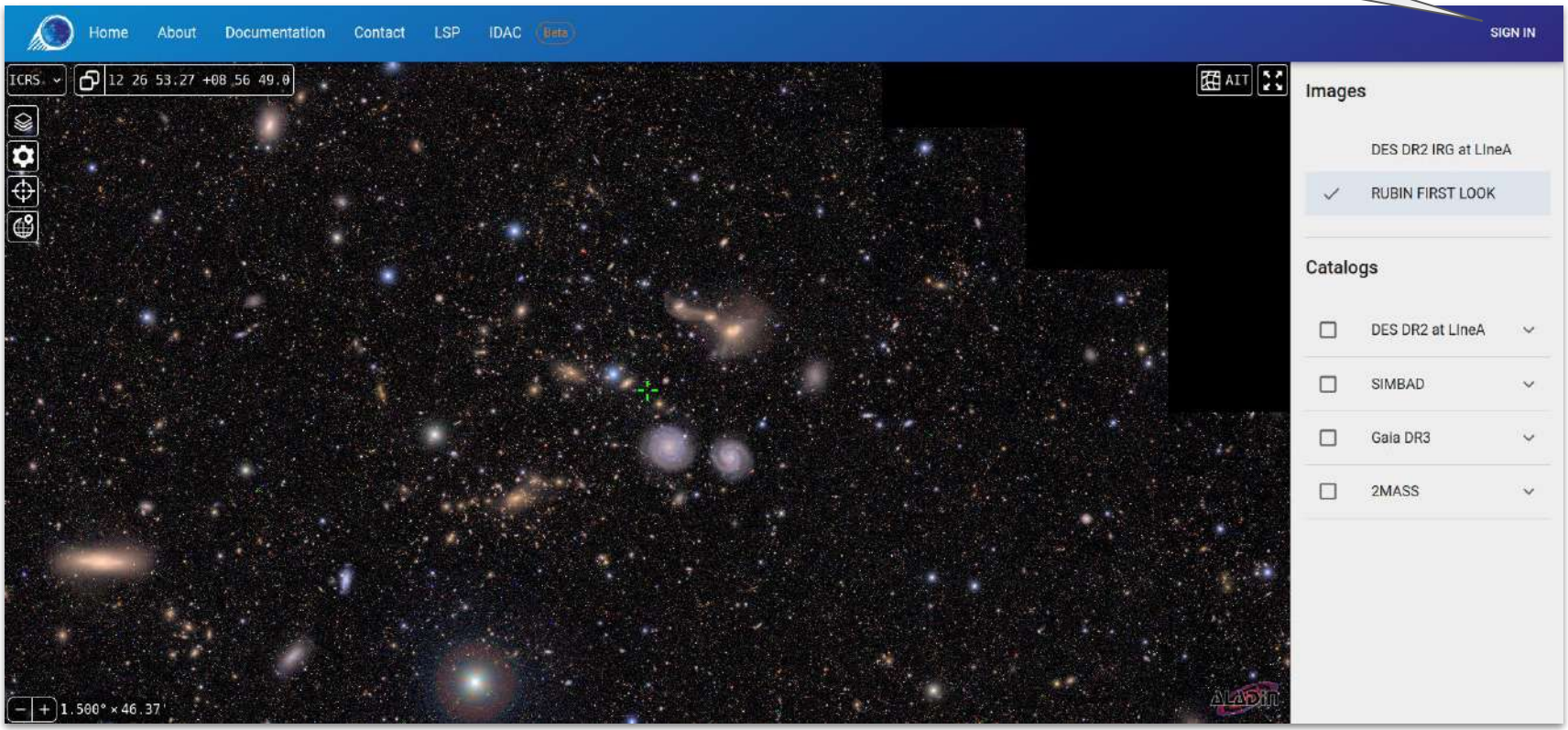




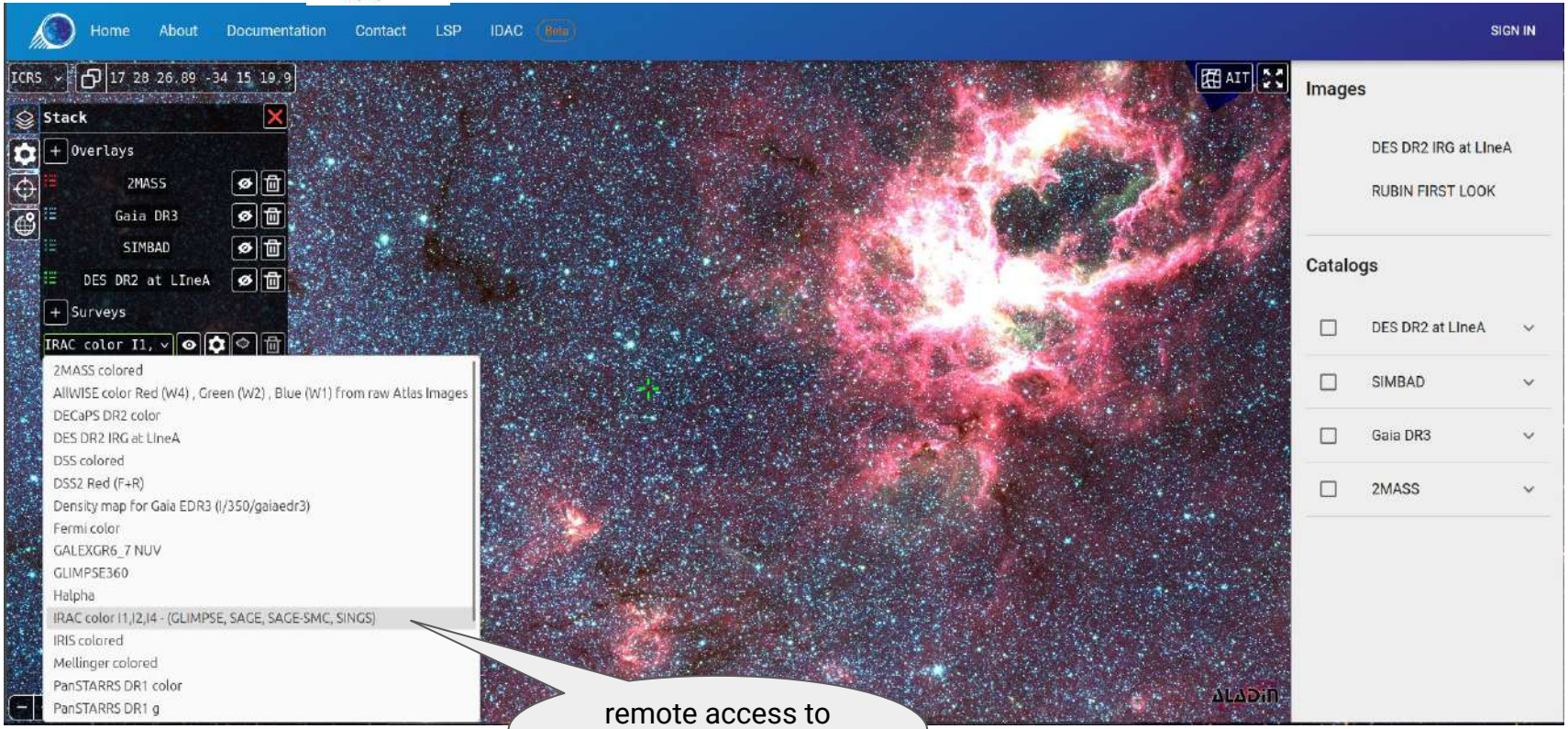
Sky Viewer

User Manual

no login required for public data



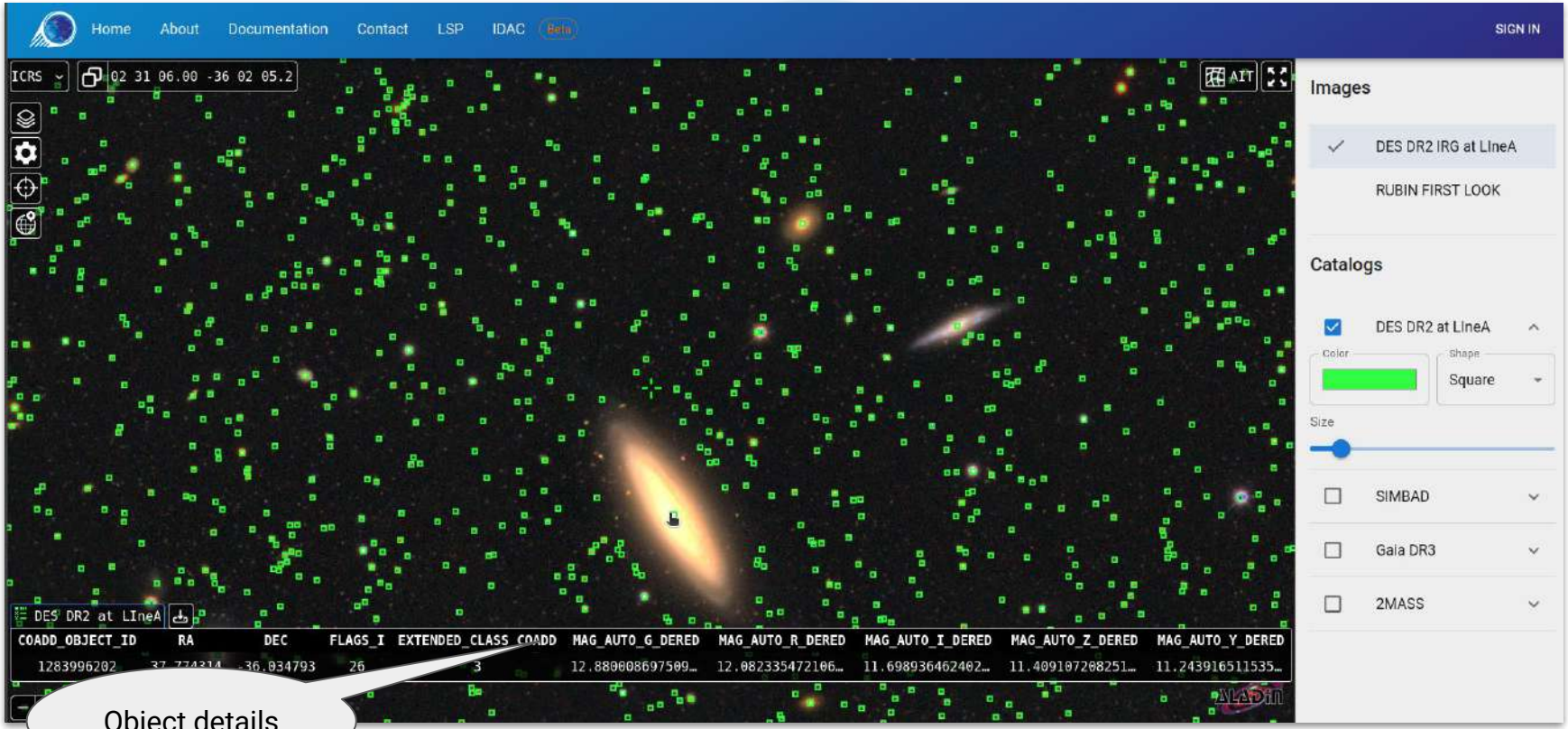
Sky Viewer


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17 28 26.89 -34 15 19.9
Stack
Overlays
2MASS
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SIMBAD
DES DR2 at LIneA
Surveys
IRAC color I1,
2MASS colored
AllWISE color Red (W4) , Green (W2) , Blue (W1) from raw Atlas Images
DECaPS DR2 color
DES DR2 IRG at LIneA
DSS colored
DSS2 Red (F+R)
Density map for Gaia EDR3 (I/350/gaiaedr3)
Fermi color
GALEXGR6_7 NUV
GLIMPSE360
Halpha
IRAC color I1,I2,I4 - (GLIMPSE, SAGE, SAGE-SMC, SINGS)
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Mellinger colored
PanSTARRS DR1 color
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Images
DES DR2 IRG at LIneA
RUBIN FIRST LOOK
Catalogs
DES DR2 at LIneA
SIMBAD
Gaia DR3
2MASS
remote access to several resources

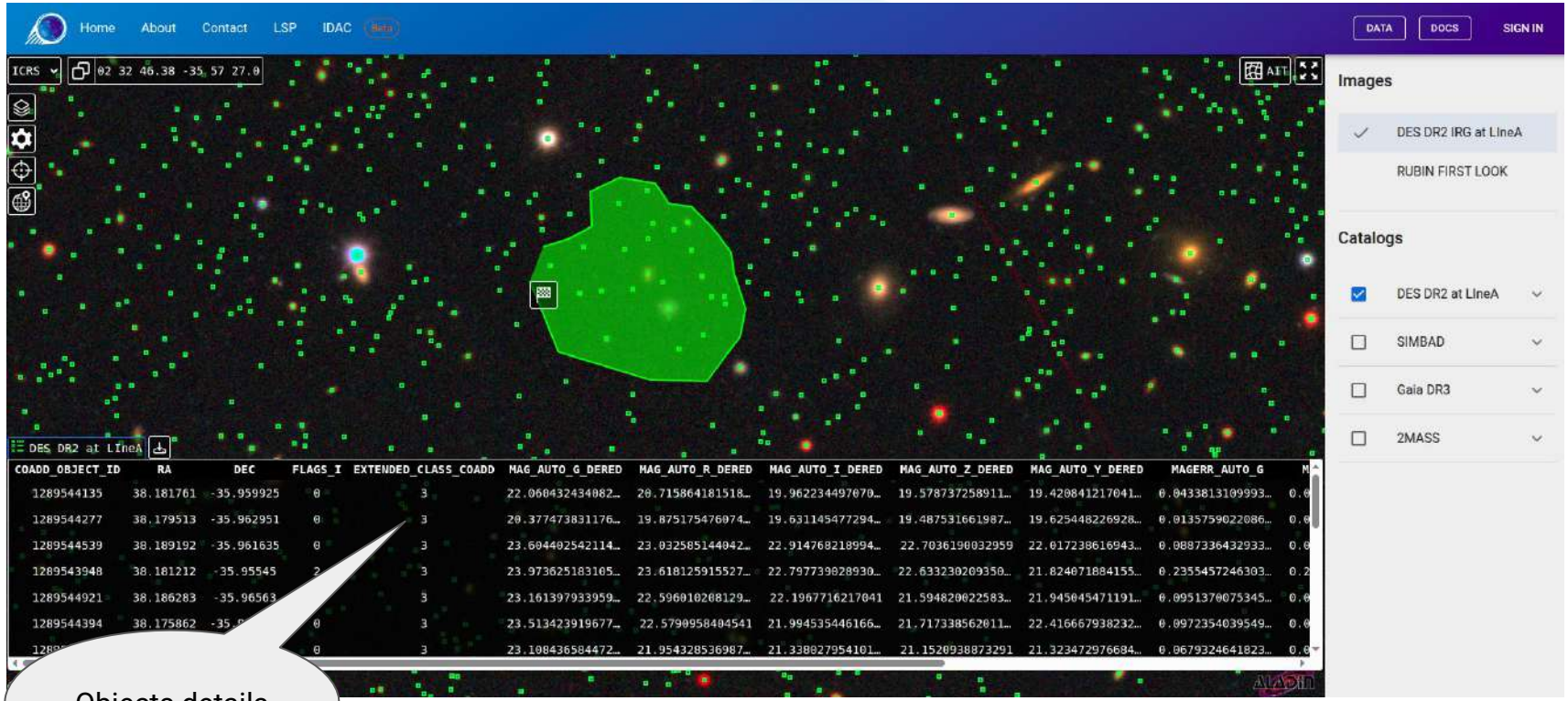
Sky Viewer


Catalog overlay
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Object details

Sky Viewer

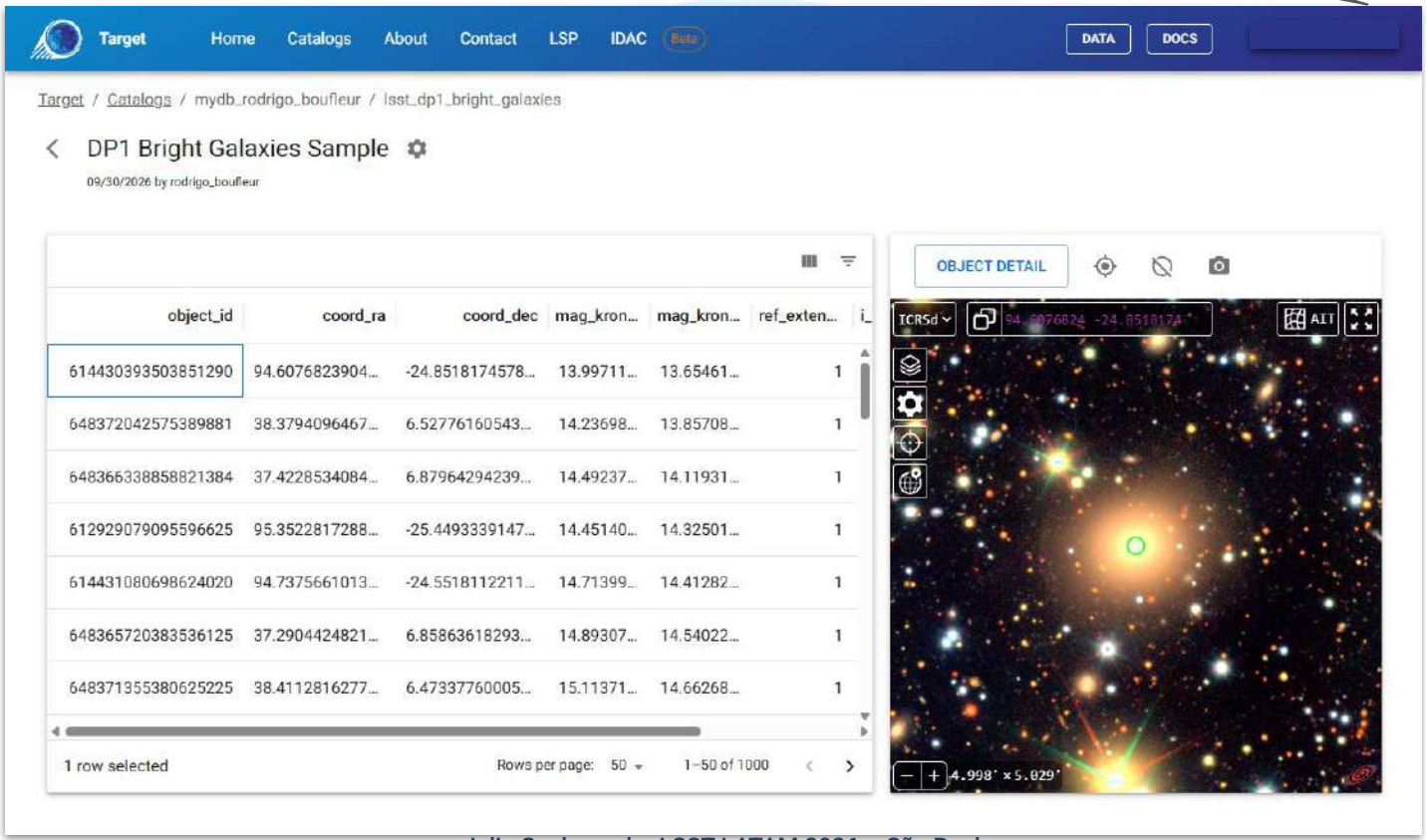


Objects details

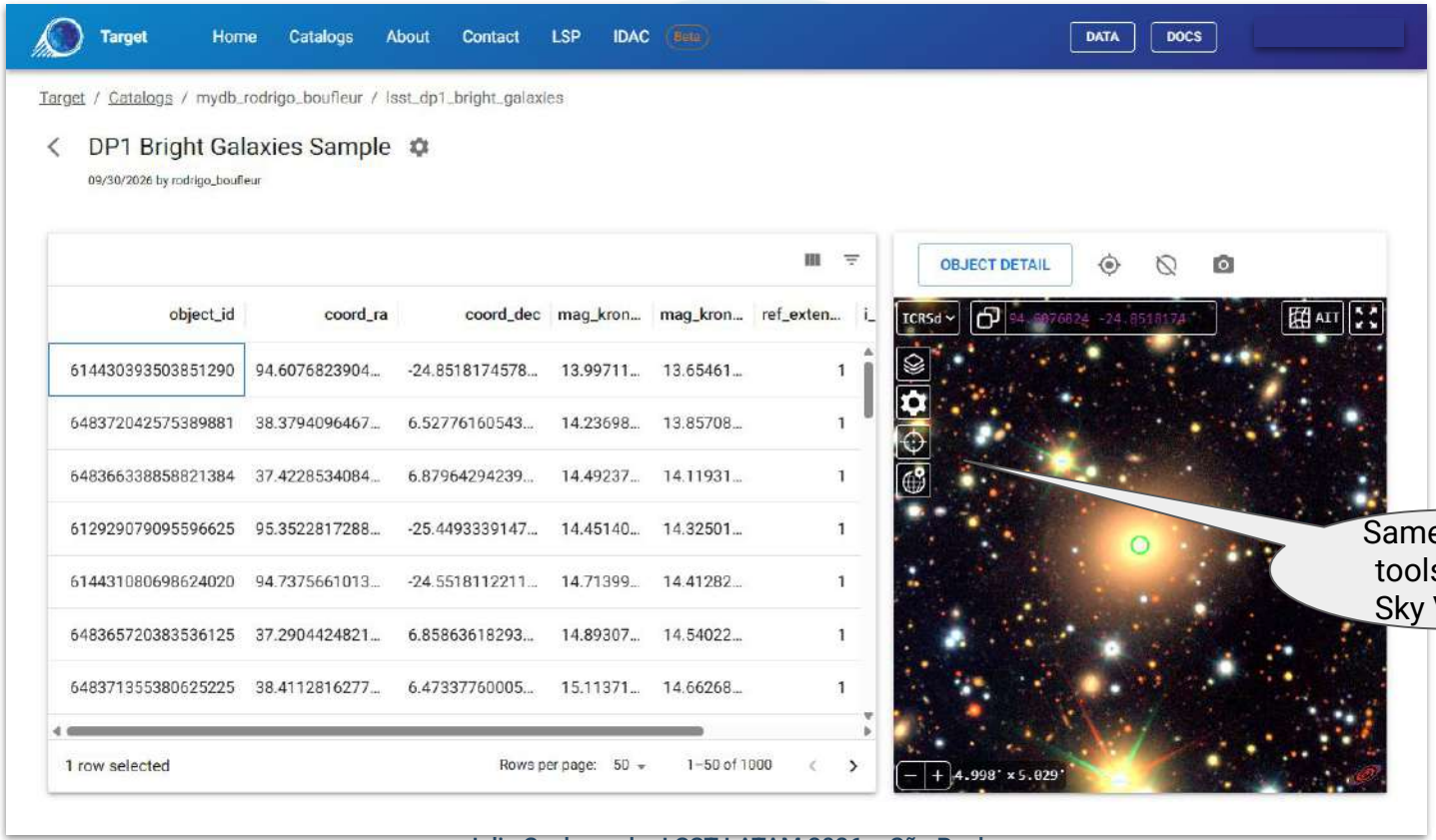
Target Viewer

User Manual

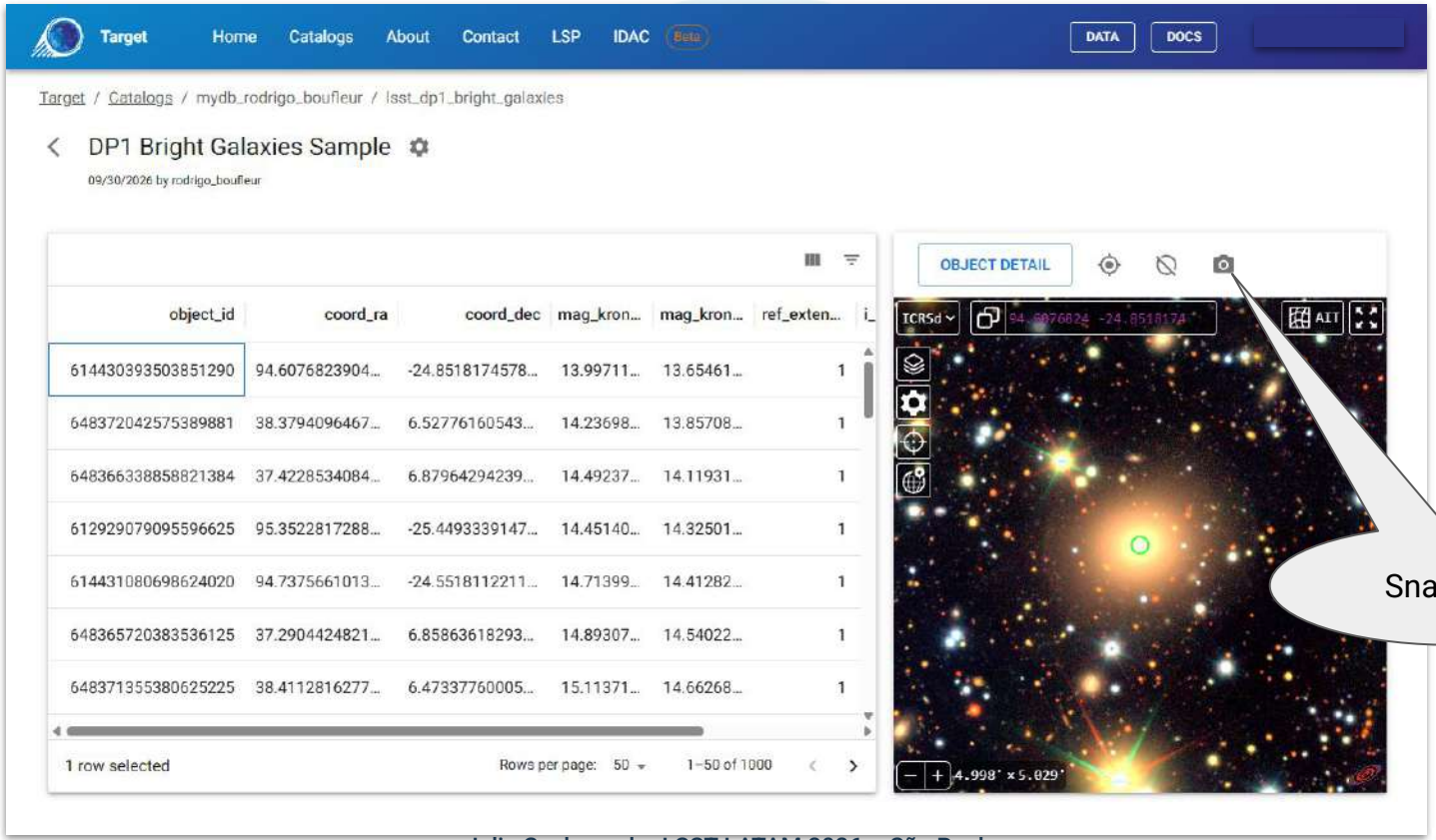
login required to access your own tables



Target Viewer



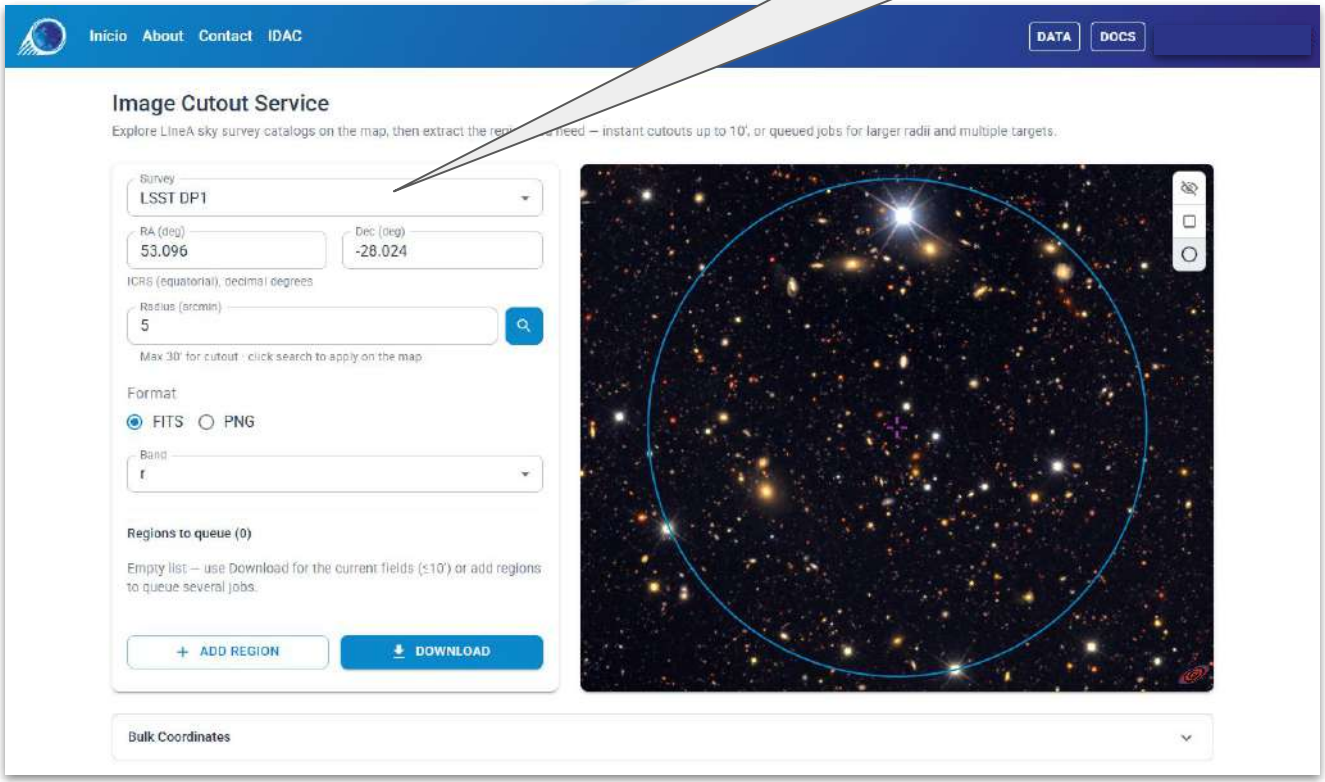
Target Viewer



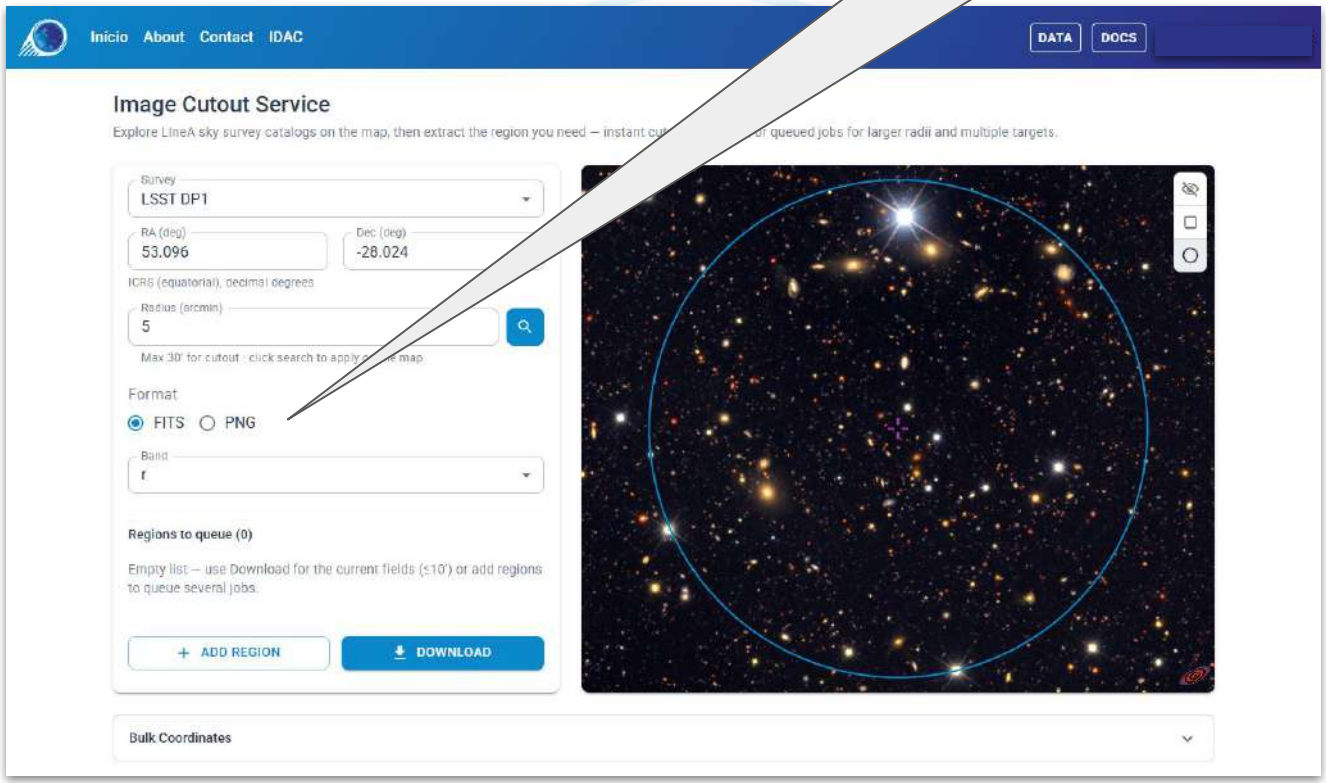
Cutout service

User Manual

LSST DP1 and DP2 (private)
DES DR2 (public)



Cutout service



Cutout service



Download single cutout or
Submit list for asynchronous process

Início About Contact IDAC

DOCS

Image Cutout Service

Explore LineA sky survey catalogs on the map, then extract the region you need — instant cutouts up to 10′, or queued jobs for l… targets.

Survey
LSST DP1

RA (deg)
53.096

Dec (deg)
-28.024

ICRS (equatorial), decimal degrees

Radius (arcmin)
5

Max 30′ for cutout · click search to apply on the map

Format

FITS PNG

Band
r

Regions to queue (0)

Empty list — use Download for the current fields (≤10′) or add regions to queue several jobs.

+ ADD REGION

DOWNLOAD

Bulk Coordinates

Summary – general purpose IDAC-BR apps

	Catalogs	Images	Main features / application	Status / Requirements
Jupyter Hub	✓	✓	• Pre-setup Python envs • Integrated to the database and LSDB • Suitable for exploratory analysis	• Catalog access in production • Image access under development (cutout API)
Jupyter OnDemand	✓	✓	• Original parquets and FITS + LSDB • High performance computing • Big data analysis	• Open for BPG-LSST • Restricted access for DRH depending on project approval
User Query / TAP Service	✓	✗	• SQL and ADQL database queries • MyDB space for query results • Exploratory analysis	• Accessible catalogs depending on user profile • API token for embargoed data
Sky Viewer	✓	✓	• All sky HiPS Images • Maps visualization • HiPS catalog overlay	• Accessible images depending on user profile • Cutout integration under dev
Target Viewer	✓	✓	• User-generated targets catalog • Integrated with User Query • Target-centered HiPS Images	• Cutout integration under dev
Cutout Service	✗	✓	• Download FITS or PNG images • RGB or single band	• Under development

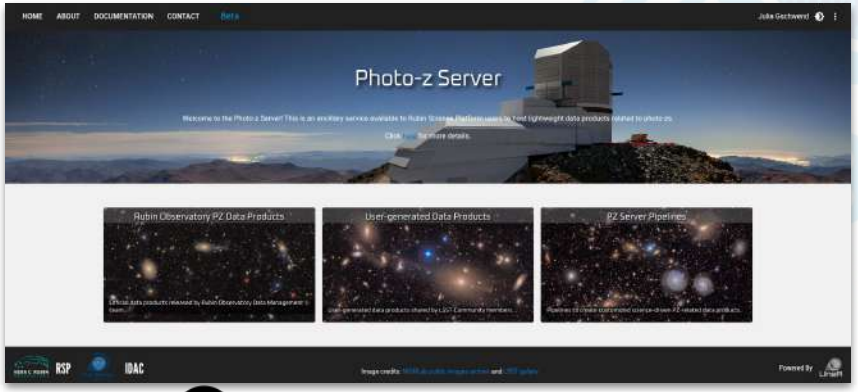


Science-driven applications

Photo-z (PZ) Server

- **What it is:** A specialized service for creating and hosting pz-related derived data products
- **Highlights**
  - Official data products validated by Rubin DM (from DR1)
  - User-generated data products
  - Download/upload/share
  - Crossmatching pipelines - DIY

https://pzserver.linea.org.br

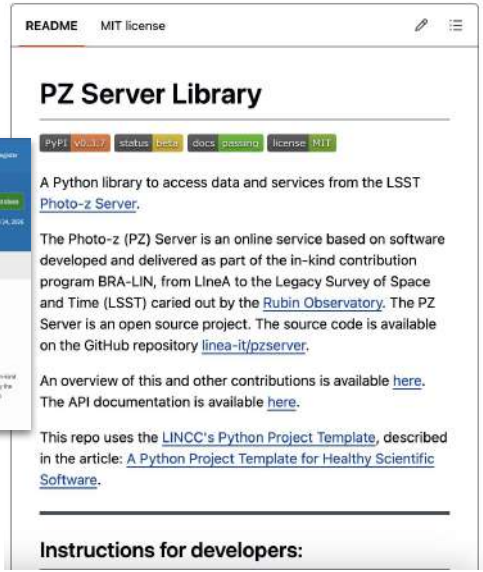


Repo: linea-it/pzserver_app

https://linea-it.github.io/pzserver/

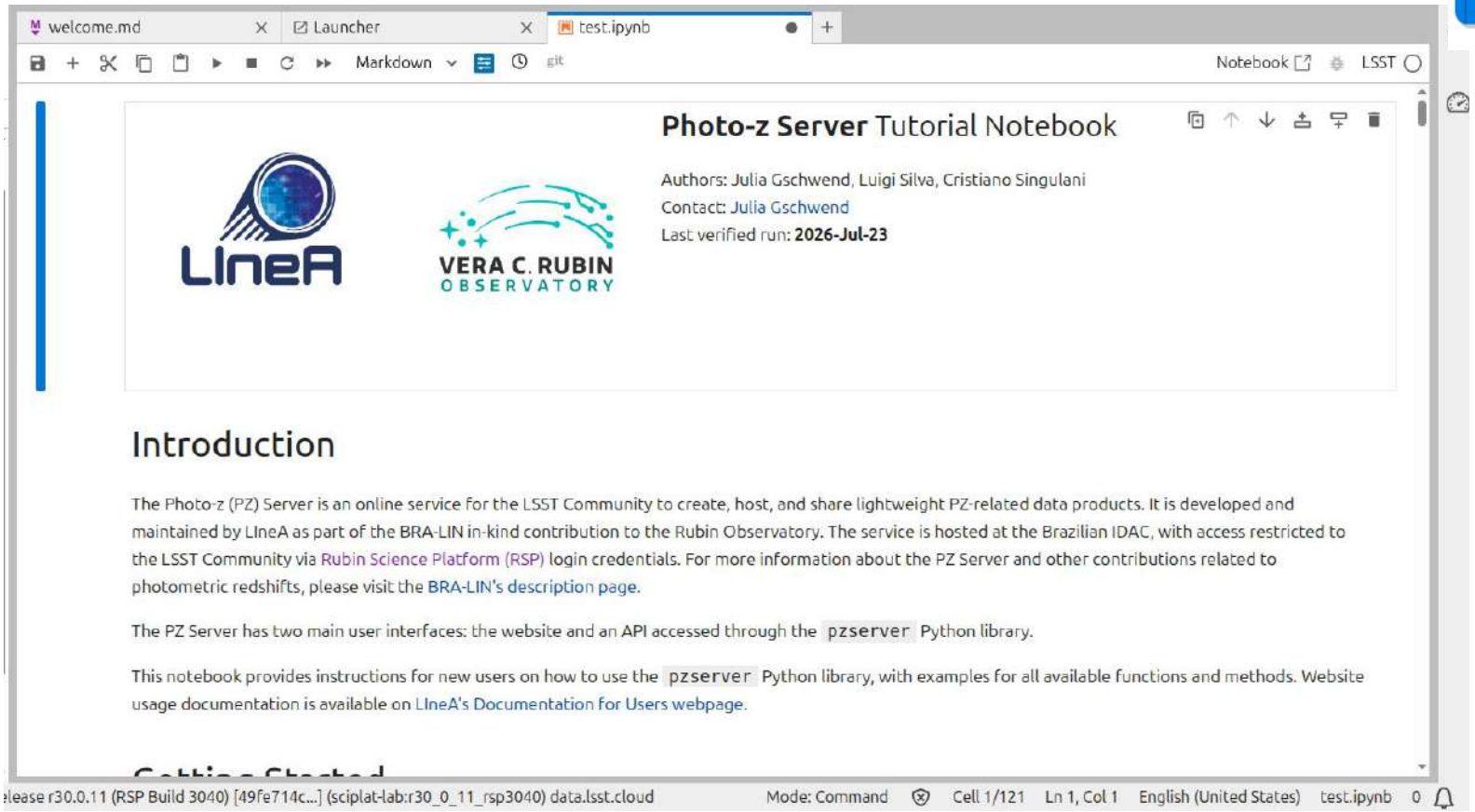
Python Library (API) `$ pip install pzserver`





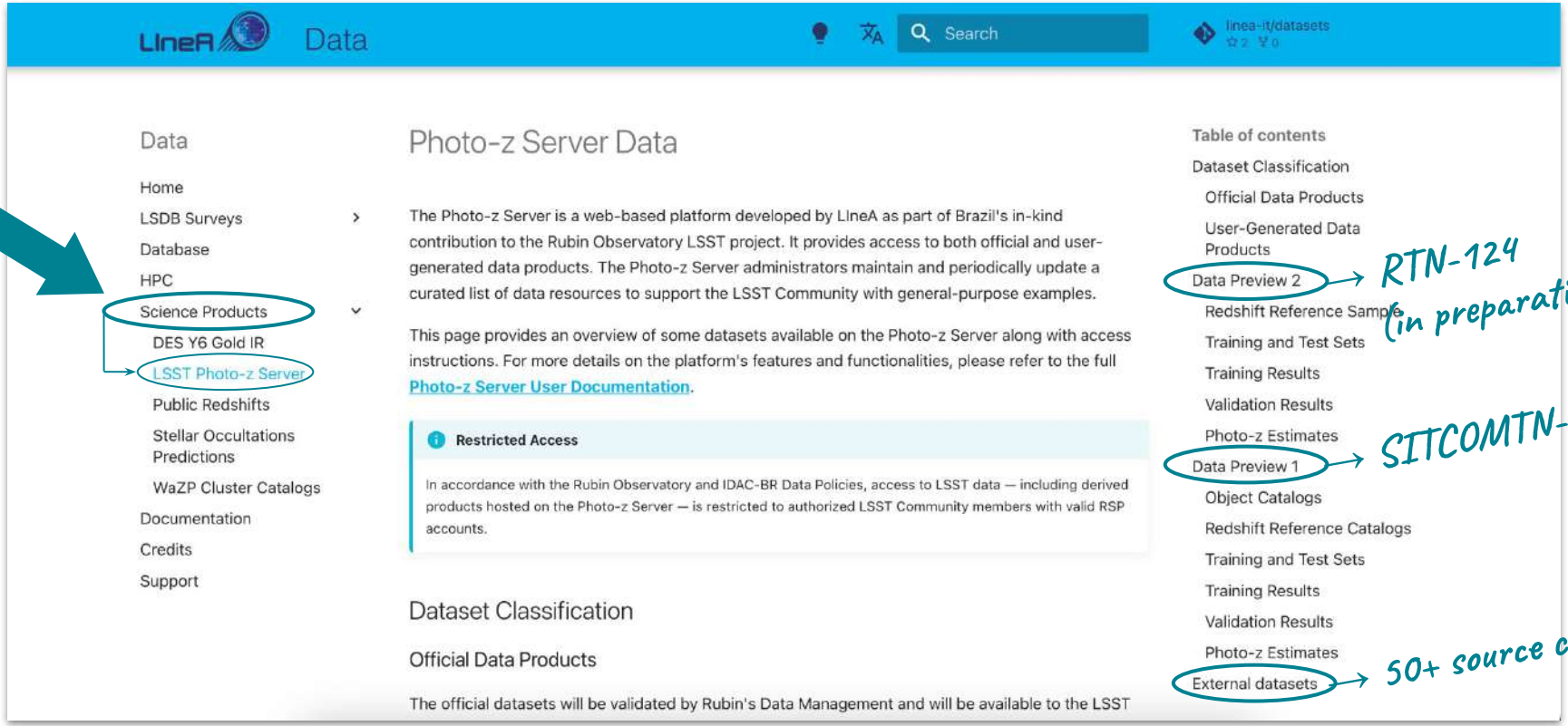
Repo: linea-it/pzserver

pzserver_tutorial.ipynb



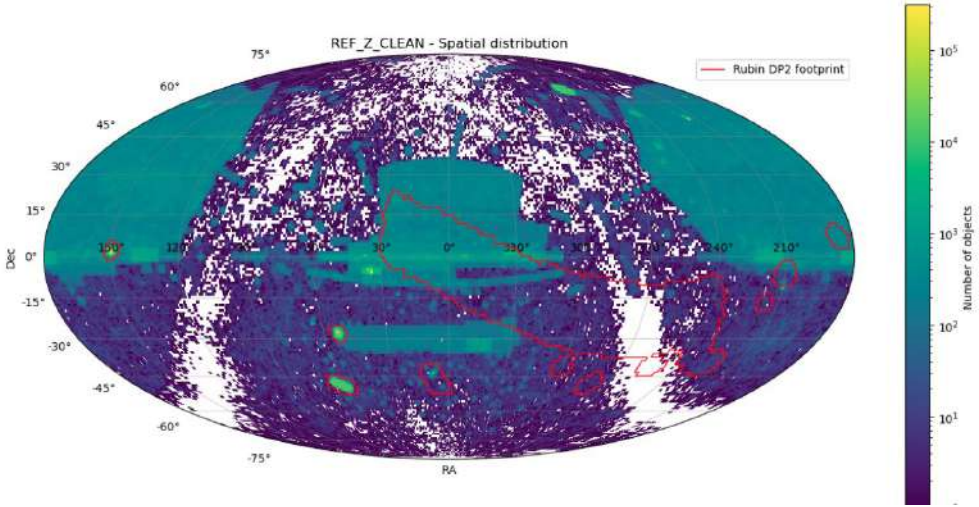
Curated data products index page

https://data.linea.org.br



Ref. z compilation - Current version

Data Product	Release Date (MM/DD/YYYY)	# of Products	# of Objects
REF_Z_COMPLETE	07/06/2026	38	43,555,318
REF_Z_CLEAN	07/06/2026	38	20,856,682
REF_Z_CLEAN_NO_DESI_LSS	07/06/2026	37	6,668,608

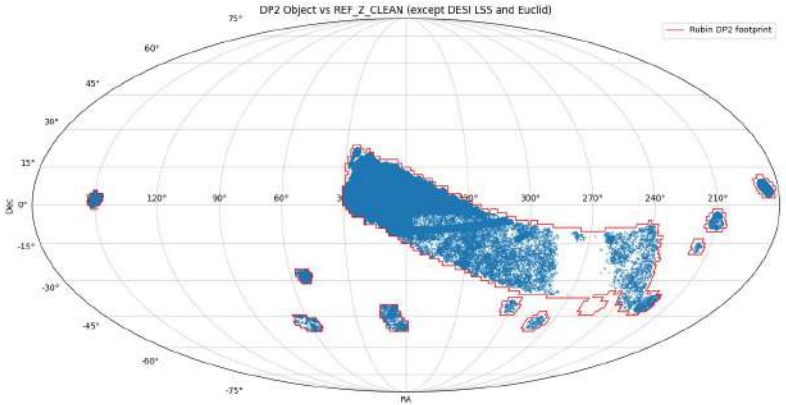


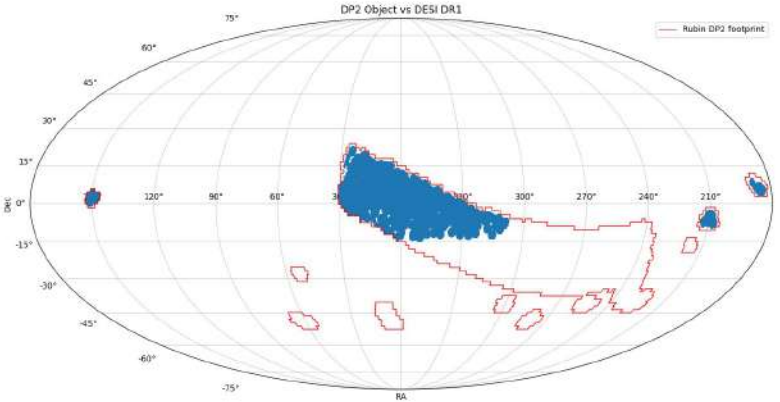
Seq.	Data Product	Reference	Number of Redshifts
1	2dFGRS Final Data Release	Colless et al. (2001)	245,591
2	2dFLens Final Data Release	Blake et al. (2016)	70,079
3	2MRS v240	Huchra et al. (2012)	240,496
4	3D-HST v415	Momcheva et al. (2016)	207,967
5	6dFGS DR3	Jones et al. (2009)	136,304
6	ASTRODEEP GS43	Merlin et al. (2021)	35,108
7	ASTRODEEP JWST	Merlin et al. (2024)	531,173
8	C3R2 DR3	Stanford et al. (2021)	676
9	CANDELS SITCOMTN-154	Grogin et al. (2011)	31,440
10	COSMOS Specz Compilation DR1	Khostovan et al. (2025)	482,579
11	COSMOS Web DR1 - LEPHARE Extension	Shuntov et al. (2025)	784,016
12	COSMOS2020 CLASSIC LITE	Weaver et al. (2022)	1,720,700
13	DEIMOS 10K	Hasinger et al. (2018)	10,770
14	DESI DEEP PILOT	Dey et al. (2026)	7,546
15	ELAISFBMC	Rowan-Robinson et al. (2004)	3,762
16	ELAISS1OID	Feruglio et al. (2008)	478
17	ELG_FIGS	Pharo et al. (2020)	201
18	EUCLID Q1 GALAXY BEST RANK	Euclid Collaboration (2025)	3,716,438
19	FMOS-COSMOS	Kashino et al. (2019)	5,484
20	GAMA DR4	Driver et al. (2022)	522,558
21	HELP DR1 - DMU23 - ELAIS-S1	Shirley et al. (2021)	18,422
22	JADES DR4	Curtis-Lake et al. (2025)	5,190
23	JADES DR5 PHOTOZ	Robertson et al. (2026)	304,366
24	MOSDEF Final Data Release	Kriek et al. (2015)	1,791
25	NED SITCOMTN-154	NASA/IPAC Extragalactic Database (2025)	3,770
26	OLD DES COMPILATION DIFF V2	Gschwend et al. (2018)	207,877
27	OzDES DR2	Lidman et al. (2020)	38,624
28	PRIMUS DR1	Coil et al. (2011)	213,696
29	SDSS DR17 LITE	Abdurro'uf et al. (2022)	5,801,200
30	SDSS DR19 LITE	Kollmeier et al. (2025)	2,183,284
31	SWIRE REVISED PHOTO-Z	Rowan-Robinson et al. (2013)	1,152,665
32	VANDELS DR4	Garilli et al. (2021)	2,165
33	VIPERS PDR-2	Scodeggio et al. (2018)	91,507
34	VLT VIMOS V2.0.1	Balestra et al. (2010)	5,052
35	VUDS DR1	Tasca et al. (2017)	698
36	VVDS Final Data Release	Le Fèvre et al. (2013)	40,944
37	XMM-LSS	Stalin et al. (2010)	487
38	zCOSMOS Final Release	Lilly et al. (2016)	20,689

DP2 Training Sets

Training and Test Sets ¶

Data Product	Description	# of objects
MATCHED_CLEAN RTN-124	REF_Z_CLEAN_NO_DESI_LSS matched to DP2 Objects	1,194,088
MATCHED_DESI RTN-124	DESI DR1 LITE matched to DP2 Objects	1,544,298
CLIPPED_TRAIN RTN-124 (PARQUET)	80% random sample from MATCHED_CLEAN trimmed for biased excess based on i_mag-redshift binning	554,676
SOM_TEST RTN-124 (PARQUET)	remaining 20% from MATCHED_CLEAN with SOM-based sampling to mimic "DP2 galaxies"	18,400





Slide credits: Rodrigo Boufleur

LIneA Occultation Prediction Database

https://solarsystem.linea.org.br/



- **What it is:** a public database of predicted stellar occultations by small Solar System objects.
- **Highlights**
  - Millions of regularly updated predictions;
  - Filters by date, star magnitude, object, dynamical class, local solar time, event properties, and geographic location;
  - Event circumstances, star and object information, uncertainty, and prediction maps;
  - Maps generated periodically or on demand;
  - Optional subscriptions for customized alerts;
  - REST API, OpenAPI documentation, and Python module.
- **Why it matters for Rubin science?**
- Occultations are predictable but time-constrained. They can only be observed at the predicted time and along the relevant path on Earth. Rubin astrometry can improve the orbit information used for future predictions.

Slide credits: Rodrigo Boufleur

LIneA Occultation Prediction Database

This database features predictions for stellar occultations by small Solar System objects, updated regularly. Use the advanced filters to refine your search. Subscribe and set up customized updates.

Email Address | SUBSCRIBE

TOTAL FORECAST
394,002,330
Unique Asteroids: 60,204
Earliest: 01 Jan 2024 00:00 UTC
Latest: 02 Apr 2028 19:16 UTC

EVENTS TODAY
525,275
This Week: 8,256,493
Next Week: 9,130,346

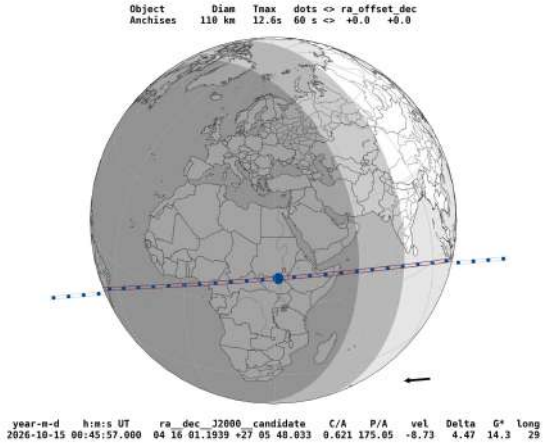
UPCOMING THIS MONTH
38,915,939
Next Month: 46,150,265

Date Range (Local Time)
From: 2026-10-08 10:01 AM
To: 2026-10-08 11:01 AM
Mag Limit: 15

Object
Filter Type

Nighttime
Advanced
Geo Location





Slide credits: Rodrigo Boufleur

CAnVAS - Cluster Analysis and Visualization As a Service

- **What it is:** an environment under validation for visual analysis of (currently) WaZP galaxy-cluster catalogs and their member galaxies.

- **Highlights**
  - Cluster catalog linked to a member catalog;
  - Image view centered on the selected cluster;
  - Cluster-radius and member-galaxy overlays;
  - Cluster-detail view;
  - Links to related maps, catalogs, and follow-up analysis products.

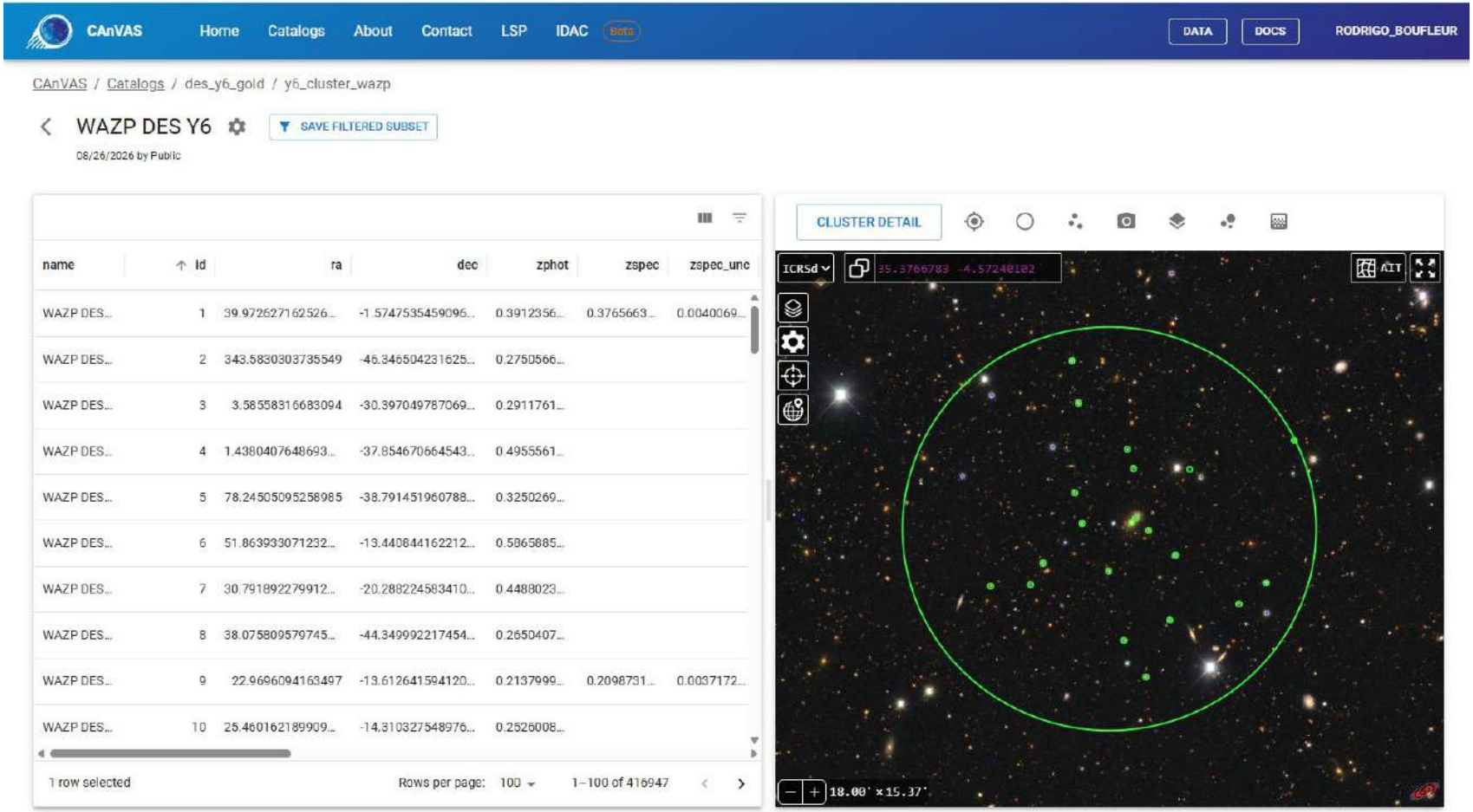
User manual in preparation

- **Why it matters for Rubin science?**

- Cluster science needs more than a catalog table. CAnVAS is being validated with DES Y6 WaZP catalogs to test the cluster-and-members workflow before applying this type of interface to future Rubin science catalogs.

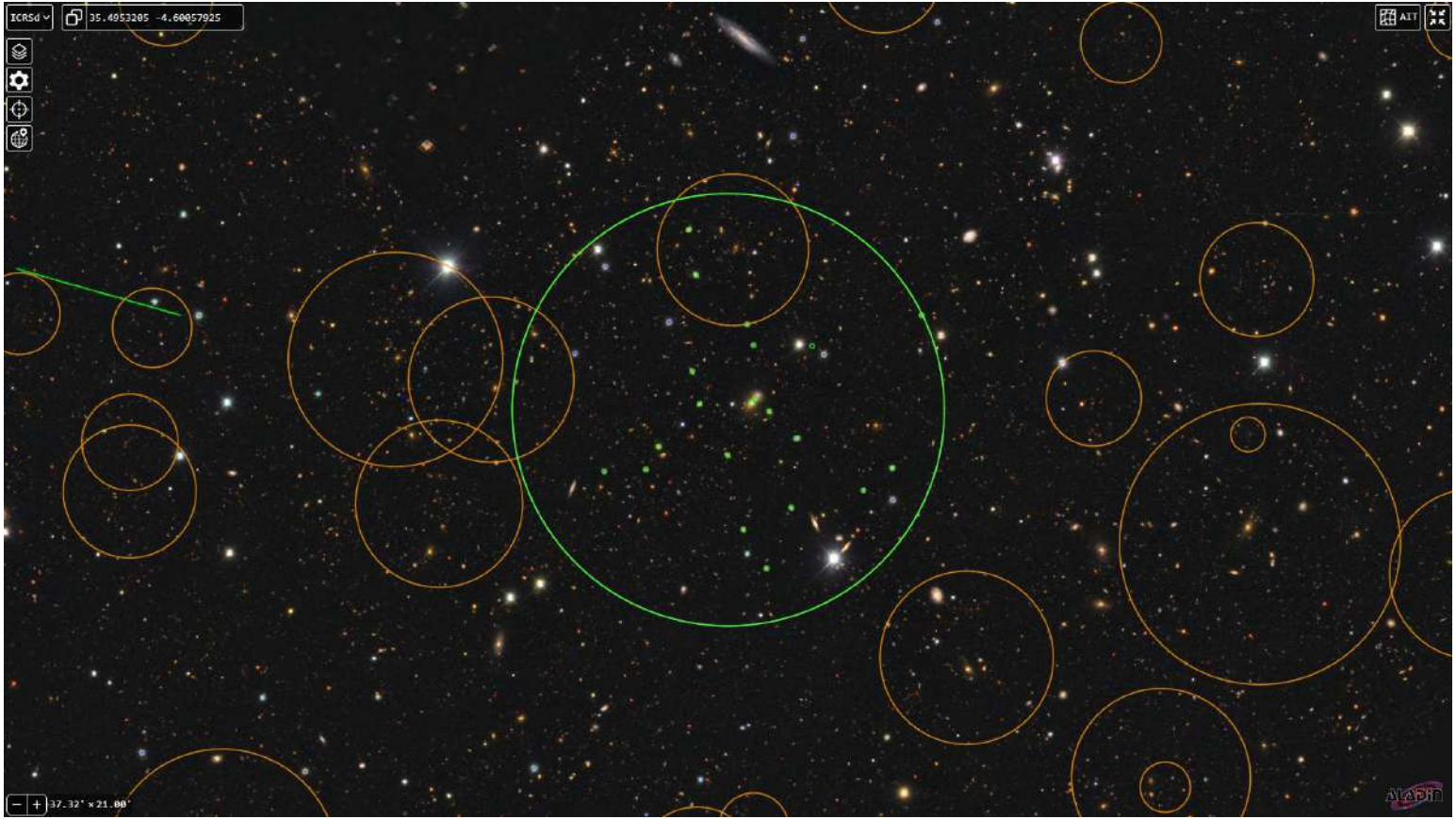
IDAC BRASIL
LSST

Slide credits: Rodrigo Boufleur



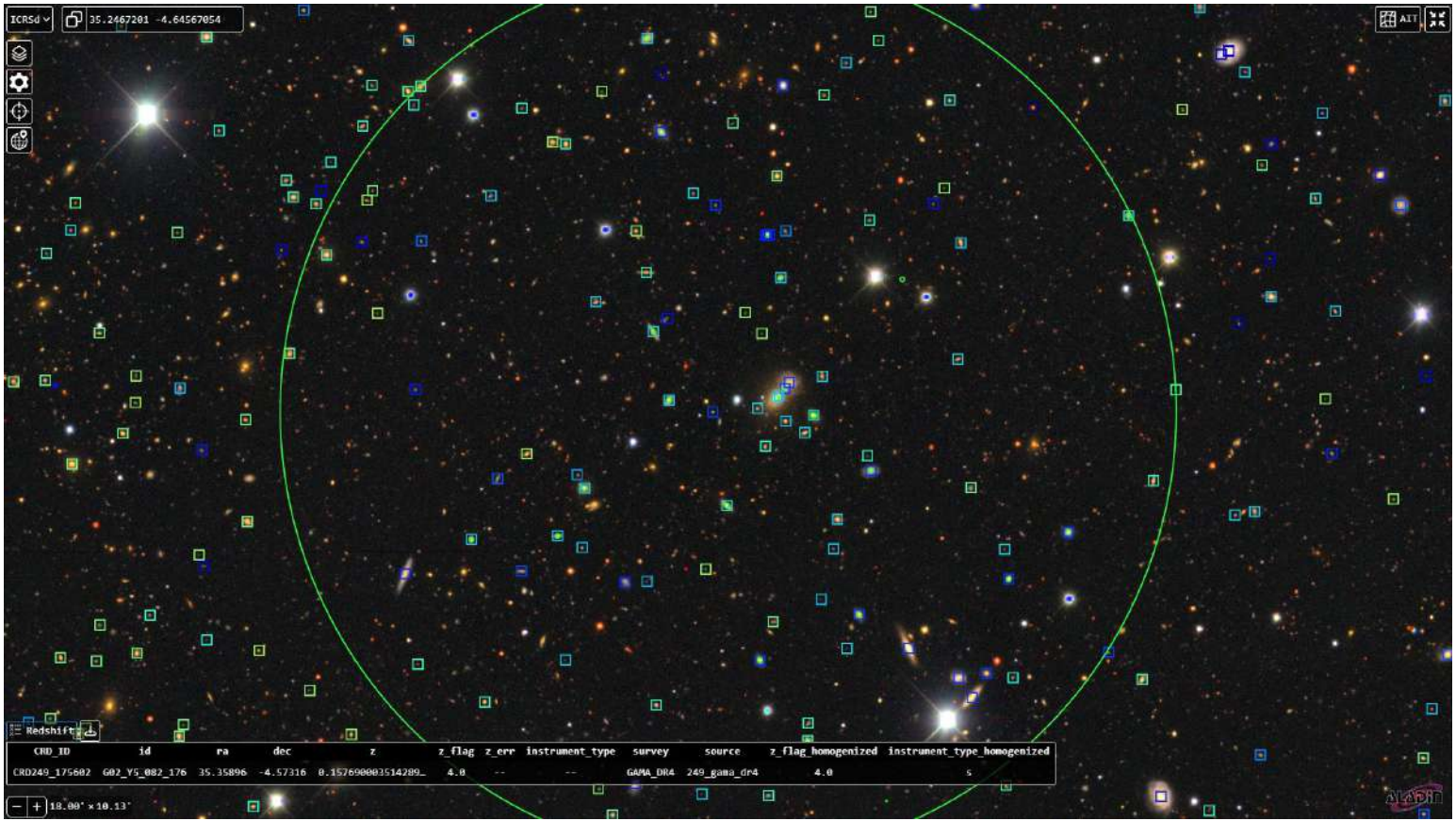
Slide credits: Rodrigo Boufleur

Explore neighbour clusters spatially



Slide credits: Rodrigo Boufleur

Redshift overlays



Slide credits: Rodrigo Boufleur

Diagnostic plots by cluster and survey

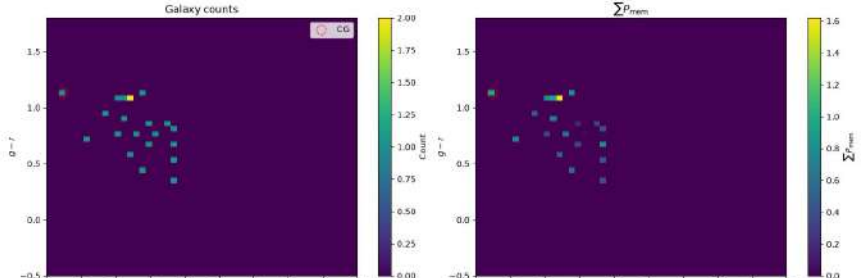
Primary color-magnitude diagram

Two-dimensional histogram of member galaxies in the recommended color-magnitude plane for this cluster's photometric redshift. The left panel shows galaxy counts per bin; the right panel shows the sum of membership probabilities ($\sum P_{\rm mem}$) per bin. The central galaxy (CG) is marked with a red dashed circle when identified.

Recommended color index as a function of cluster $z_{\rm phot}$ (Aguena et al. 2021; Benoist et al. 2025):

$$c = \begin{cases} g-r & z_{\rm phot} < 0.35 \\ r-i & 0.35 \le z_{\rm phot} < 0.75 \\ i-z & z_{\rm phot} \ge 0.75 \end{cases}$$

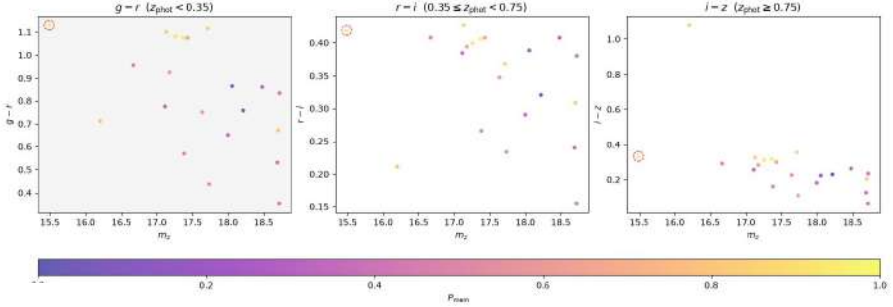
DES Y6 uses m_z as the reference magnitude (Benoist et al. 2025).



Color-magnitude diagrams by color index

m_z versus $g-r$, $r-i$, and $i-z$ for all members. Point color encodes $P_{\rm mem}$. The highlighted panel shows the color index recommended for this cluster's $z_{\rm phot}$. The central galaxy (CG) is marked with a red dashed circle when identified.

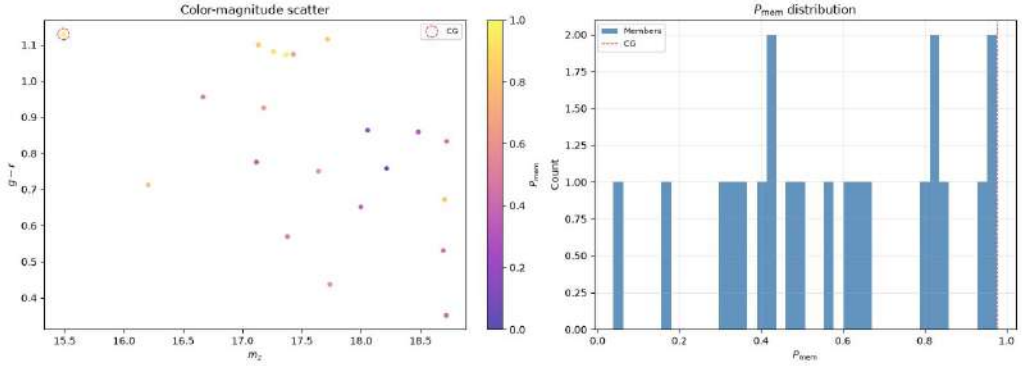
$$g-r = m_g - m_r, \quad r-i = m_r - m_i, \quad i-z = m_i - m_z$$



Scatter diagram and membership probability

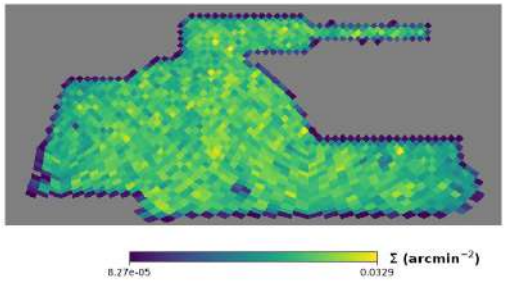
Left: Recommended color versus m_z at the cluster photometric redshift; point color encodes $P_{\rm mem}$. The CG is marked when identified.

Right: Distribution of membership probabilities among members (Castignani & Benoist 2016). The CG value is shown as a red dashed line when identified.



Sky distribution

Spatial density map in HEALPix projection ($N_{\rm side} = 32$, resolution $\approx 1.8°$). The color scale shows cluster surface density Σ (arcmin^{-2}). This map reveals the DES Y6 footprint geometry and any large-scale projection systematics (Benoist et al. 2025).

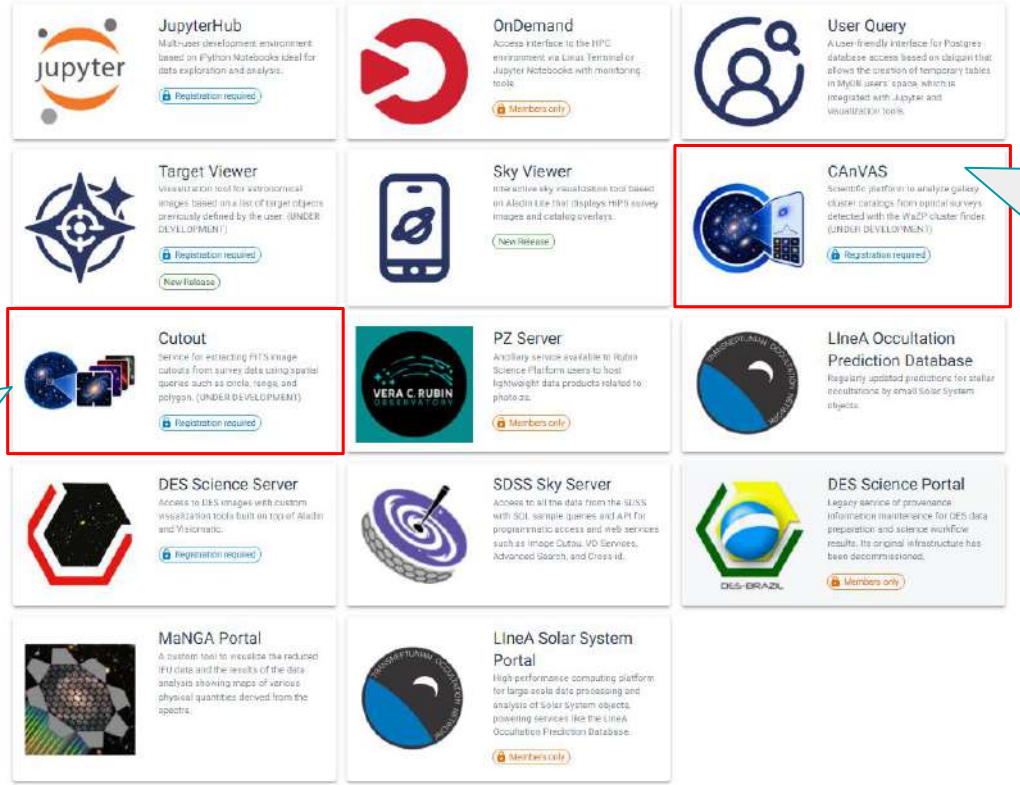


Summary – science-driven IDAC-BR apps

	Catalogs	Images	Main features / application	Status / Requirements
Photo-z (PZ) Server	✓	X	• Store and share PZ lightweight data products with provenance control • Cross-matching remote services using the IDAC-BR HPC cluster	• Beta version open for DRH (RSP credentials) • DP1 and DP2 preliminary data products available • Rubin official data products for DR1
Occultation Predictions Database	✓	X	• Filter occultation predictions; event circumstances, and dynamic maps • Customized alerts and REST API	• Publicly available; JPL orbit and Gaia catalog • Orbit refinement with Rubin astrometry planned
Cluster Analysis and Visualization as a Service - **CAnVAS**	✓	✓	• Visualization of WaZP clusters and members • Reference Redshift Catalog overlay	• Under development

Final remarks

LIneA Science Platform New Apps



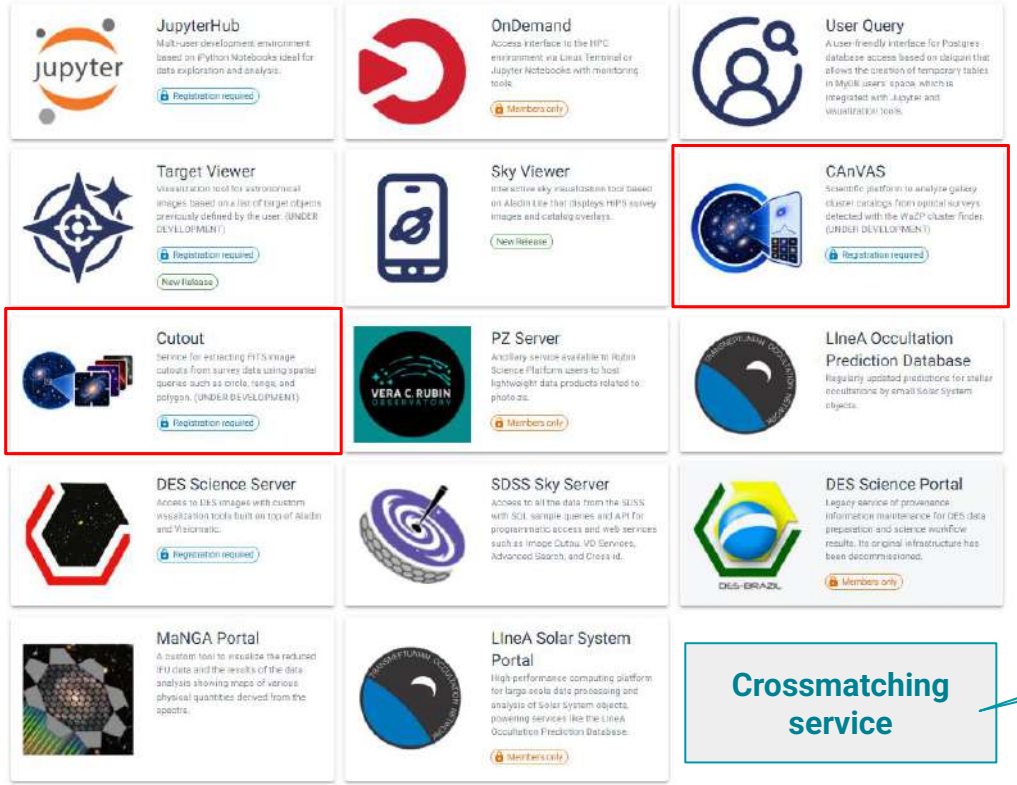
Cutout service under development (beta version available)

Download FITS and PNG images

CAnVAS under development (beta version available)

Visualization tool for WaZP Clusters and members

LIneA Science Platform New Apps

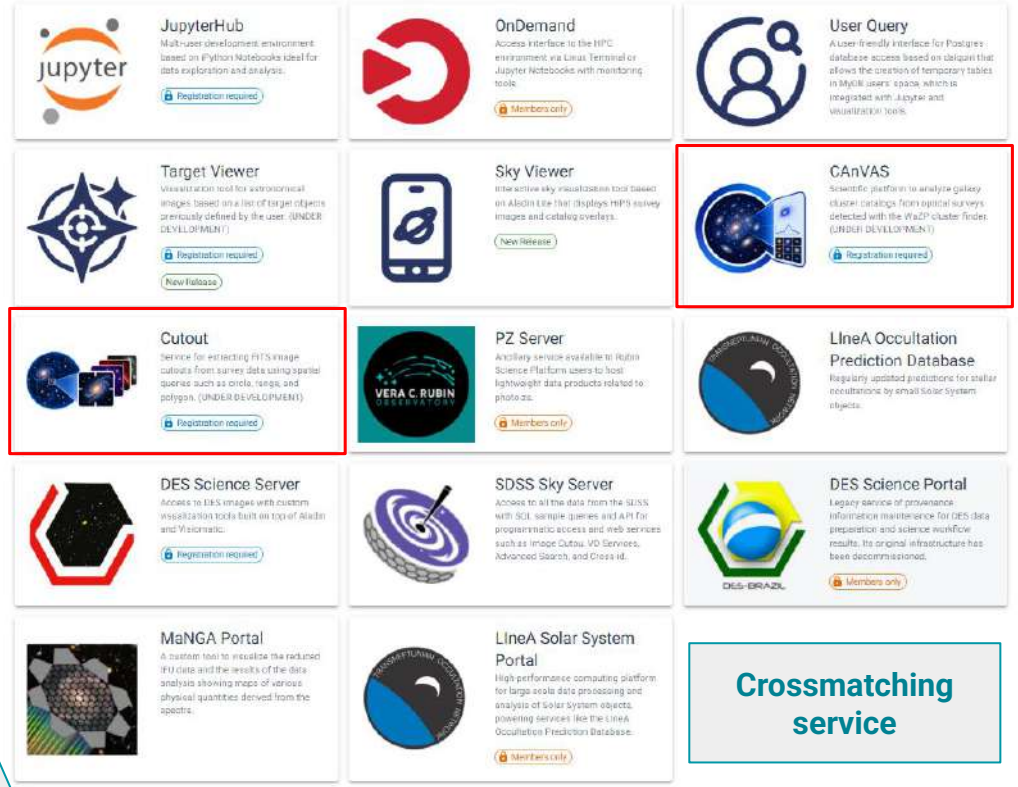


Science-ready catalogs

Crossmatching service

based on LSDB

LIneA Science Platform New Apps

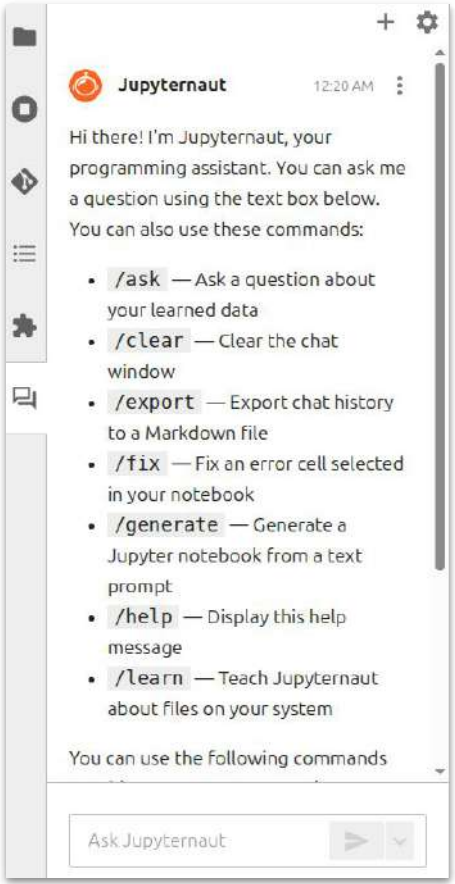


Planning to include value-added catalogs on demand (e.g. extra columns from crossmatching, real-time photoz compute using RAIL)

Science-ready catalogs

Crossmatching service

AI-based resources for user support (under development)



Chatbot (prototype available)

- Local SLM with privacy
- Integration with third-party APIs

Agentic Layer (in preparation)

- RAG with internal documentation
- Complex Query Builder
- Workflow Optimization
- HPC Resource Allocation
- Local ML Training
- Future expansions

Summary

- Brazil has an IDAC as part of Rubin Observatory international data access ecosystem
- There are still opportunities to join the BPG (~70 positions with data-rights available; total:195)
- Annual releases will be available during the whole survey (2 private + 1 public)
  - 2-year embargo period: data rights holders only
  - After 2 years: general public
- Tens of datasets from legacy surveys already integrated to be easily combined with LSST data
- HPC resources available
  - BPG has access and priority in the cluster queues
  - International Rubin community and Brazilian community as a whole can apply projects
- IDAC-BR Apps available for visualization, exploration, processing, and scientific analysis
- Tutorials every day this week at 15:10 — check the program at the website!



Support: helpdesk@linea.org.br

Feedback, suggestions: julia@linea.org.br

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INCT do e-Universo · inct institutos nacionais de ciência e tecnologia · Finep INOVAÇÃO E PESQUISA · CNPq · FAPERJ · LSST Discovery Alliance · HEISING-SIMONS FOUNDATION

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❤️

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Crowdfunding campaign