VERA C. RUBIN OBSERVATORY

Data Preview 0: Kick-Off Info Session w/ Q&A

Tue Jun 29	8am US Pacific	3pm UTC
Wed Jun 30	12pm US Pacific	7pm UTC
Thu Jul 1	4pm US Pacific	11pm UTC
Tue Jul 6	**12pm US Pacific**	**7pm UTC**
Wed Jul 7	4pm US Pacific	11pm UTC
Thu Jul 8	8am US Pacific	3pm UTC

Presented by the Rubin Observatory Community Engagement Team

NSF NOIRLab AURA SLAC U.S. DEPARTMENT OF ENERGY

Agenda (1 hour)

1. Introduction
   - Rubin Observatory
   - Rubin Science Platform (RSP)

2. Data Preview Zero (DP0)
   - Goals and Timeline
   - The DP0 Data Set
   - The DP0-Era RSP
   - DP0 Delegates

3. Resources for Delegates
   - Documentation: dp0-1.lsst.org
   - Tutorials: Jupyter Notebooks
   - RSP Usage Risks
   - DP0 Live Seminars (tutorials, office hours)
   - Community Forum (Community.lsst.org)

4. Getting Help and Support
   - Support via the Community Forum
   - Technical Assistance via GitHub Issues
   - Contacts for the Code of Conduct

5. DP0 Delegate Activities

6. RSP Account Activation
   - Demo RSP Log In

7. Important Links
   - Come to the first Delegate Assembly!

Time for Q&A

Post your questions in the Zoom chat at any time.
We will make many pauses for Q&A throughout.

Director’s Welcome from Bob Blum

We are very excited to have you today! This initial data preview is the very beginning of Rubin’s commitment to the science community to provide science ready data products and tools so everyone everywhere in our community can participate in discovery, research, and education.

A Data Preview is an early look at how things will work in the full survey. For this first one, please enjoy, explore, ask questions and be patient! We are learning how to run our current system as an Ops team and understand what works and what needs work.

This Data Preview is the work of a dedicated and hard working team throughout Rubin Observatory. I am very proud of them and what they have done so far. I look forward to our partnership with you. This is just the start.

Community Engagement Team

We look forward to interacting with you during our live virtual DP0.1 seminar series and in our online Community Forum, and supporting all your DP0-related science.

Melissa Graham
University of Washington
Time-domain surveys, supernovae.

Alex Drlica-Wagner
Fermilab/UChicago
Cosmology, dark matter & energy, imaging surveys.

Grzegorz (Greg) Madejski
SLAC/Stanford (KIPAC)
Active galactic nuclei, lensed quasar cosmology.

Jeff Carlin
AURA/Rubin Observatory
Galactic structure, stellar populations, dwarf galaxies.

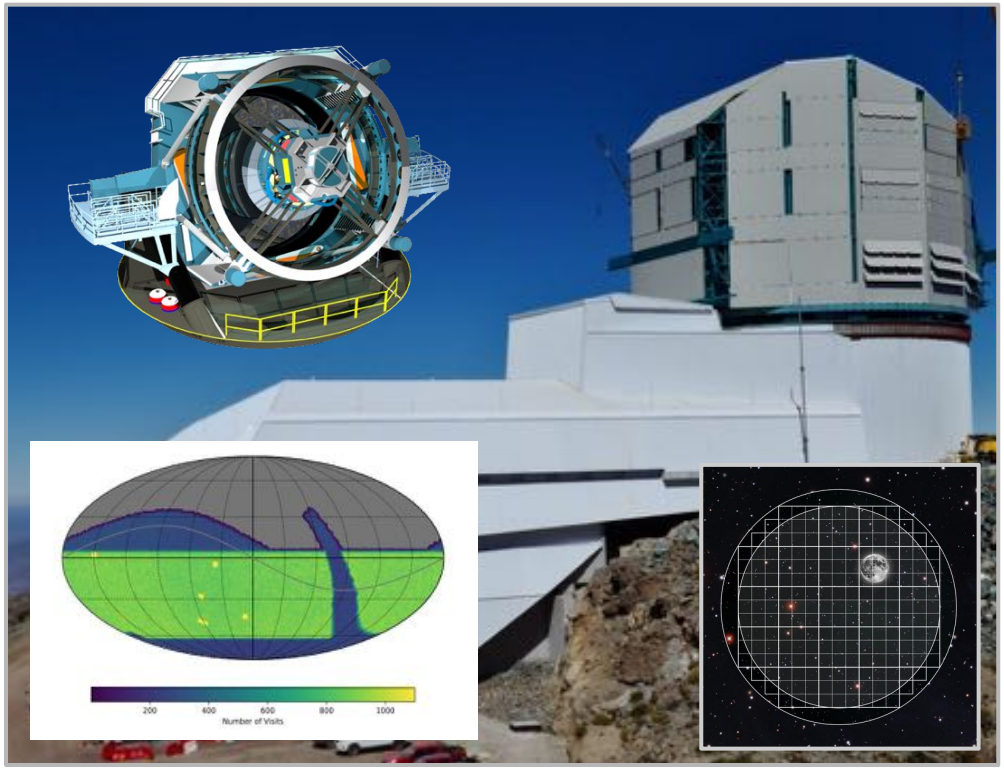
James Annis
Fermilab
Cosmology, gravitational waves, astronomical surveys.

Tina Adair
SLAC/Stanford
Documentation, stellar populations, planetary formation.

Rubin Data Production / Management

We represent the large team of Rubin staff who are building the Rubin Science Platform and the LSST Science Pipelines, and who have made the DC2 data products available for DP0.
We look forward to your feedback, as the first cohort of RSP users!

The Vera C. Rubin Observatory



The Rubin Observatory, located in Chile, has an 8.4 meter diameter primary mirror and a 9.6 deg^2 field-of-view camera with six filters, *ugrizy*.

Once complete, Rubin Observatory will execute the **Legacy Survey of Space and Time (LSST)**.

The 10-year southern sky survey will make major advances in four core science areas:

1. Probing dark energy and dark matter
2. Taking an inventory of the solar system
3. Exploring the transient optical sky
4. Mapping the Milky Way

The LSST will cover ~⅓ of the sky each night, detect billions of stars and galaxies, and millions of transients, variables, and moving objects -- a data set of unprecedented volume and complexity.

Rubin Science Platform (RSP)

It will not be possible to download the entire LSST data set, and scientists will need a venue for **“next-to-the-data analysis”**.

The **Rubin Science Platform (RSP)** is a set of integrated web-based applications and services running at the Rubin Observatory Data Access Centers (DACs).

Portal Aspect
exploratory analysis and visualization of the Rubin archive

Notebook Aspect
in-depth ‘next-to-data’ analysis and creation of added-value data products

API Aspect
remote access to the Rubin archive via industry-standard APIs

The RSP will include tools to query, visualize, subset, and analyze the full LSST data archives in a stable software environment located “next-to-the-data”, along with storage space, compute resources, and remote access options.

RSP “Vision Document”: ls.st/lse-319

Data Preview 0 (DP0)

DP0 is the first of three planned data previews between now and Operations.

Rubin's DP0 Goals

- enable the community to prepare for early LSST science with the RSP
- test integration of the LSST science pipelines and the RSP
- use feedback on RSP functionality to inform future development

DP0 Data Set

- simulated LSST-like images and catalogs from the DESC's Data Challenge 2 (DC2)
- future DP data sets will be based on LSST commissioning data from Rubin Observatory

DP0 Timeline

- DP0.1, June 30 2021: *DC2 as processed by the DESC available in the RSP*
- DP0.2, mid-2022: *DC2 as reprocessed by Rubin Data Production available in the RSP*

The DP0 Simulated Data Set

Simulated LSST-like images and catalogs generated by the LSST Dark Energy Science Collaboration (DESC) for their Data Challenge 2 (DC2; arXiv:2101.04855).

Simulated images over 300 square degrees with a baseline (fiducial) survey strategy for the wide-fast-deep (WFD) region and cadence only (i.e., no deep drilling fields).

Simulated astrophysical objects in the WFD images include galaxies (with large-scale structure), Type Ia supernovae, and stars (10% have variability).

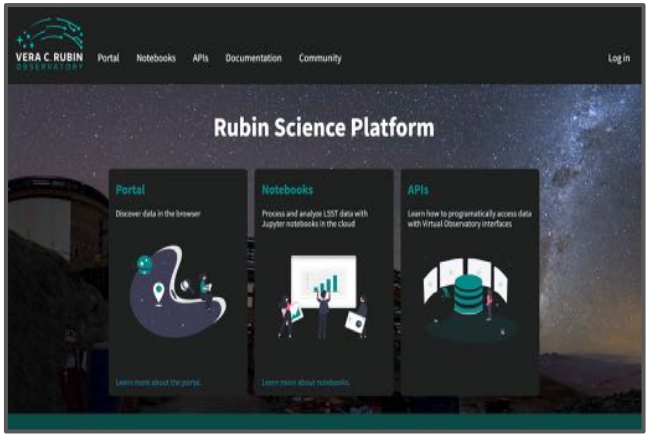
Imaging data products include processed visit images (PVIs) and deep coadds.
Catalog data products include sources in the PVIs and objects in the coadds.

The “DP0.1 Data Products Definitions Document”: ls.st/dp0-1-dpdd

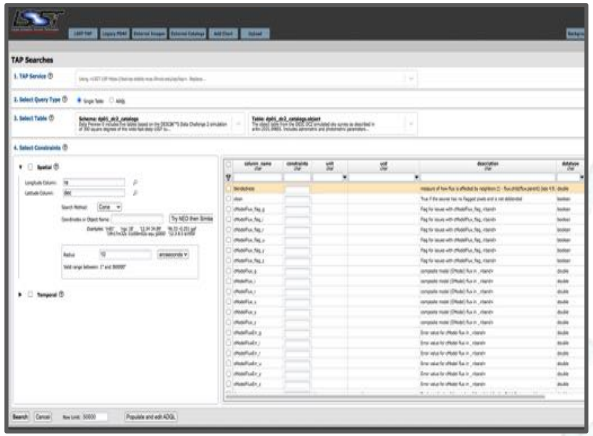
The DP0-Era Rubin Science Platform

The DP0-era RSP provides delegates with access to the data set via the Portal and the Notebook Aspects. Both aspects have tools to query, subset, visualize, and analyze the DP0 data set, as well as documentation and tutorials for users. The LSST Science Pipelines (and many other common software packages) are pre-installed in the Notebook environment.

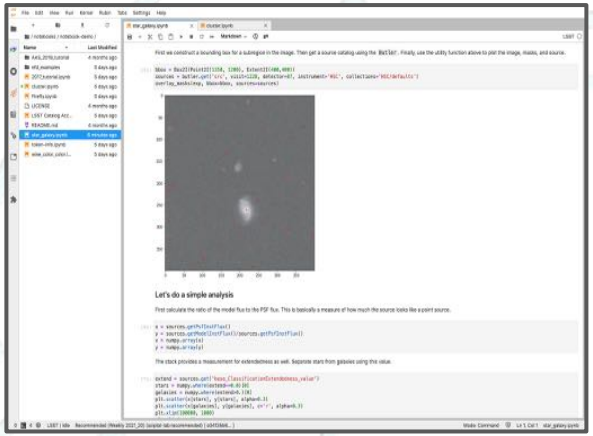
RSP Landing Page



RSP Portal Aspect



RSP Notebook Aspect



API = Application Programming Interface. Not available for DP0.

The DP0-Era Rubin Science Platform

The RSP and the LSST Science Pipelines are in *active development*.
The software will evolve over the course of your DP0 participation (e.g., bug fixes, functionality expansions, package updates). Code that you write will require some maintenance.

The DP0-Era RSP offers limited functionality compared to the Operations-Era.
This is truly a *preview* of the RSP. Your active use and feedback will be used to guide future development of the science pipelines' functionality and the RSP's tools.

There are some risks inherent in using the DP0-era RSP.
E.g., some data sharing safeguards are not in place, compute resources are finite and shared by all users; we will review the risks. Delegates are responsible for safe use of the RSP.

Rubin staff are limited in their capacity to provide support for RSP use during DP0.
Multiple venues for delegates to ask questions and report issues are provided (this talk will review these venues) but generally, answers and issue resolution may take some time.

RSP Usage Risks

Always shut down your notebooks and log out of Jupyter Lab when you are done working.

Bulk downloads of data from the RSP are not supported; delegates should work *in the RSP*.

Acceptable Use Policy: RSP users may do science and undertake investigations that otherwise further the mission of the observatory, but will lose access if they misuse our resources, interfere with other users, or otherwise do anything that would bring the observatory into disrepute

Use storage space appropriately:

- /home: your space for storing files that other users cannot see (but Rubin staff can)
- /scratch: shared space for all that is not backed up (use this for temporary sharing)
- /project: shared space in which all files are read/writeable by all; be careful!

Advanced Butler users: as there are no global write/delete restrictions, avoid disaster by only writing to your own "u/<user>/*" named collections.

DP0 Delegates

What is a "DP0 Delegate"? A scientist or student who is given an account for the RSP at the Interim Data Facility (IDF; the Google Cloud), via which they can access the DP0 data set.

Why "delegate"? The term reflects their role of representing the broad science community as learners, testers, and providers of feedback, and of sharing the benefits of their DP0 participation with their communities as teachers and colleagues.

Why 300? The total number of delegates (for DP0.1 and DP0.2) is limited to 300 because the Rubin pre-operations team has a limited ability to provide support for services that are still in development, and needs to scale-up in a safe and sustainable way.

Will more people be able to join? Yes: 25% of the 300 accounts were held back for the second call for DP0 applications in early 2022, so new delegates will join us next year for DP0.2.

DP0 Delegates

Delegates are expected to:

- Be aware of the usage risks in the RSP's active development environment.
- Use their RSP accounts! Explore the RSP. Access and analyse the DP0 data set.
- Let us know if they no longer need their account so we can allocate it to the waitlist.

- Use the documentation and tutorials to learn to use the RSP.
- Report bugs and issues when they are encountered.

- Do their own DP0-related science at their own pace in the RSP.
- Interact via the Community Forum and the biweekly assemblies (as often as possible).
- Choose a delegate activity to do for DP0 (next slide).

DP0 Delegate Activities

"Delegates are invited to take on a simple activity to inform and improve development of the Rubin Science Platform, and/or extend and enhance the benefits of DP0 within the science community."

Inform and improve the Rubin Science Platform

- submit bug reports via GitHub issues
- respond to calls to test new features as they arise
- complete a feedback survey for Rubin Observatory when requested
- post examples of your DP0-related work in the Community Forum

Extend or enhance the benefits of DP0 in the science community.

- join one of the eight LSST Science Collaborations
- build the reservoir of expertise in the Forum by asking questions and responding to others'
- participate in the DP0 Delegate Assemblies (volunteer to lead a tutorial or breakout discussion)
- contribute tutorials to the delegate's shared repository in the rubin-dp0 GitHub Organization
- share your DP0-related work outside of DP0 via seminars or publications

DP0 Live Sessions

Connection info: ls.st/dp0-events
Schedules: dp0-1.lsst.io

Delegate Assemblies: biweekly on Fridays from 9-11am US Pacific
- **first hour**: a “formal” presentation with Q&A
  - DP0 RSP demonstrations and **tutorials** by Rubin staff
  - presentations from delegates about their DP0 work
- **second hour**: breakout sessions for discussion
  - “office hours” for Q&A with Rubin staff
  - grassroots DP0 science working groups and collaborative projects
- all are welcome to attend one or both hours
- first hour will be recorded and made available

Assemblies Schedule

Schedule and planned content of DP0 Delegate Assemblies

Date (Fridays at 9am US Pacific)	First Hour Presentation Topic	Second Hour Breakouts Topics	Chair and Presenter(s)
2021-07-16	Introduction to DP0 and the RSP's Portal and Notebook Aspects.	Q&A with delegates.	The Community Engagement Team (Melissa Graham)
2021-07-30	Querying Catalogs via the Notebook (TAP Service) and Portal Aspects.	Notebook Q&A. Portal Q&A. DP0 science.	The Community Engagement Team (Leanne Guy)
2021-08-13	no assembly (Rubin 2021 Project and Community Workshop)		
2021-08-27	Image Query, Retrieval, and Display.	Butler Q&A. Notebook Q&A. Image type Q&A. DP0 science.	The Community Engagement Team (Jeff Carlin)
2021-09-10	Data Discovery with the Butler and the Portal	Butler Q&A. Portal Aspect Q&A. DP0 science.	The Community Engagement Team (Alex Drlica-Wagner)
2021-09-24	*LSST Science Pipelines*	*Pipeline Q&A. DP0 science.*	*TBD*
2021-10-08	*Data Visualization*	*Data vis package*	*TBD*

Third Thursdays: monthly at 9am Sydney (Wed 4pm US Pacific)
- DP0 office hour for drop-in discussions or Q&A with Rubin staff
- Thu July 15, Aug 19, and Sept 16; to be continued if there is interest/need

Stack Club: biweekly on Fridays from 9-11am US Pacific (alternating with the assemblies)
- DP0 delegates are welcome to join this co-working session

DP0 Resources

First, a tour of the DP0 documentation at dp0-1.lsst.io.

Open in your browser and follow along.

- the main page & sidebar menu
- delegates homepage (seminar schedules, support venues)
- data products definitions document
- data access and analysis tools (RSP user guide)
- tutorials

Jupyter Notebook Tutorials

https://github.com/rubin-dp0/tutorial-notebooks

These notebooks will appear in a read-only folder of your home directory in the RSP.
Save a copy in another directory in order to edit and play around with these notebooks.

Title	Description
01. Intro to DP0 Notebooks	Use a python notebook; query a DC2 catalog and plot data; retrieve and display a DC2 image.
02. Intermediate TAP Queries	Query, and retrieve DC2 catalog data with the Table Access Protocol (TAP) service. Use bokeh and holoviews to create interactive plots.
03. Image Display and Manipulation	Display and manipulate DC2 images, explore image mask planes, create cutout and RGB images.
04. Intro to Butler	Discover, query, retrieve, and display DC2 images and catalog data with the Generation 3 Butler.
05. Intro to Source Detection	Use the LSST Science Pipelines tasks for image characterization, source detection, deblending, measurement, and to interact with a source footprint.
06. Comparing Object and Truth Table	Retrieve and merge data from the DC2 Object and Truth-Match tables, and compare simulated and measured properties.

Rubin Community Forum

First, a tour of our Community Forum at Community.lsst.org.

Open in your browser and follow along.

- the banner
- navigation and search
- categories and tags
- topics and replies
- notifications (watch the “DP0 RSP Service Issues” category)
- moderation (flagging posts)
- user profiles & direct messaging

Support via the Rubin Community Forum

Category: “Support - Data Preview 0”

- visible to everyone
- for scientific support for DP0
  - questions about the contents of the DP0 data set
  - discussions about unexpected or interesting results of data analyses

Category: “Support - DP0 RSP Service Issues”

- visible only to “DP0 Delegates” group *(and forum moderators)*
- for discussion of transient or potential issues (*e.g. is this a feature or a bug?*)
- to ask if others experience the same issue (*e.g. is this a local vs. general network outage?*)

For both categories, delegates are encouraged to respond to each others posts, and help each other to crowd-source solutions to technical or scientific issues when possible.

Use the ‘dp0’ tag for your DP0-related topics.

Technical Assistance via GitHub Issues

Submit a GitHub Issue for:

- bug reports, persistent technical issues (*e.g., did not go away in 5 min or after a refresh*)
- requests for assistance from Rubin staff, *e.g.,*
  - *connection problems (504 errors)*
  - *slow response times, hanging queries*
  - *authentication issues, login failures*
  - *change in behavior of RSP functionality*

A demonstration of how to submit an issue at https://github.com/rubin-dp0/Support

Open in your browser and follow along.

Support for Code of Conduct Violations

Code of Conduct: ls.st/comms-coc

- Bullying and harassment will not be tolerated.
- Research inclusion and collaborative work must not be impeded by poor behavior.
- Discussion should be constructive and civil at all times.

If you experience or witness a violation of the COC in the Community Forum, *flag the post.*
https://community.lsst.org/t/how-and-why-to-flag-a-post
https://community.lsst.org/t/how-to-react-if-your-post-is-flagged

If you experience or witness a violation of the Code of Conduct in another venue, please reach out to Sandrine Thomas, one of the Rubin Observatory Workplace Culture Advocates:
https://project.lsst.org/workplace-culture-advocate

Please also feel free to reach out to any Community Engagement Team member at any time.

Support via Science Collaborations

All DP0 delegates are welcome to join one or more of the eight LSST Science Collaborations. The 8 SCs:

- provide expert advice and analysis to Rubin
- fundraise for our teams and their projects
- implement research inclusion practices
- train, educate, & engage the scientific community
- collaborate on software development

SC members enjoy and benefit from a supportive collaborative environment that places them in the best position to generate science with Rubin data!

DP0 Partnership Program: The Science Collaborations are looking to pair their long-term members with new-to-Rubin scientists and students from small and/or underserved US institutions. Contact Melissa Graham if you're interested and keep an eye out for future advertising.

- Transients and Variable Stars SC
- Stars, Milky Way, & Local Volume
- Strong Lensing SC
- Active Galactic Nuclei SC
- Solar System SC
- Galaxies SC
- Dark Energy SC
- Informatics and Statistics SC

Join an SC:

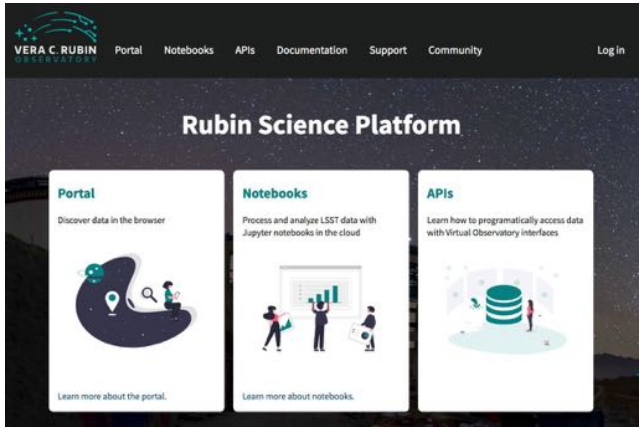
RSP Account Authorization

You must **accept** the email invitation to join the **GitHub Organization** "**rubin-dp0**" and its "**Delegates**" **team** in order to access the Rubin Science Platform.
Not sure? Check if you can see this list: https://github.com/orgs/rubin-dp0/teams/delegates/members

A brief demo of logging in to the Portal and the Notebook Aspect

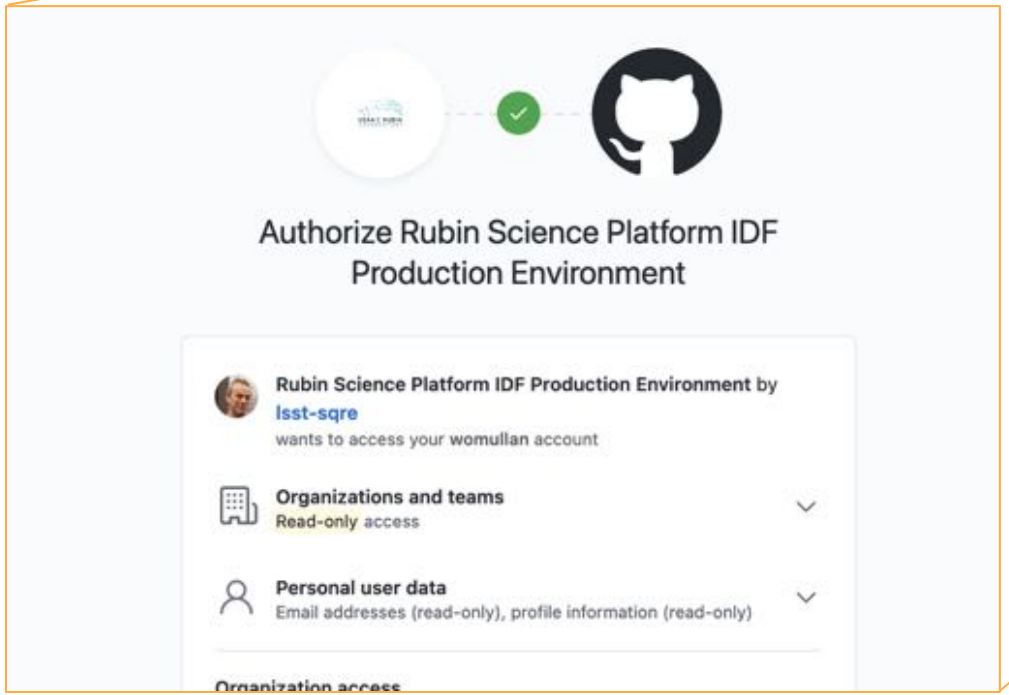
Open in your browser and follow along *(**iff** you've accepted the GitHub invite)*.

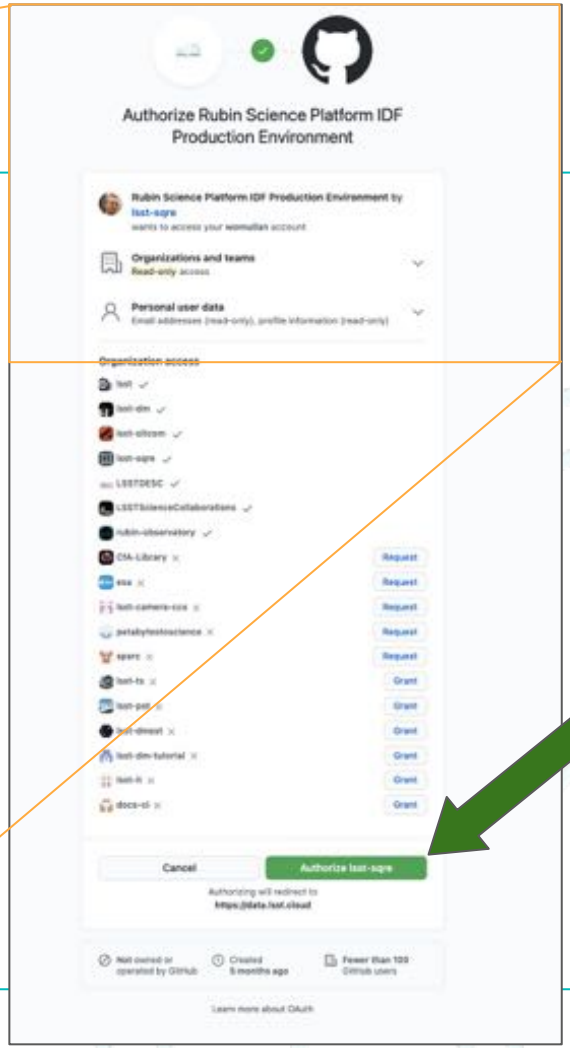
Use a web browser
Be logged into GitHub
Navigate to data.lsst.cloud



Instructions for the Portal and Notebook are available at dp0-1.lsst.io, under "Data access and analysis tools".

First-time RSP Log In





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Important Links

First Delegate Assembly: Friday July 16, 9-11am US Pacific
Connection info and schedule: ls.st/dp0-events
Learn to query, retrieve, and plot DP0 data.

Documentation & Resources: dp0-1.lsst.io
Community Forum: Community.lsst.org
GitHub Org (tutorials & issues): github.com/rubin-dp0
Rubin Science Platform: data.lsst.cloud

Join a Science Collaboration: https://www.lsst.org/scientists/science-collaborations

The LSST DESC DC2 Simulated Sky Survey, arXiv:2010.05926
DESC DC2 Data Release Note, arXiv:2101.04855
The Rubin Science Platform Vision Document, https://lse-319.lsst.io
The Rubin Observatory Data Policy, ls.st/rdo-013
The Rubin Communications team Code of Conduct, ls.st/comms-coc