

Centre de Calcul
de l'Institut National de Physique Nucléaire
et de Physique des Particules

Rubin LSST data access and analysis via the Rubin Science Platform

An overview

Gabriele Mainetti - Fabio Hernandez - Quentin Le Boulc'h



Data types



Data Access



Conclusions

Data types (repetita iuvant)

-32.8620936	63.034697	0	false	false	true	false	true	false	true
-32.8621294	63.0407525	0	false	true	true	true	true	false	true
-32.8614472	63.0411234	0	false	true	true	true	true	false	true
-32.8621166	63.0438228	0	false	true	true	true	true	false	true
-32.8537398	63.0270331	2	false	false	false	false	false	false	true
-32.8623497	63.0416251	0	false	true	true	true	true	false	true
-32.8632418	63.0444413	0	false	true	true	true	true	false	true
-32.8635633	63.0448791	0	false	true	true	true	true	false	true
-32.8618352	63.0206734	0	false	true	true	true	true	false	true
-32.8626203	63.0211533	0	false	true	true	true	true	false	true
-32.862664	63.0043335	0	false	true	true	true	true	false	true
-32.8619702	63.0051489	0	false	true	true	true	true	false	true
-32.8626509	63.029992	0	false	true	true	true	true	false	true
-32.862651	63.0304225	0	false	true	true	true	true	false	true
-32.862535	63.005246	0	false	true	true	true	true	false	true
-32.8628098	62.9927023	0	false	false	true	false	false	true	true
-32.8626622	63.0441973	0	false	true	true	true	true	false	true
-32.8615879	63.0427071	0	false	false	true	false	false	true	true
-32.8614469	62.9990366	0	false	false	true	false	false	true	true
-32.8634456	62.9893952	0	false	true	true	true	true	false	true
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-32.8627032	63.0230992	0	false	false	true	false	false	true	true
-32.8625259	63.0396223	0	false	false	true	false	false	true	true
-32.8631259	62.9880494	0	false	true	true	true	true	false	true
-32.864275	63.0435901	0	false	true	true	true	true	false	true
-32.8648253	63.0439505	0	false	true	true	true	true	false	true
-32.8642073	63.0440848	0	false	true	true	true	true	false	true
-32.8655575	63.0433804	0	false	true	true	true	true	false	true
-32.8651195	63.0387416	0	false	true	true	true	true	false	true
-32.8654431	63.0391179	0	false	true	true	true	true	false	true
-32.86489	63.0236573	0	false	false	true	false	false	true	true
-32.864194	63.0422233	0	false	true	true	true	true	false	true
-32.8636811	63.0412858	0	false	true	true	true	true	false	true
-32.8645107	63.0420361	0	false	true	true	true	true	false	true
-32.865226	63.0413358	0	false	true	true	true	true	false	true
-32.8633504	63.001858	0	false	true	true	true	true	false	true
-32.860847	63.0020436	0	false	true	true	true	true	false	true
-32.861804	63.0024483	0	false	true	true	true	true	false	true
-32.8636886	63.0005575	0	false	true	true	true	true	false	true
-32.8639294	62.9927964	0	false	false	true	false	false	true	true
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-32.8638381	63.0279755	0	false	true	true	true	true	false	true
-32.8642842	63.0259191	0	false	true	true	true	true	false	true
-32.8629259	63.0272059	0	false	true	true	true	true	false	true
-32.8654394	63.030945	0	false	true	true	true	true	false	true
-32.8645317	63.0309715	0	false	true	true	true	true	false	true
-32.8646199	63.0301206	0	false	true	true	true	true	false	true
-32.8653567	63.0302656	0	false	true	true	true	true	false	true
-32.8628633	63.0277403	0	false	true	true	true	true	false	true
-32.8631824	63.0264591	0	false	true	true	true	true	false	true
-32.8632239	63.0284337	0	false	true	true	true	true	false	true
-32.8636332	63.0261746	0	false	true	true	true	true	false	true
-32.8645533	63.040138	0	false	false	true	false	false	true	true
-32.8660209	63.0442657	0	false	false	true	false	false	true	true
-32.865957	63.0404706	0	false	false	true	false	false	true	true
-32.8646998	63.0340281	0	false	true	true	true	true	false	true

Data Types: Overview

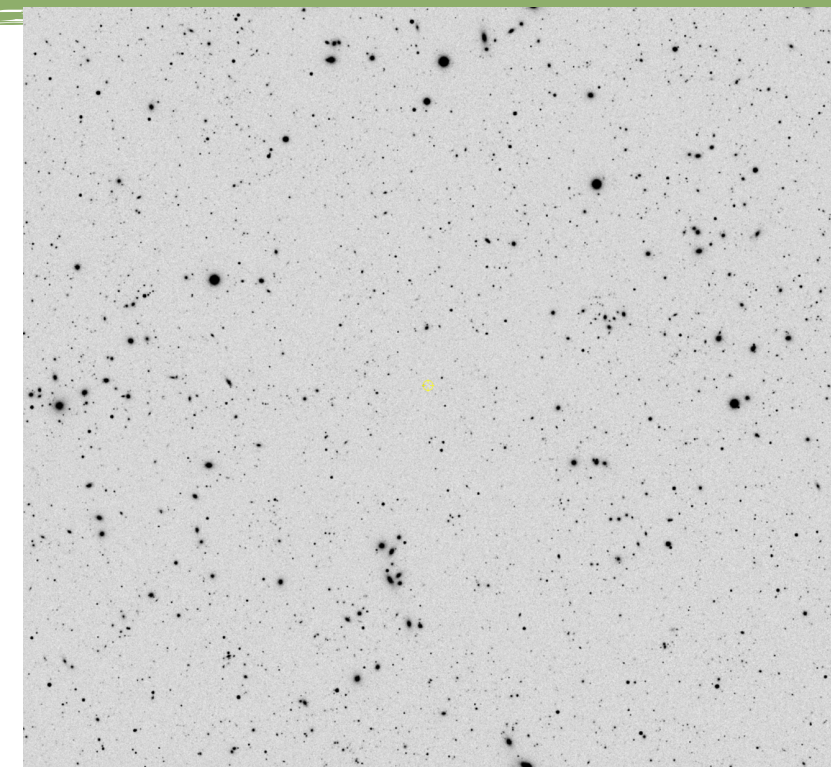


LSST Data Products

Data Types: Overview

LSST Data Products

Images



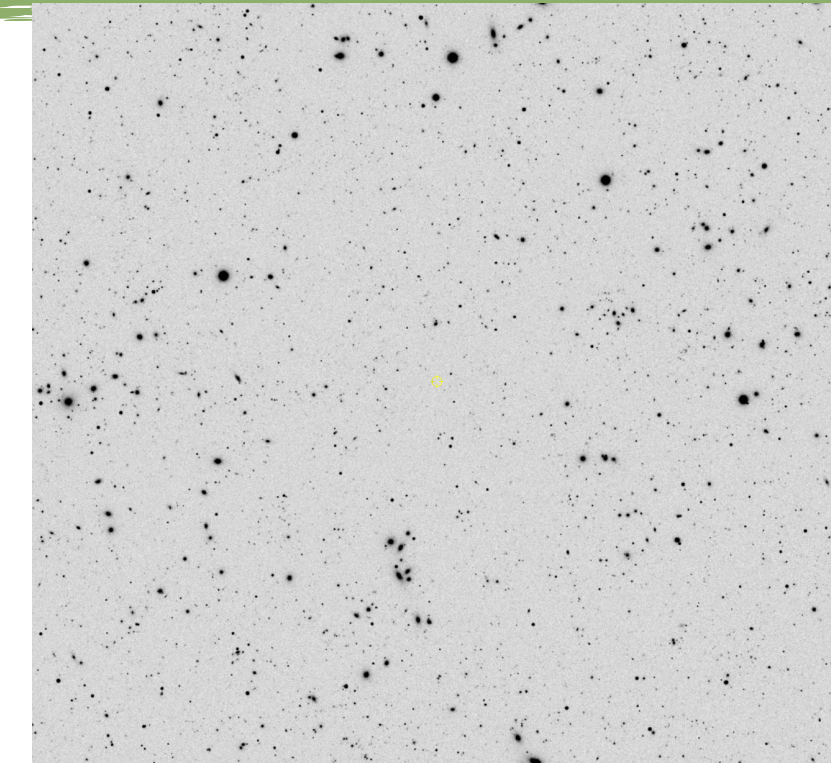
Data Types: Overview

LSST Data Products

Catalog

Images

coord_dec (deg) double	coord_ra (deg) double	deblend_nChild int	deblend_skipped boolean	detect_fromBlend boolean	detect_isDeblendedModelSource boolean	detect_isDeblendedSource boolean	detect_isIsolated boolean	detect_isPatchInner boolean	detect_isPrimary boolean	detect_isTractInner boolean	footprintArea (pixel) int	q_ap03Flux (nJy) double	q_ap03Flux_flag boolean	q_ap03FluxErr (nJy) double	q_ap06Flux (nJy) double	q_ap06Flux_flag boolean	q_ap06FluxErr (nJy) double	q_ap09Flux (nJy) double	q_ap09Flux_flag boolean
-32.8731327	63.0168574	1	false	false	false	true	true	true	true	true	143	61.2333679	false	8.6223576	135.1218886	false	17.3136285	164.6818271	false
-32.8752928	63.0172388	0	false	true	true	true	false	true	true	true	651	109.4846596	false	8.7796789	197.0007136	false	17.5803744	229.8476385	false
-32.8759299	63.017164	0	false	true	true	true	false	true	true	true	650	317.3165384	false	8.9517221	466.7059158	false	17.6773116	494.1617681	false
-32.8757029	63.0205613	0	false	false	true	false	true	true	false	true	81	21.2741645	false	8.7357334	61.4612223	false	17.5722524	110.2749747	false
-32.874725	63.0161931	0	false	true	true	true	false	true	true	true	2407	47.1925192	false	8.5785793	71.6698694	false	17.3014455	80.403129	false
-32.8751307	63.0151232	0	false	true	true	true	false	true	true	true	3508	2367.2119154	false	10.2437228	4152.2584567	false	18.9773117	4832.0008339	false
-32.8756587	63.0152527	0	false	true	true	true	false	true	true	true	3333	144.2648622	false	8.896067	277.5704323	false	17.8996456	319.2882308	false
-32.8744746	63.0155065	0	false	true	true	true	false	true	true	true	3474	188.4251397	false	8.7756968	406.0152593	false	17.5145565	484.4950779	false
-32.8737537	63.0157199	0	false	true	true	true	false	true	true	true	2349	26.2440227	false	8.5990249	41.0337997	false	17.2829104	41.2700127	false
-32.8744004	63.0167379	0	false	true	true	true	false	true	true	true	2355	52.5095027	false	8.6332981	83.8199298	false	17.3014404	79.0942695	false



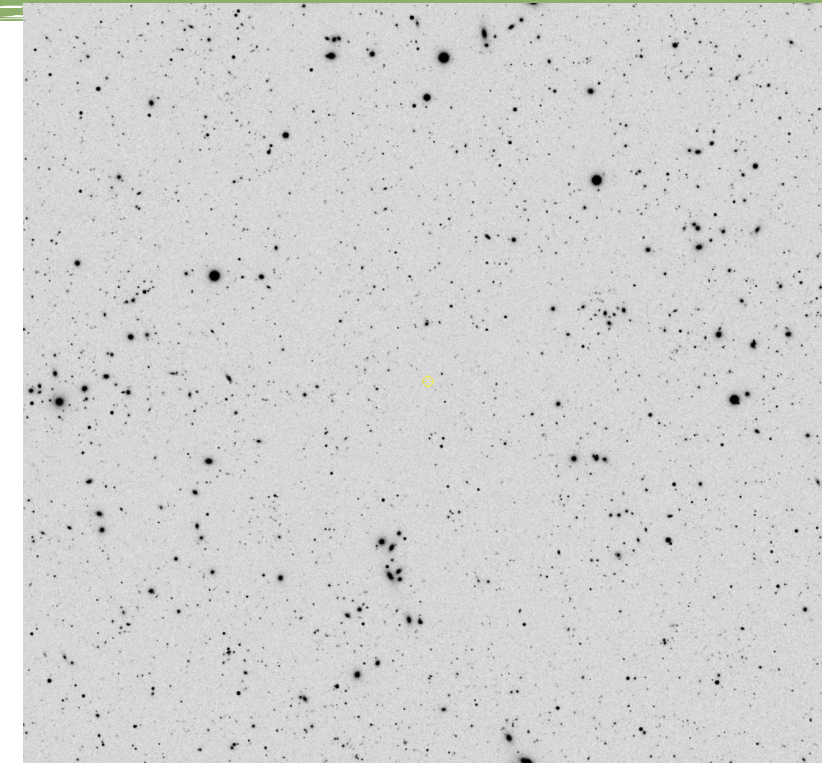
Data Types: Overview

LSST Data Products

Catalog

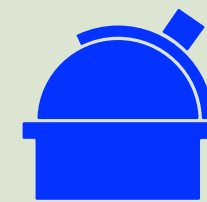
coord_dec (deg) double	coord_ra (deg) double	deblend_nChild int	deblend_skipped boolean	detect_fromBlend boolean	detect_isDeblendedModelSource boolean	detect_isDeblendedSource boolean	detect_isIsolated boolean	detect_isPatchInner boolean	detect_isPrimary boolean	detect_isTractInner boolean	footprintArea (pixel) int	q_ap03Flux (nJy) double	q_ap03Flux_flag boolean	q_ap03FluxErr (nJy) double	q_ap06Flux (nJy) double	q_ap06Flux_flag boolean	q_ap06FluxErr (nJy) double	q_ap09Flux (nJy) double	q_ap09Flux_flag boolean
-32.8731327	63.0168574	1	false	false	false	true	true	true	true	true	143	61.2333679	false	8.6223576	135.1218886	false	17.3136285	164.6818271	false
-32.8752928	63.0172388	0	false	true	true	true	false	true	true	true	651	109.4846596	false	8.7796789	197.0007136	false	17.5803744	229.8476385	false
-32.8759299	63.017164	0	false	true	true	true	false	true	true	true	650	317.3165384	false	8.9517221	466.7059158	false	17.6773116	494.1617681	false
-32.8757029	63.0205613	0	false	false	true	false	true	true	false	true	81	21.2741645	false	8.7357334	61.4612223	false	17.5722524	110.2749747	false
-32.874725	63.0161931	0	false	true	true	true	false	true	true	true	2407	47.1925192	false	8.5785793	71.6698694	false	17.3014455	80.403129	false
-32.8751307	63.0151232	0	false	true	true	true	false	true	true	true	3508	2367.2119154	false	10.2437228	4152.2584567	false	18.9773117	4832.0008339	false
-32.8756587	63.0152527	0	false	true	true	true	false	true	true	true	3333	144.2648622	false	8.896067	277.5704323	false	17.8996456	319.2882308	false
-32.8744746	63.0155065	0	false	true	true	true	false	true	true	true	3474	188.4251397	false	8.7756968	406.0152593	false	17.5145565	484.4950779	false
-32.8737537	63.0157199	0	false	true	true	true	false	true	true	true	2349	26.2440227	false	8.5990249	41.0337997	false	17.2829104	41.2700127	false
-32.8744004	63.0167379	0	false	true	true	true	false	true	true	true	2355	52.5095027	false	8.6332981	83.8199298	false	17.3014404	79.0942695	false

Images

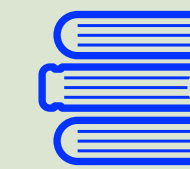


Prompt Data Products :

Products generated by the prompt processing on a nightly/daily basis for time-dependents phenomena



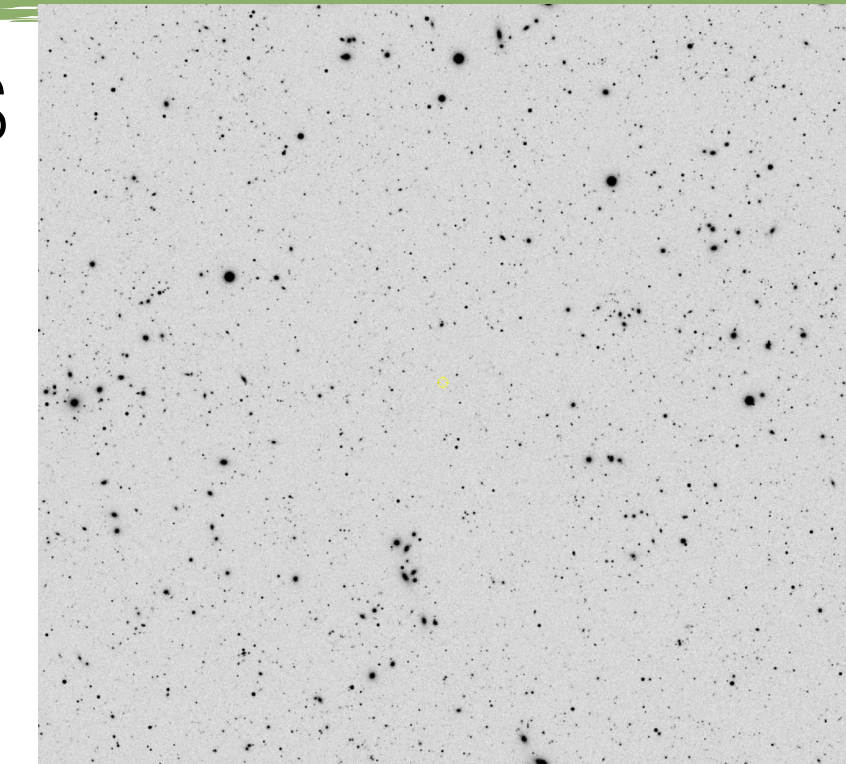
Processed Visit Images
Difference Images



DIASource → Fink
DIAObject and SSObjects
Almost real time database

Data Types: Overview

Images



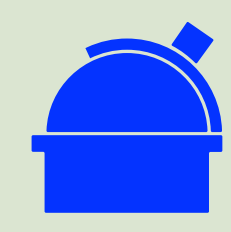
LSST Data Products

Catalog

coord_dec (deg) double	coord_ra (deg) double	deblend_nChild int	deblend_skipped boolean	detect_fromBlend boolean	detect_isDeblendedModelSource boolean	detect_isDeblendedSource boolean	detect_isIsolated boolean	detect_isPatchInner boolean	detect_isPrimary boolean	detect_isTractInner boolean	footprintArea (pixel) int	q_ap03Flux (nJy) double	q_ap03Flux_flag boolean	q_ap03FluxErr (nJy) double	q_ap06Flux (nJy) double	q_ap06Flux_flag boolean	q_ap06FluxErr (nJy) double	q_ap09Flux (nJy) double	q_ap09Flux_flag boolean
-32.8731327	63.0168574	1	false	false	false	true	true	true	true	true	143	61.2333679	false	8.6223576	135.1218886	false	17.3136285	164.6818271	false
-32.8752928	63.0172388	0	false	true	true	true	false	true	true	true	651	109.4846596	false	8.7796789	197.0007136	false	17.5803744	229.8476385	false
-32.8759299	63.017164	0	false	true	true	true	false	true	true	true	650	317.3165384	false	8.9517221	466.7059158	false	17.6773116	494.1617681	false
-32.8757029	63.0205613	0	false	false	true	false	true	true	false	true	81	21.2741645	false	8.7357334	61.4612223	false	17.5722524	110.2749747	false
-32.874725	63.0161931	0	false	true	true	true	false	true	true	true	2407	47.1925192	false	8.5785793	71.6698694	false	17.3014455	80.403129	false
-32.8751307	63.0151232	0	false	true	true	true	false	true	true	true	3508	2367.2119154	false	10.2437228	4152.2584567	false	18.9773117	4832.0008339	false
-32.8756587	63.0152527	0	false	true	true	true	false	true	true	true	3333	144.2648622	false	8.896067	277.5704323	false	17.8996456	319.2882308	false
-32.8744746	63.0155065	0	false	true	true	true	false	true	true	true	3474	188.4251397	false	8.7756968	406.0152593	false	17.5145565	484.4950779	false
-32.8737537	63.0157199	0	false	true	true	true	false	true	true	true	2349	26.2440227	false	8.5990249	41.0337997	false	17.2829104	41.2700127	false
-32.8744004	63.0167379	0	false	true	true	true	false	true	true	true	2355	52.5095027	false	8.6332981	83.8199298	false	17.3014404	79.0942695	false

Prompt Data Products :

Products generated by the prompt processing on a nightly/daily basis for time-dependents phenomena



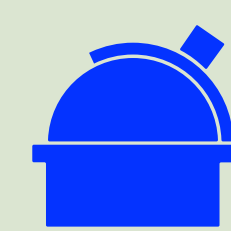
Processed Visit Images
Difference Images



DIASource → Fink
DIAObject and SSObjects
Almost real time database

Data Release Products :

Products generated by the annual process and it uses all the data collected

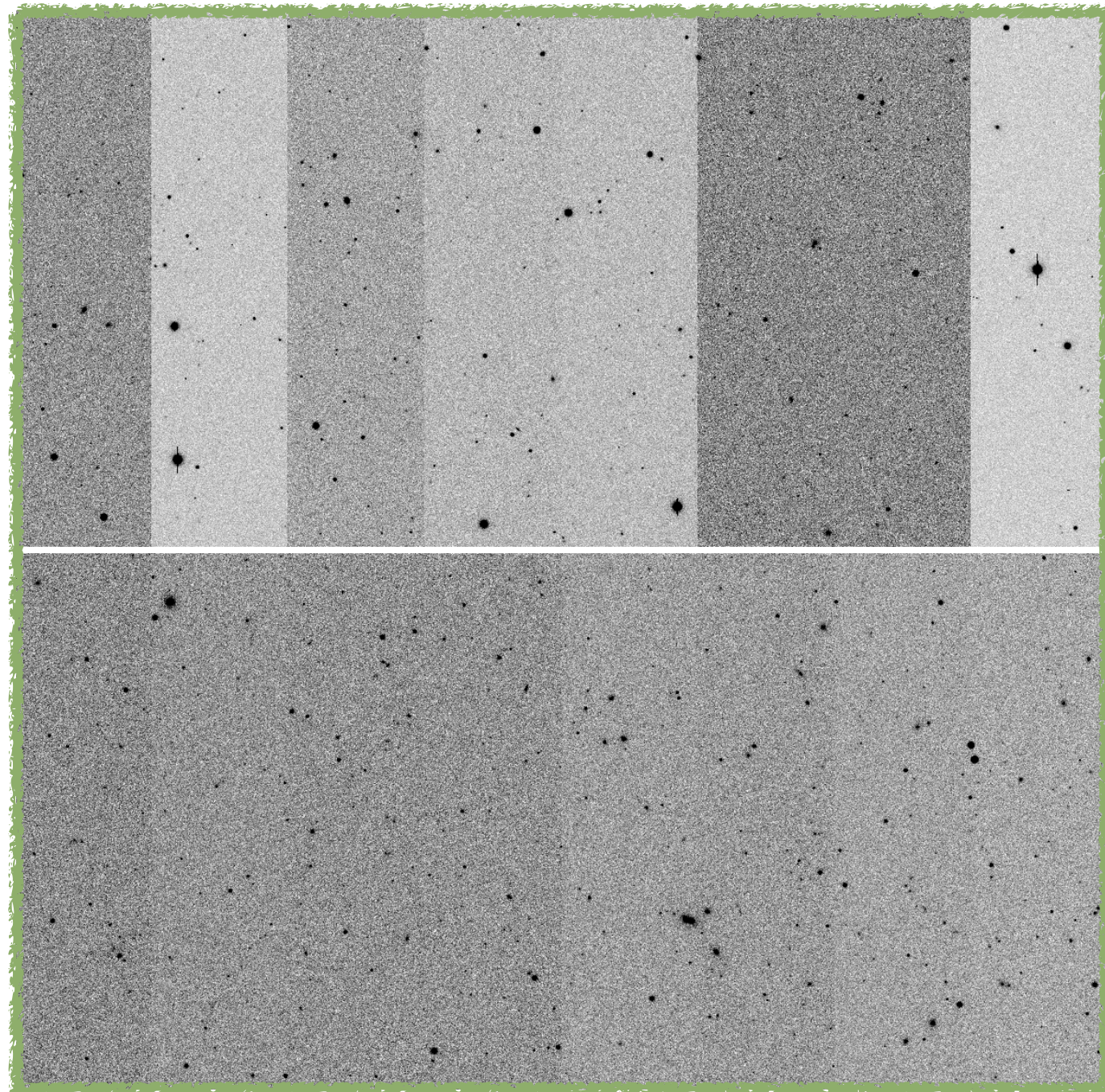


Processed Visit Images
Coadded images

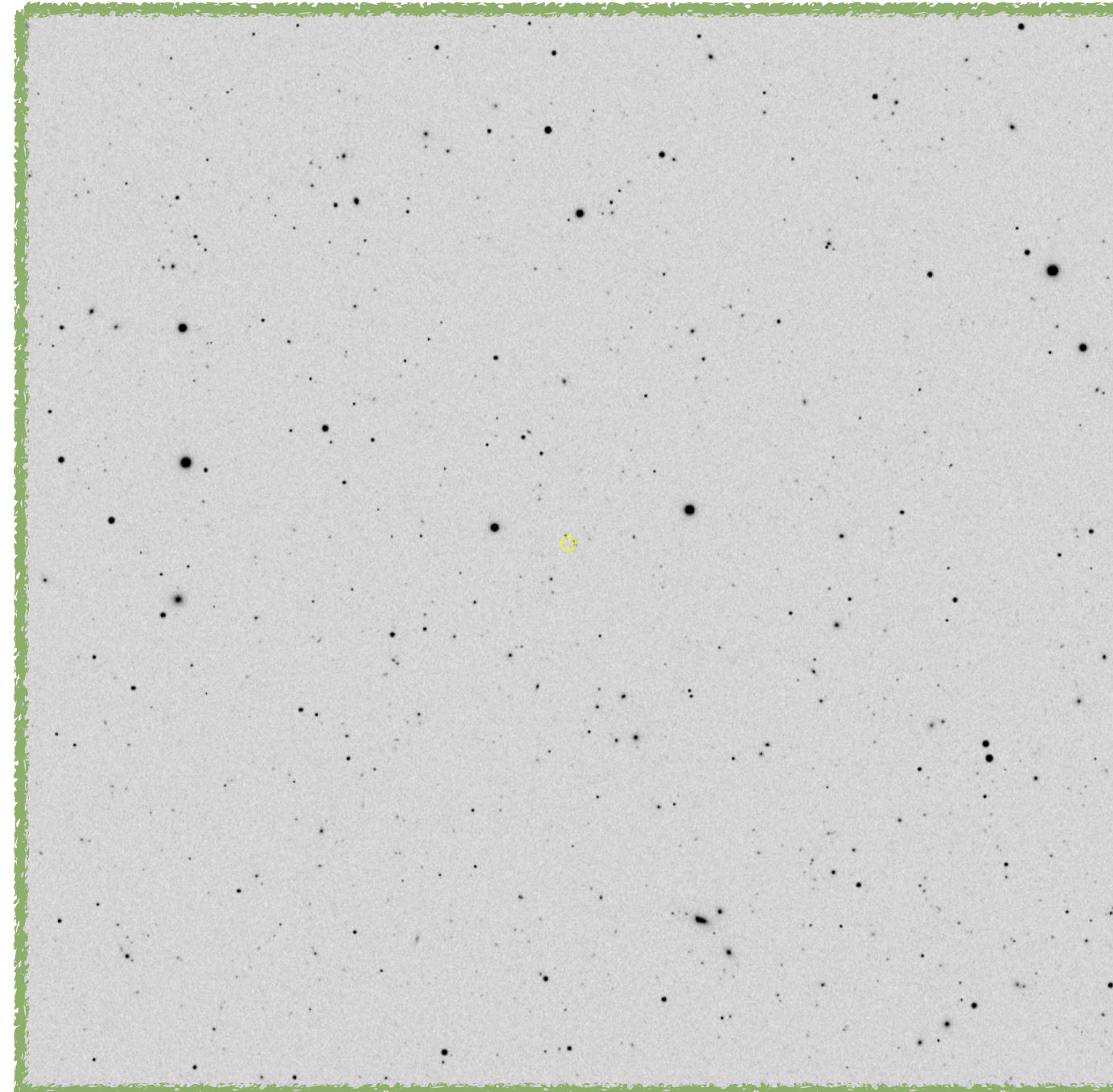


Source and Object
ForcedSource
DIAObject and SSObjects
Static Database

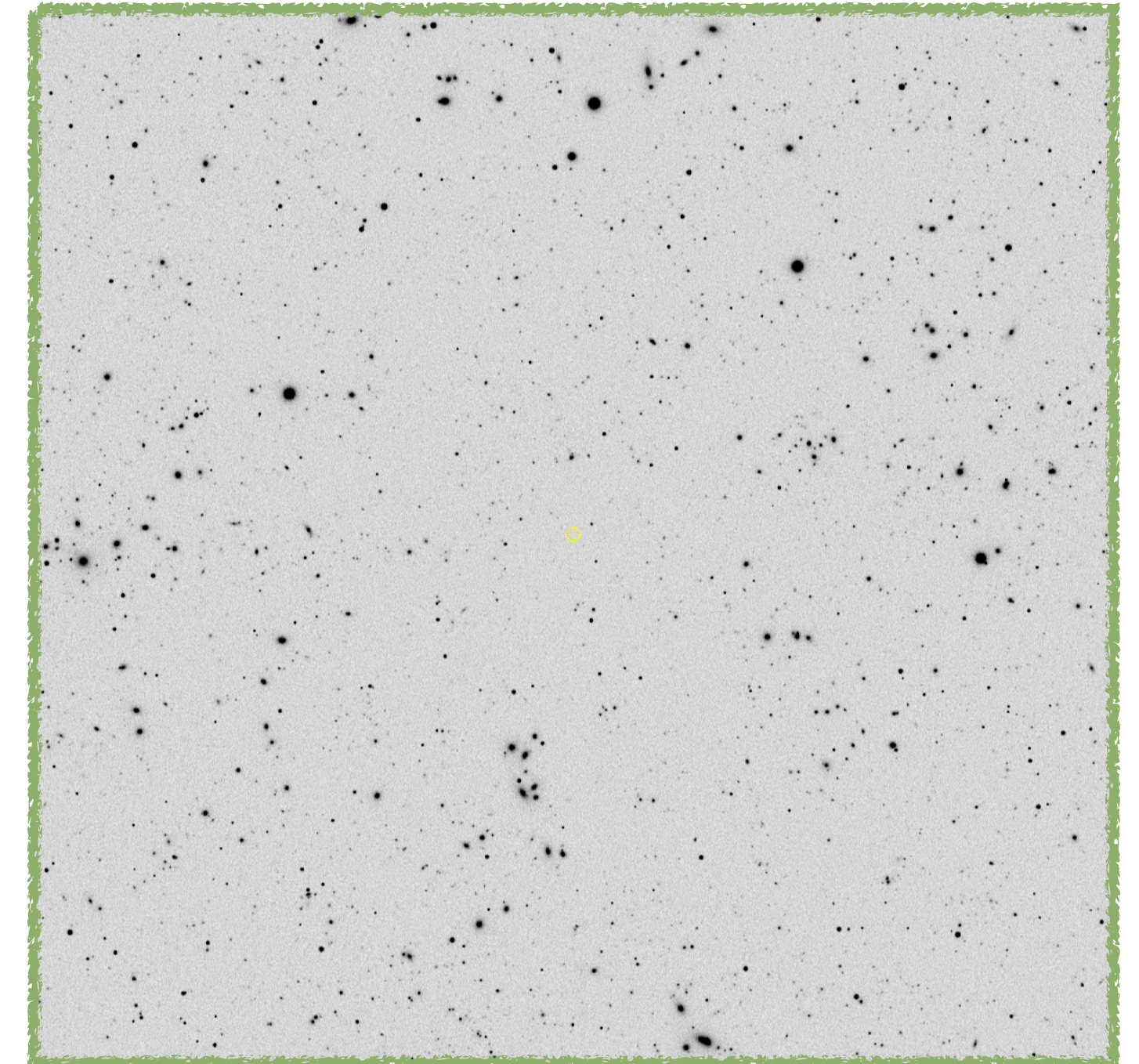
Data Types: Images



Raw Images: 16 slices output produced by a single CCD



Processed Visit Images (PVI a.k.a Calexp)

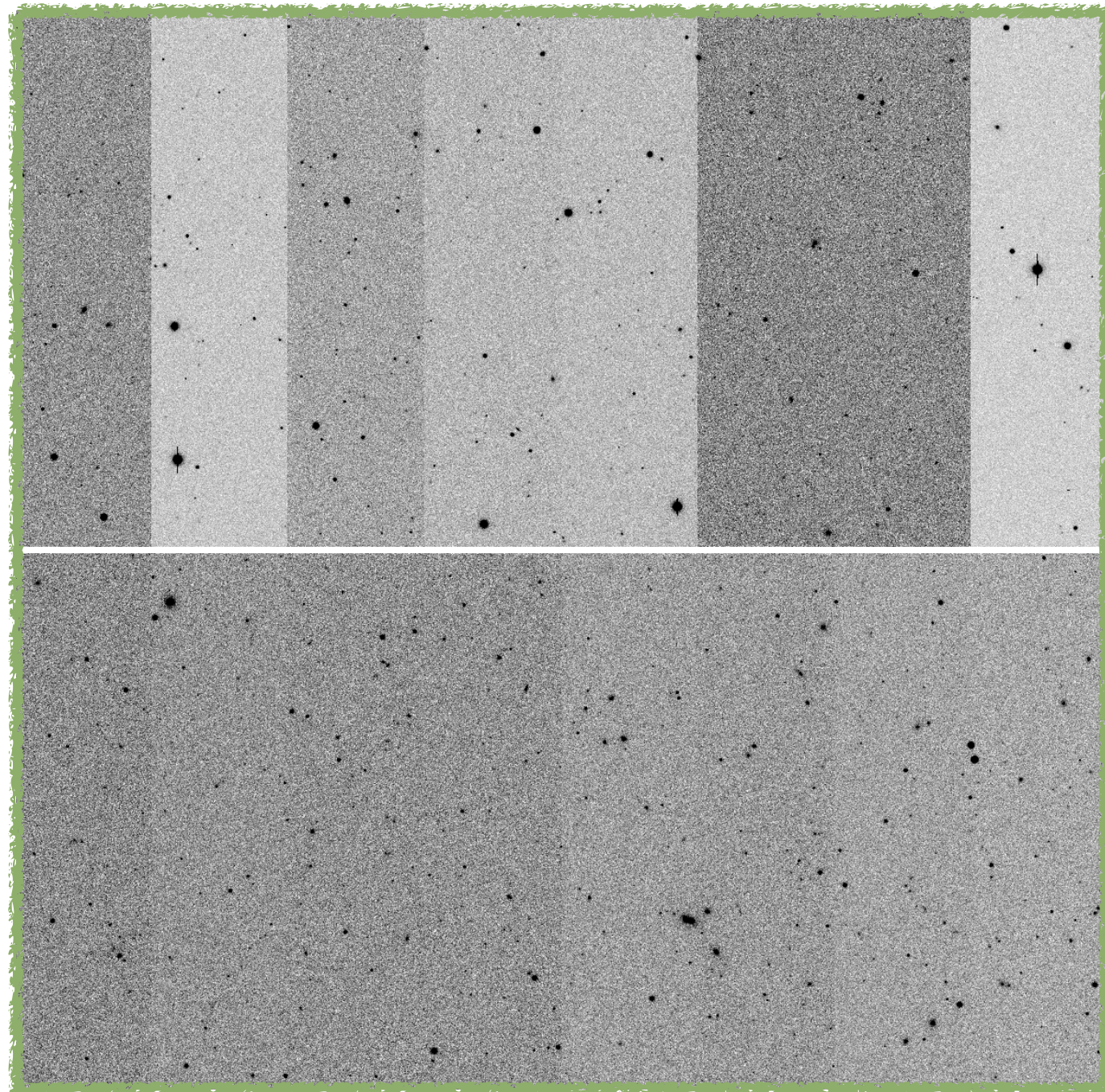


Coadded images

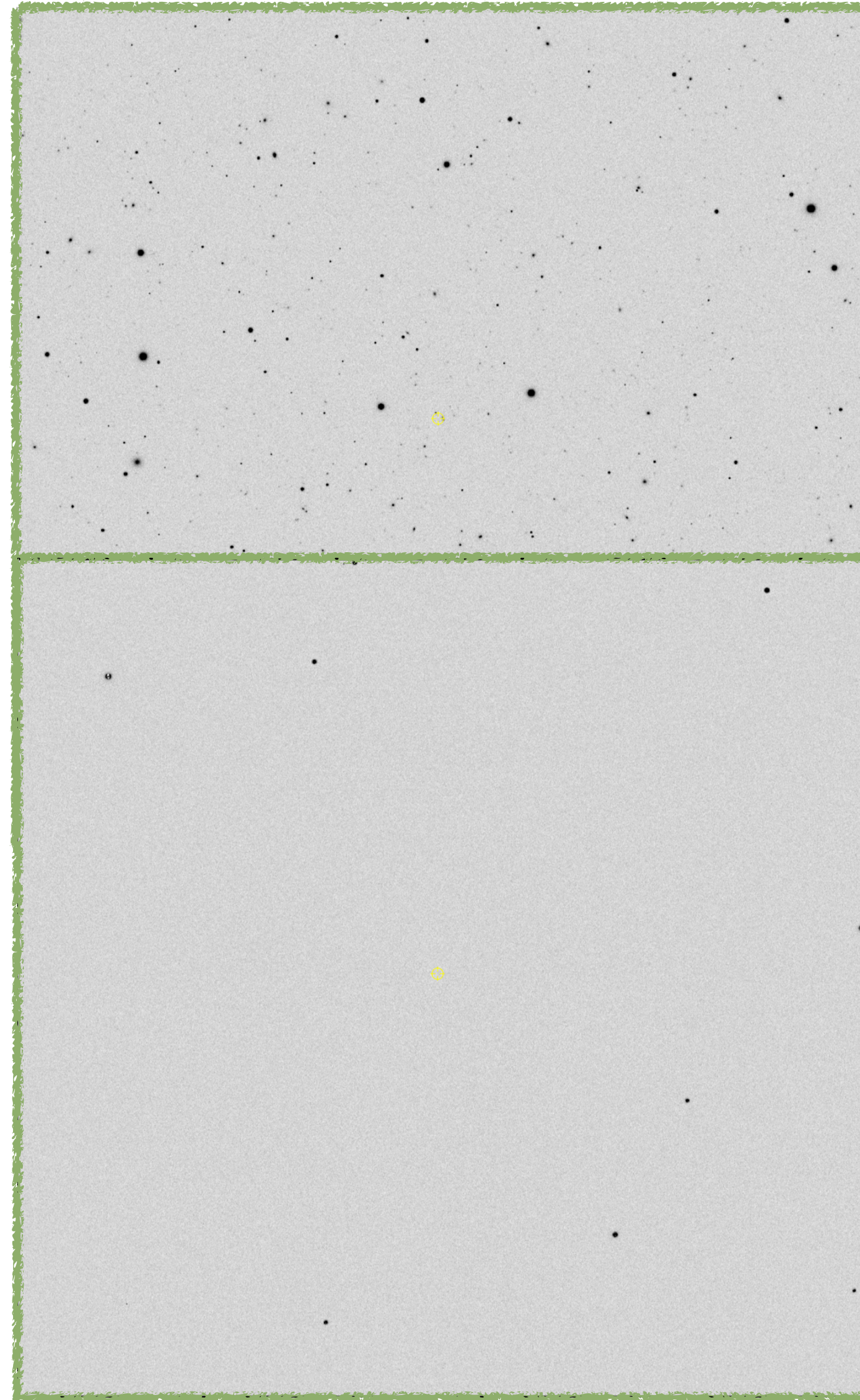
Data Products References

- *Data Products Definition Document* [LSE-163](#)
- *The Rubin Data Products, Abridged* <https://doi.org/k8d3>
- *LSST Data Product Categories* [LPM-231](#)
- *Data Management System (DMS) Requirements* [LSE-61](#)
- *Data Management Science Pipelines Design* [LDM-151](#)
- <https://www.lsst.org/about/dm/data-products>

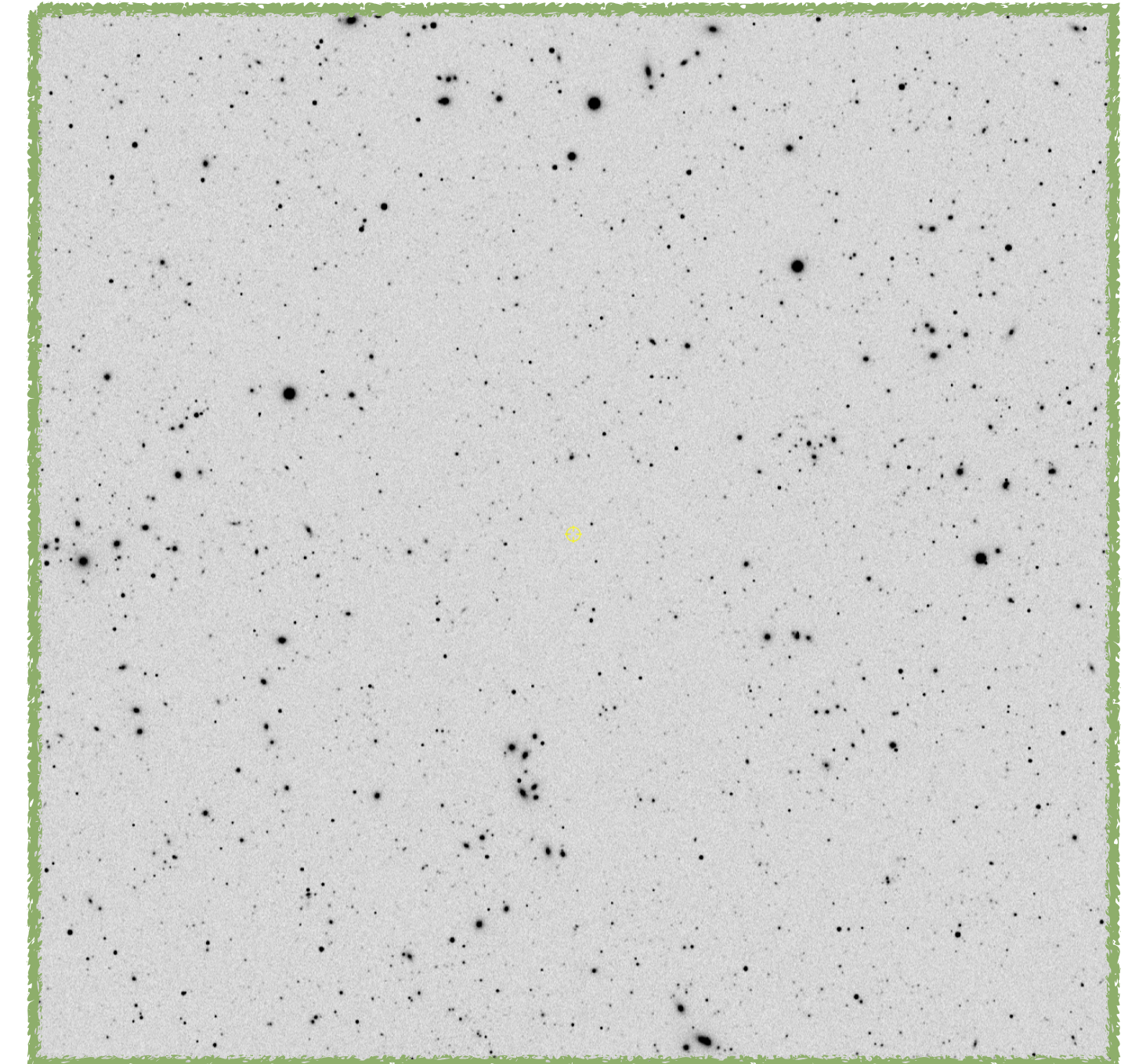
Data Types: Images



Raw Images: 16 slices output produced by a single CCD



Diff images

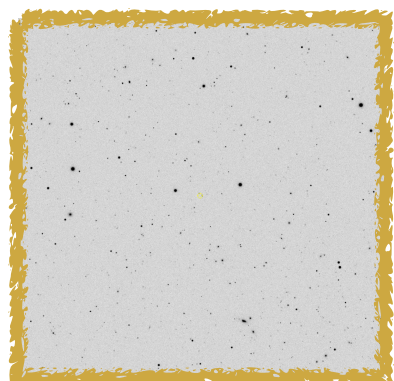


Coadded images

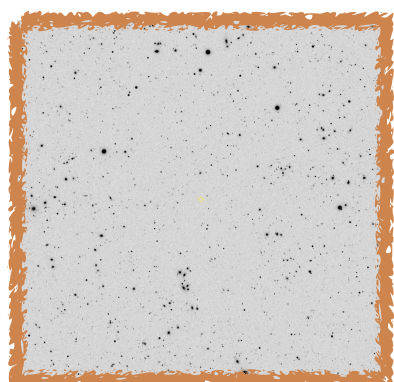
Data Products References

- *Data Products Definition Document* [LSE-163](#)
- *The Rubin Data Products, Abridged* <https://doi.org/k8d3>
- *LSST Data Product Categories* [LPM-231](#)
- *Data Management System (DMS) Requirements* [LSE-61](#)
- *Data Management Science Pipelines Design* [LDM-151](#)
- <https://www.lsst.org/about/dm/data-products>

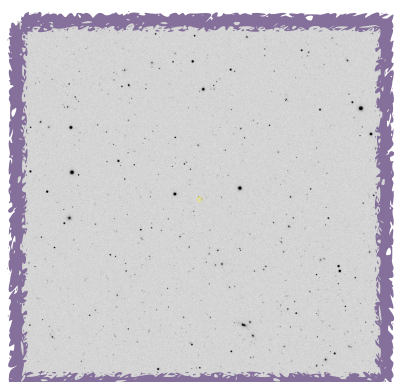
Data Types: Catalog



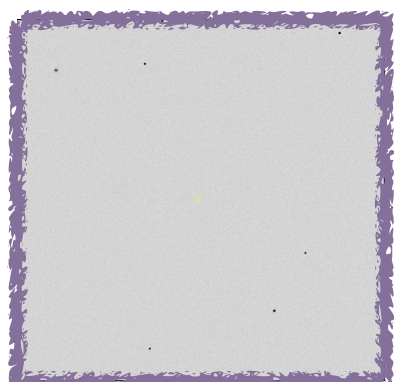
The **Source** table stores properties of detections (instrumental fluxes and shapes) of sources independently detected, deblended, and measured on all **PVI (Calex)**.



The **Object** table stores properties of the astronomical objects detected and measured on the deep **coadded** images.



The **ForcedSource** table stores forced-photometry measurements on individual **calexp images and difference images**, based on and linked to the entries in the Object table. Point-source PSF photometry is performed, based on coordinates from a reference band chosen for each Object.



Dia Source/Object/ForcedSource tables store the same properties of equivalent tables but for time-varying astronomical objects

```
[9]: butler = Butler('dp02', collections='2.2i/runs/DP0.2')
```

Last executed at 2024-05-31 15:51:39 in 1.87s

Data Access

```
[10]: dataId = {'visit': 192350, 'detector': 175, 'band': 'i'}
```

Last executed at 2024-05-31 15:51:39 in 2ms

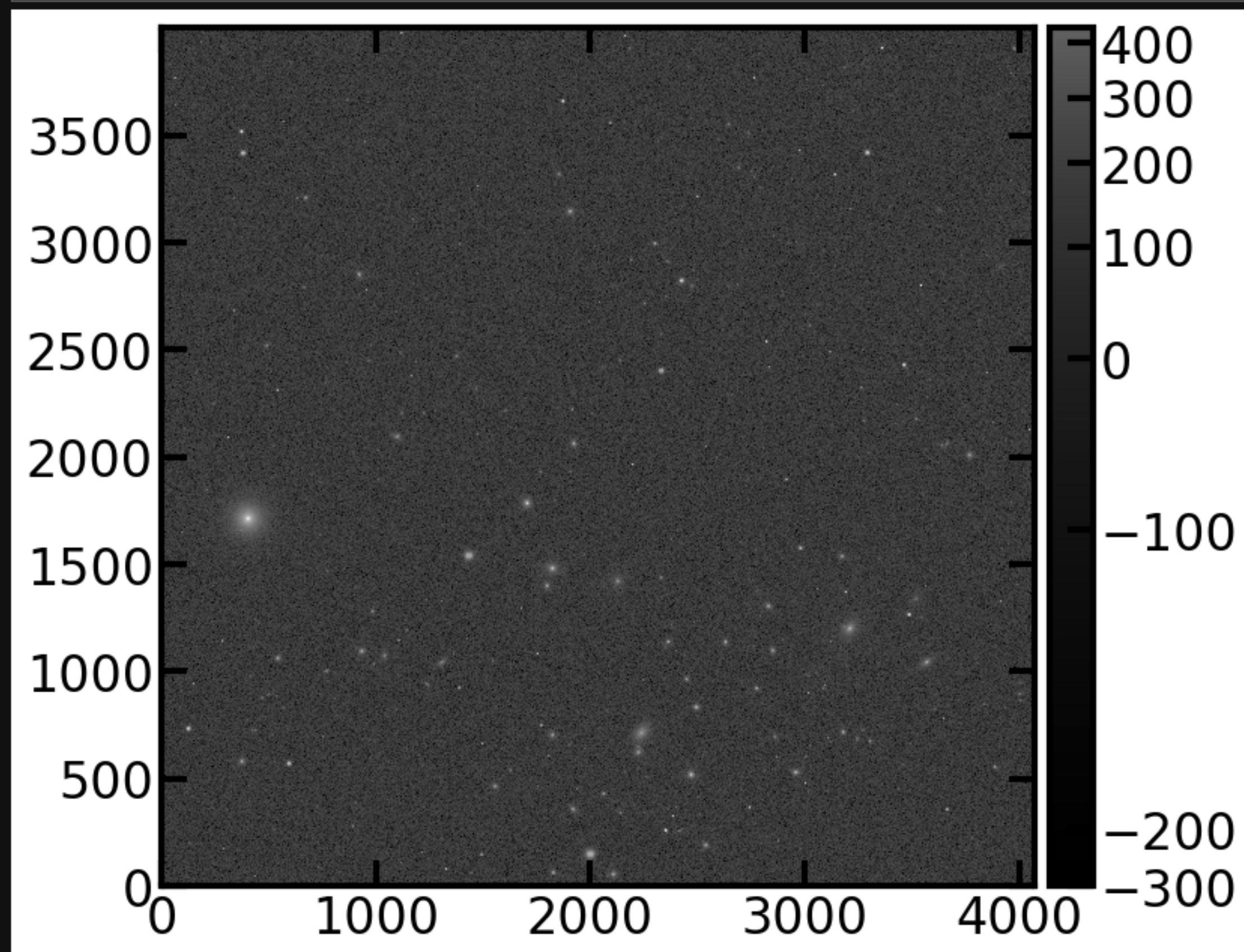
```
[11]: calexp = butler.get('calexp', **dataId)
```

Last executed at 2024-05-31 15:51:44 in 4.94s

The `calexp` that is returned by the Butler in the previous cell is an `ExposureF` Python object. Exposures are powerful representations of image data because they contain not only the image data, but also a variance image for uncertainty propagation, a bit mask image, and key-value metadata. In the next section, we will use `AFWDisplay` to visualize the image and mask associated with this Exposure. More documentation on accessing and visualizing an Exposure be found [here](#).

```
[12]: fig = plt.figure()
display = afwDisplay.Display(frame=fig)
display.scale('asinh', 'zscale')
display.mtv(calexp.image)
plt.show()
remove_figure(fig)
```

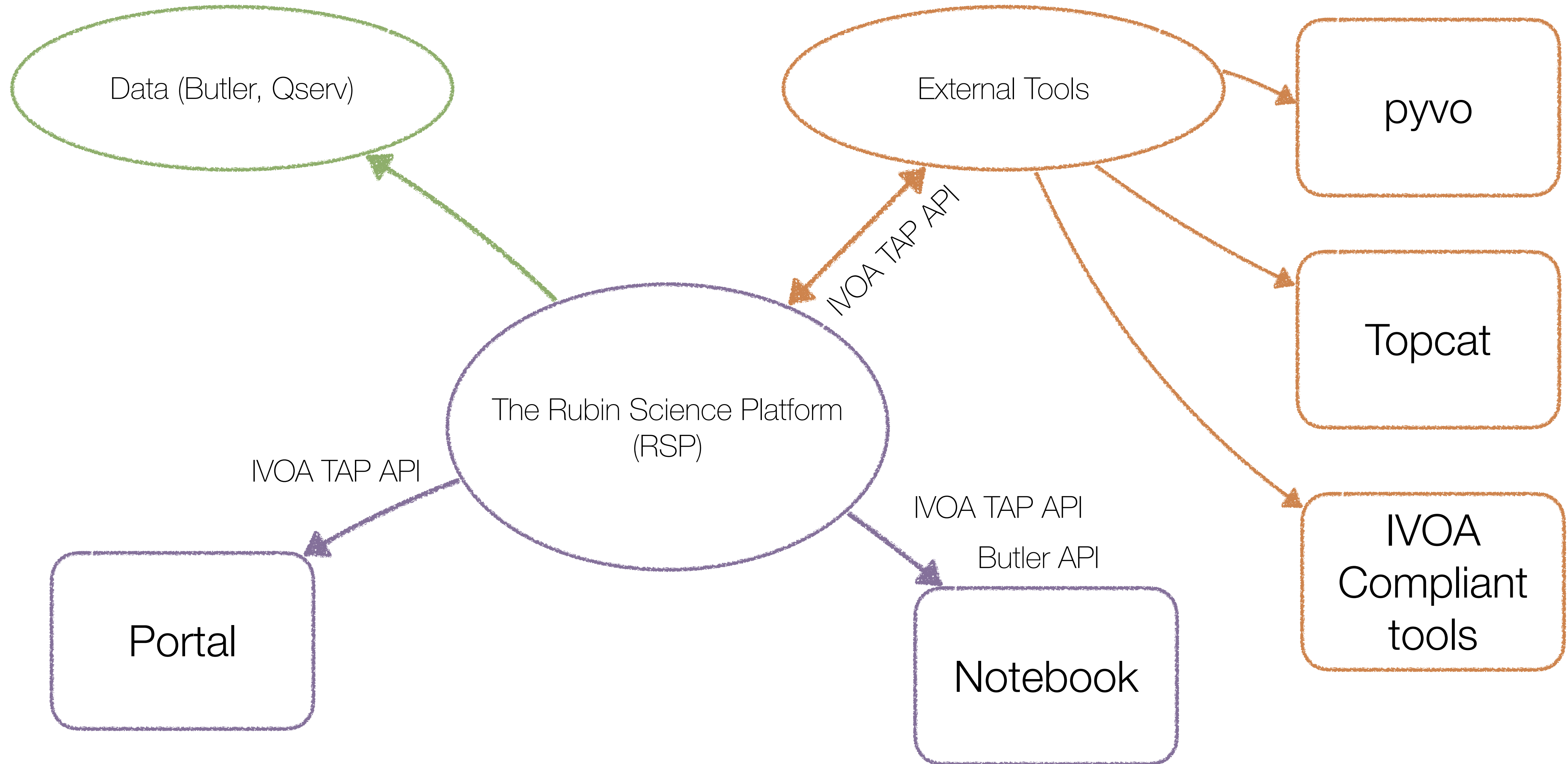
Last executed at 2024-05-31 15:51:45 in 1.29s



Data Access: Rubin Science Platform

- Web environment for interactive data analysis
- Access to Qserv catalog via UI or via script (TAP service)
- Access to Butler data
- Visualization of images, creation of graphs, catalogs analysis
- Execution of notebooks (Python API)
- Gateway to Qserv and Butler for "IVOA" tools

Data Access



RSP Instances

Three instances for data access: CC-IN2P3, USDF, IDF (+ others)

CC-IN2P3

<https://data-dev.lsst.eu>

- Authentication: SSO CC-IN2P3 + Unix group **lsst**
- Commissioning Data
- DP0.2 produced by IDF
 - Catalogs
 - Images
- DP0.3
- DP0.1
- DP0.2 produced by FrDF
 - Catalogs
 - Images (only in Jupyter via Butler API)
- cosmoDC2 Catalogs
- skysim500 Catalogs

USDF @ SLAC

<https://usdf-rsp.slac.stanford.edu/>

- Authentication: via SLAC Account + Unix group **rubin**
- Commissioning Data**
- DP0.2 produced by IDF
 - Catalogs
 - Images
- DP0.3
- DP0.1

IDF @ Google Cloud

<https://data.lsst.cloud>

- Authentication: SSO CNRS (Janus) after authorisation
- Commissioning Data
- DP0.2 produced by IDF
 - Catalogs
 - Images (via Portal and Jupyter)
- DP0.3
- DP0.1

Demo Time



Demo Time



Data Access: RSP home

VERA C. RUBIN
OBSERVATORY

Portal Notebooks APIs Documentation Support Community

mainetti ▾

New "home" for the notebook platform. [Show less](#)

Due to the update of the application that provides RSP notebook services, the notebook platform home is now set to `/sps/lsst/users/your_login/rsp_home`. You can continue to access data in `/pbs $HOME` and `$THRONG` via a terminal or using the symbolic links available in the new `rsp_home`.

Butler access from the notebook platform. [Show less](#)

The production butler at CC-IN2P3 is now accessible from the notebook platform. A set of tutorial notebooks is available within the notebook platform to help you.

Rubin Science Platform

Portal
Discover data in the browser

[Learn more about the portal.](#)

Notebooks
Process and analyze LSST data with Jupyter notebooks in the cloud

[Learn more about notebooks.](#)

APIs
Learn how to programatically access data with Virtual Observatory interfaces

CC-IN2P3 RSP: <https://data-dev.lsst.eu>

Data Access: RSP Portal

LSST DP0.2 DC2 Tables

Enter Constraints

Table Collection (Schema): dp02_dc2_catalogs_frff (tables: 8)
 Data Preview 0.2 contains the image and catalog products of the Rubin Science Pipelines v23 processing of the DESI Data Challenge 2 simul...

Tables: dp02_dc2_catalogs_frff Object
 Properties of the astronomical objects detected and measured on the deep coadded images.

Table count: 8

action and Constraints

constraints char	unit char	ucd char	description char	datatype	arrayize char	u1type char	u2type char	principal int	size int	column_index int	indexed int	ind int
coord_ra	deg	pos.eq.decmeta.main	Fiducial ICRS Declination of cen...	double				0	0	0	0	0
coord_dec	deg	pos.eq.ra.meta.main	Fiducial ICRS Right Ascension of ce...	double				0	0	0	0	0
id			Number of children this object has	int				0	0	0	0	0
del			Delimiter aligned this source	boolean				0	0	0	0	0
delend			This source is delimitated from a par...	boolean				0	0	0	0	0
delend1			True if source has no children and is...	boolean				0	0	0	0	0
delend2			True if source has no children and is...	boolean				0	0	0	0	0
delend3			This source is not a part of a blend.	boolean				0	0	0	0	0
delend4			True if source is in the inner region	boolean				0	0	0	0	0
delend5			True if source has no children and is...	boolean				0	0	0	0	0
delend6			True if source is in the inner region	boolean				0	0	0	0	0
delend7			True if source has no children and is...	boolean				0	0	0	0	0
delend8			True if source is in the inner region	boolean				0	0	0	0	0
delend9			Number of pixels in the sources det...	int				0	0	0	0	0
delend10			Flux within 3.0-pixel aperture. Forc...	double				0	0	0	0	0
delend11			General Failure Flag. Forced on g-b...	boolean				0	0	0	0	0
delend12			Flux uncertainty within 3.0-pixel ap...	double				0	0	0	0	0
delend13			Flux within 6.0-pixel aperture. Forc...	double				0	0	0	0	0
delend14			General Failure Flag. Forced on g-b...	boolean				0	0	0	0	0
delend15			Flux uncertainty within 6.0-pixel ap...	double				0	0	0	0	0
delend16			Flux within 9.0-pixel aperture. Forc...	double				0	0	0	0	0
delend17			General Failure Flag. Forced on g-b...	boolean				0	0	0	0	0
delend18			Flux uncertainty within 9.0-pixel ap...	double				0	0	0	0	0
delend19			Flux within 12.0-pixel aperture. For...	double				0	0	0	0	0
delend20			General Failure Flag. Forced on g-b...	boolean				0	0	0	0	0
delend21			Flux uncertainty within 12.0-pixel a...	double				0	0	0	0	0
delend22			Flux within 17.0-pixel aperture. For...	double				0	0	0	0	0
delend23			General Failure Flag. Forced on g-b...	boolean				0	0	0	0	0
delend24			Flux uncertainty within 17.0-pixel a...	double				0	0	0	0	0
delend25			Flux within 25.0-pixel aperture. For...	double				0	0	0	0	0
delend26			General Failure Flag. Forced on g-b...	boolean				0	0	0	0	0
delend27			Flux uncertainty within 25.0-pixel a...	double				0	0	0	0	0
delend28			Flux within 35.0-pixel aperture. For...	double				0	0	0	0	0
delend29			General Failure Flag. Forced on g-b...	boolean				0	0	0	0	0
delend30			Flux uncertainty within 35.0-pixel a...	double				0	0	0	0	0
delend31			Flux within 50.0-pixel aperture. For...	double				0	0	0	0	0
delend32			General Failure Flag. Forced on g-b...	boolean				0	0	0	0	0
delend33			Flux uncertainty within 50.0-pixel a...	double				0	0	0	0	0
delend34			Flux within 70.0-pixel aperture. For...	double				0	0	0	0	0
delend35			General Failure Flag. Forced on g-b...	boolean				0	0	0	0	0
delend36			Flux uncertainty within 70.0-pixel a...	double				0	0	0	0	0
delend37			General Failure Flag. Measured on g...	boolean				0	0	0	0	0
delend38			Aperture did not fit within measure...	boolean				0	0	0	0	0
delend39			Full sinc coefficient image did not f...	boolean				0	0	0	0	0
delend40			-ln(likelihood) (chi^2) in crmodel fit...	double				0	0	0	0	0
delend41			FracDev-weighted average of exp.e1...	double				0	0	0	0	0
delend42			FracDev-weighted average of exp.e1...	double				0	0	0	0	0
delend43			Flux from the de Vaucouleur fit. Mea...	double				0	0	0	0	0
delend44			Flux uncertainty from the de Vaucou...	double				0	0	0	0	0
delend45			Flux from the exponential fit. Meas...	double				0	0	0	0	0
delend46			Flux uncertainty from the exponen...	double				0	0	0	0	0

Search Row Limit: 50000 Populate and edit ADQL

Data query

Results Analysis

Coverage Data Product: dp02_dc2_catalogs_frff Object - data-dev.lsst.eu/lpi

Active Chart Details

dp02_dc2_catalogs_frff Object

coord_dec (deg)	coord_ra (deg)	delblend_nChild	delblend_skipped	detect_fromblend	detect_isDeblendedModelSource	detect_isDeblendedSource	detect_isolated	detect_isPatched	detect_isPrimary	detect_isTractinner	footprintArea (pixel)	g_ap03Flux (Jy)	g_ap03FluxErr (Jy)	g_ap03FluxFlag	g_ap03FluxErrFlag	g_ap06Flux (Jy)	g_ap06FluxErr (Jy)	g_ap06FluxFlag	g_ap06FluxErrFlag	g_ap09Flux (Jy)	g_ap09FluxErr (Jy)	g_ap09FluxFlag	g_ap09FluxErrFlag	g_ap12Flux (Jy)	g_ap12FluxErr (Jy)	g_ap12FluxFlag	g_ap12FluxErrFlag	g_ap17Flux (Jy)	g_ap17FluxErr (Jy)	g_ap17FluxFlag	g_ap17FluxErrFlag
-32.87436	63.0961340	0	false	false	true	false	true	false	false	true	879	379.836830	8.7034007	705.4032003	false	8.7034007	705.4032003	false	17.211038	813.2760333	false	25.8117286	837.9300261	false	34.4648854	908.1388991	false				
-32.8751227	63.0124095	0	false	false	true	false	true	false	true	true	81	23.6603557	8.697557	27.111915	false	17.4379242	76.6219847	false	26.2911528	129.2768789	false	35.163612	332.678746	false							
-32.8753553	63.0505247	0	false	false	true	false	true	false	true	true	80	37.9663262	8.9677757	67.5720228	false	18.1371998	55.705525	false	36.5211252	94.4913863	false	35.3478938	232.8161409	false							
-32.8759583	63.0192541	0	false	true	true	true	true	true	true	true	956	119.6798135	207.5552101	false	17.5637994	241.3105481	false	26.4669312	252.8072626	false	35.3478938	232.8161409	false								
-32.8752068	63.0192069	0	false	true	true	true	true	true	true	true	960	195.7947234	8.8467673	308.566342	false	17.5996955	339.3723181	false	26.5029294	349.1568933	false	35.4360994	366.3538161	false							
-32.8749361	63.0189405	0	false	true	true	true	true	true	true	true	956	208.1899955	8.8926146	470.3866175	false	17.6868311	611.4092289	false	26.5927238	523.3822726	false	35.4444277	524.8961085	false							
-32.8753781	62.9873085	0	false	true	true	true	true	true	true	true	565	51.0645411	8.4752599	67.6724637	false	17.0232708	63.6233148	false	25.6420394	54.0987248	false	34.2837129	48.1354553	false							
-32.875687	62.9864819	0	false	true	true	true	true	true	true	true	567	191.6923425	8.5505976	320.9809556	false	17.0688184	354.0569638	false	25.707305	345.7520218	false	34.3027311	349.4876486	false							

Data Access: RSP Notebook

Server Options

Image	Options
<input checked="" type="radio"/> Recommended	<input type="radio"/> Small (2.0 CPU, 8Gi RAM)
<input type="radio"/> Release r26.0.2	<input type="radio"/> Medium (4.0 CPU, 16Gi RAM)
<input type="radio"/> Weekly 2024_21	<input checked="" type="radio"/> Large (8.0 CPU, 32Gi RAM)
<input type="radio"/> Weekly 2024_20	
<input type="radio"/> Daily 2024_05_28	<input type="checkbox"/> Enable debug logs
<input type="radio"/> Daily 2024_05_27	<input type="checkbox"/> Reset user environment: relocate .cache, .conda, .eups, jupyter, .local, and user_setups
<input type="radio"/> Daily 2024_05_26	
Select unattached image to follow start:	
<input checked="" type="radio"/> Recommended	
<input type="radio"/> Release r26.0.2	
<input type="radio"/> Release r26.0.1	
<input type="radio"/> Release r26.0.0	
<input type="radio"/> Release r25.0.4	
<input type="radio"/> Release r25.0.3	
<input type="radio"/> Release r25.0.1	
<input type="radio"/> Release r25.0.0	
<input type="radio"/> Release r24.1.4	
<input type="radio"/> Release r24.1.3	

Different flavours of stack and resources

CC-IN2P3

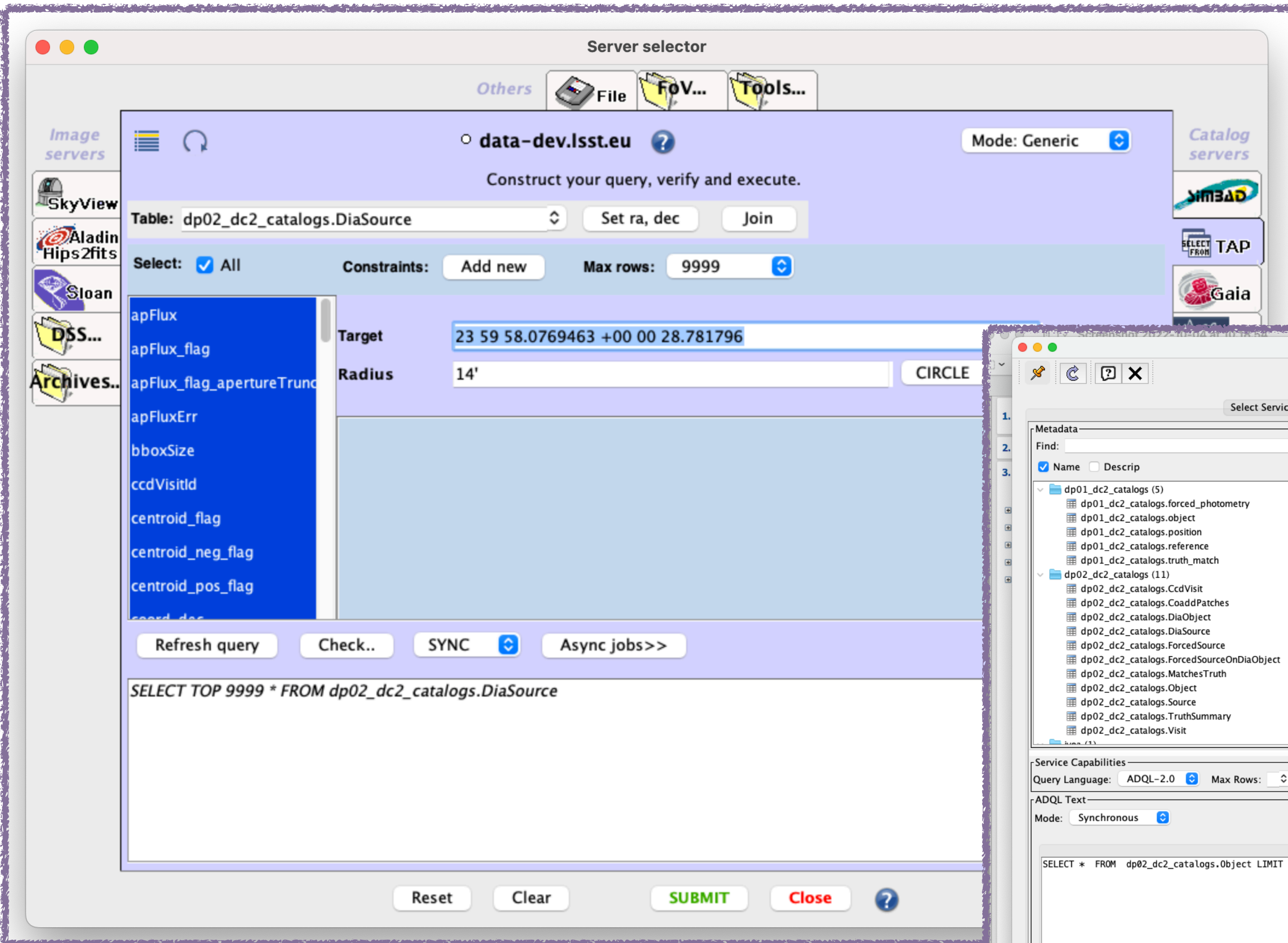
- Butler access (RO)
- SPS
- PBS
 - \$HOME
 - \$THRONG

The screenshot shows a Jupyter Notebook environment. On the left is a file browser with a list of files and folders, including 'data', 'DP02_09_Custom_Coadds', and various DP02_01 notebooks. The main notebook area has a header for 'Introduction to Jupyter Notebooks for Data Preview 0.2' with contact information for Melissa Graham. Below the header is a description, skills, LSST Data Products, packages, credit, and support information. The notebook content includes a '1.0. Introduction' section and a '1.1. How to use a Jupyter Notebook' section. A code cell is shown with the output 'Hello, world!' and a warning about execution order.

A set of tutorial based on DP0.2 data are available

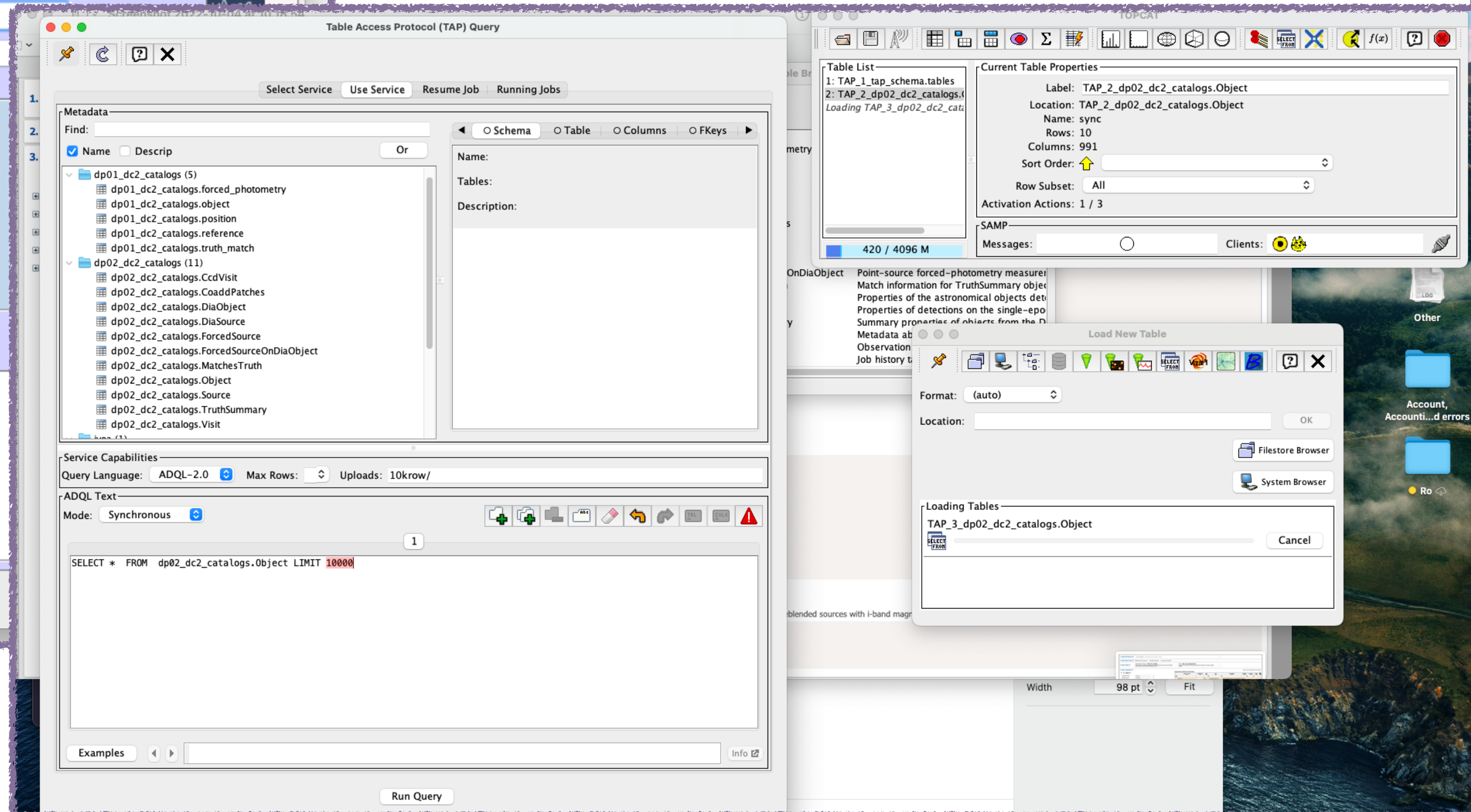
Data Access: Topcat & C.

Accessing Qserv Catalogs via RSP



Aladin

Topcat



Data Access: pyvo library

Exemple of data access using pivot library from a notebook (non RSP) platform

```
import pyvo as vo
import requests
```

Token

```
[4]: url="https://data-dev.lsst.eu/api/tap"
     token=""
```

Authentication

```
[5]: def get_auth():
     tap_url = url
     s = requests.Session()
     s.headers['Authorization'] = 'Bearer ' + token
     auth = vo.auth.authsession.AuthSession()
     auth.credentials.set('lsst-token', s)
     auth.add_security_method_for_url(tap_url, 'lsst-token')
     auth.add_security_method_for_url(tap_url + '/sync', 'lsst-token')
     auth.add_security_method_for_url(tap_url + '/async', 'lsst-token')
     auth.add_security_method_for_url(tap_url + '/tables', 'lsst-token')
     return auth
```

TAP service creation

```
[6]: tap_service = vo.dal.TAPService(url, get_auth())
```

warnings.warn(f"Unknown xsi:type {xsi_type} ignored")
/cvmfs/sw.lsst.eu/linux-x86_64/lsst_distrib/w_2022_48/conda/envs/lsst-scipipe-5.0.0-ext/lib/python3.10/site-packages/pyvo/utils/xml/elements.py:414: UserWarning: Unknown xsi:type uws:Sync ignored

Query

```
[7]: resultset = tap_service.search("SELECT TOP 100 * FROM dp02_dc2_catalogs.Object")
     [8]: resultset.to_table().show_in_notebook()
```

[8]: Table length=100

idx	coord_dec	coord_ra	deblend_nChild	deblend_skipped	detect_fromBlend	detect_isDeblendedModelSource	detect_isDeblendedSource	detect_isisolated	detect_isPatchInner	detect_isPrimary	detect_isTractInner	footprintArea	g_ap03Flux	g_ap03Flux_flag
	deg	deg										pix	nJy	
0	-44.6322113	64.4800788	1	False	False	False	True	True	True	False	False	645	412.1322886	False
1	-44.6312562	64.3185831	2	False	False	False	False	False	True	False	False	283	60.1774559	False
2	-44.6316981	64.3796335	1	False	False	False	True	True	True	False	False	153	67.1881908	False
3	-44.630617	64.3861605	2	False	False	False	False	False	True	False	False	825	397.4578227	False
4	-44.6316349	64.3526559	1	False	False	False	True	True	True	False	False	96	21.0439418	False
5	-44.6317522	64.3783342	2	False	False	False	False	False	True	False	False	377	241.9063884	False
6	-44.630403	64.3396123	3	False	False	False	False	False	True	False	False	1251	464.6395859	False

pyvo library

Authentication via token

TAP service creation

ADQL request

Conclusions



Conclusions

- Real data are coming
- The Rubin Science Platform is the access portal to the data (both catalog and images)
- Also access via IVOA compatible tools needs an RSP account
- Many instances of RSP are available, one at CC-IN2P3 (data-dev.lsst.eu) but:

If you want participate to the camera commissioning **data under embargo are accessible only via USDF RSP (<https://usdf-rsp.slac.stanford.edu/>) please take your time to ask for a SLAC account!**