



Leibniz-Institut für  
Astrophysik Potsdam

# Continuous development and maintenance of the Daiquiri framework

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# Daiquiri is a framework for web publications of scientific databases

- Based on Django (Python Web framework)
- Intuitive Web-interface for accessing the scientific data (e.g., query interface, visualization and download of data)
- Supports a wide range of protocols and standards (e.g., IVOA TAP, IVOA Simple Cone Search, etc.)
- Adapts to any type of data: single values, pictures, spectra
- Highly customizable thanks to modular services
- Easy deployment owing to docker containerization (next talk by Anastasia Galkin)
- Open Source: <https://github.com/django-daiquiri/daiquiri>



# Scientific data published with Daiquiri at AIP

- **CosmoSim:**  
<https://www.cosmosim.org/>
- **RAVE:**  
<https://www.rave-survey.org>
- **MUSE:**  
<https://musewide.aip.de>
- **APPLAUSE:**  
<https://www.plate-archive.org/>
- **GAIA@AIP:**  
<https://gaia.aip.de/>
- **4MOST (upcoming):**  
<https://www.4most.eu>



**CosmoSim**  
Project • Documentation • Database tables • Query • Contact • Login

**RAVE Survey**  
The Radial Velocity Survey of Galactic Stars  
MUSE Wide • News • Fields • Catalogs • Our Our • Query • Database • Contact • Login

**MUSE Wide**  
Welcome to th  
Archives of Photographic Plates for Astronomical USE

**APPLAUSE**  
Home • Project • Documents • Gaia@AIP • Services • Data • Database tables • Query • Contact • Login

**Gaia@AIP Services**  
Home • News • Science • Facility • Operations • Publications • Collaborators • Team • Help • Login

**4MOST - 4-metre Multi-Object Spectroscopic Telescope**  
Home • News • Science • Facility • Operations • Publications • Collaborators • Team • Help • Login

**RAVE DR6**  
The Radial Velocity Survey of Galactic stars  
medium resolution spectroscopy

**APPLAUSE**  
German astronomical observatories of significant discoveries in the past, the long-term variability of many types of stars. There are about 8000 plates in the Institut für Astrophysik Potsdam (AIP) corresponding plate envelopes and of the work is carried out within the project "internationale Virtual Observatory", which on this site, you can get access to the account. Then you can submit SQL query interface can be used as a guest user.

**APPLAUSE Data Release 4 (DR4)**  
This page describes the M CANDLEX-COSMOS areas. It also serves as a data set 1. links to reduced cut 2. an emission line cut

**4MOST DR4 contains:**

- images and metadata from 27 Vatican Observatory;
- 124574 scans of 87783 photos;
- metadata for 34050 plates with
- 117960 images of logbook page
- 215 logbooks;
- astrometric solutions for 68399
- photometric calibration for 663
- 4.486 billion extracted sources!
- 1.256 unique matches.

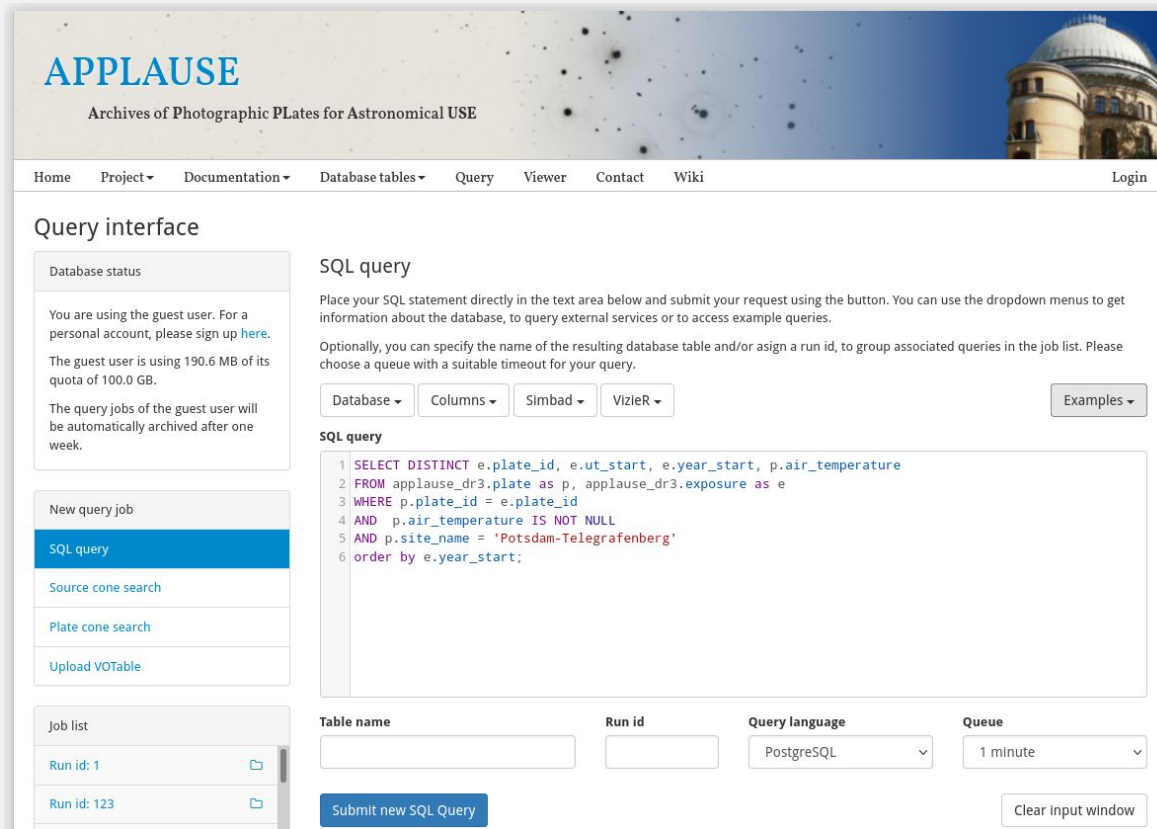
Launched in 6 positions and 13rd of June 2. The AP hosts

**4MOST** consortium has been selected by the European Southern Observatory (ESO) to provide the ESO community with a fibre-fed spectroscopic survey facility on the VISTA telescope with a large enough field-of-view to survey a large fraction of the southern sky in a few years. The facility will be able to simultaneously obtain spectra of >2400 objects distributed over an hexagonal field-of-view of 4.2 square degrees. This high multiplex of 4MOST, combined with its high spectral resolution, will enable detection of chemical and kinematic substructure in the stellar halo, bulge and thin and thick discs of the Milky Way, that helps unravel the origin of our home galaxy. The instrument will also have enough wavelength coverage to secure velocities of extra-galactic objects over a large range in redshift, thus enabling measurements of the evolution of galaxies, black holes, and the structure of the cosmos. This exceptional instrument enables many science goals, but the design is especially intended to complement three key all-sky, space-based ob-

**4MOST** Calibration System arrives in Potsdam 2022-08-18  
Closing the loop between AESOP and Metrology 2022-08-17  
4MOST Control Electronics delivered to Potsdam 2022-07-17  
4MOST Wide Field Corrector installed on the Carnegie Test Stand 2022-07-15  
Update on Local Acceptance Reviews 2022-06-14  
4MOST Science Team Meeting 2022 2022-05-07  
Introducing the new Onbudsponsors

# Daiquiri features: interactive query interface

- Supports ADQL and PostgreSQL
- Asynchronous database queries, up-to several hours



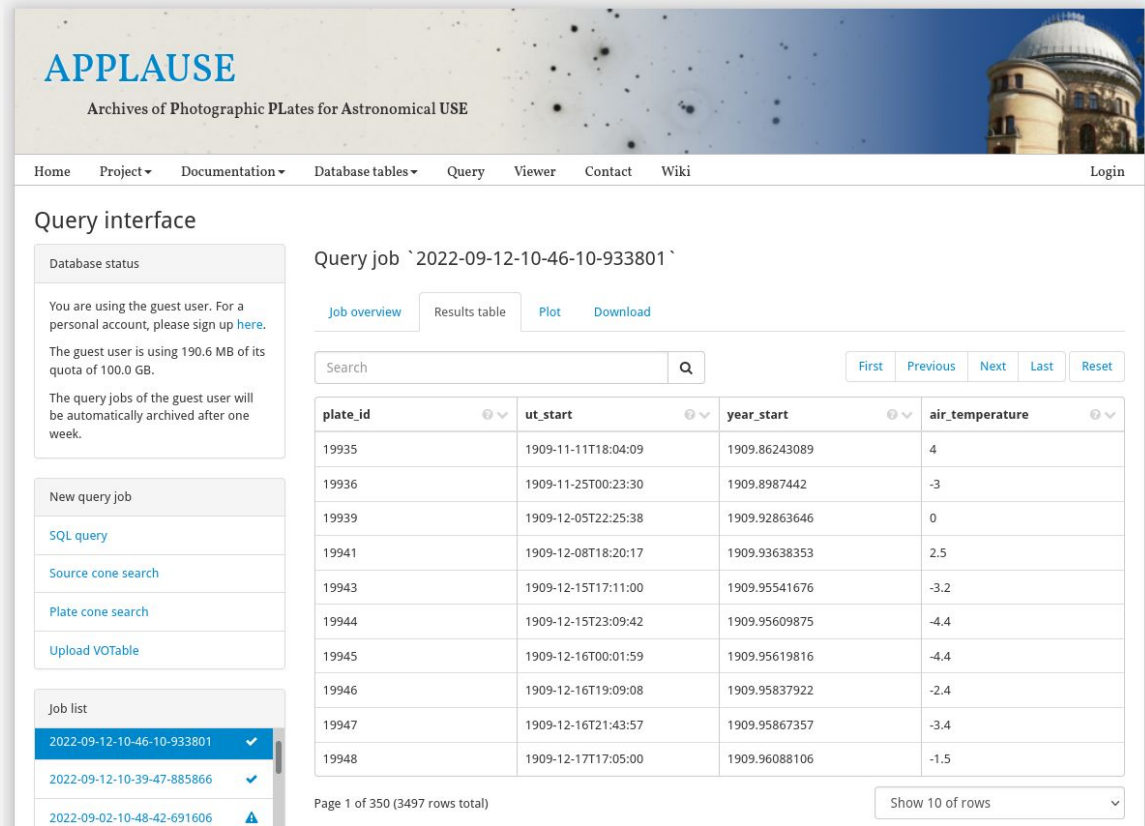
The screenshot shows the APPLAUSE web interface. At the top, the logo 'APPLAUSE' is displayed in blue, with the subtitle 'Archives of Photographic PLates for Astronomical USE' below it. A navigation bar includes links for Home, Project, Documentation, Database tables, Query, Viewer, Contact, and Wiki, along with a Login button. The main content area is titled 'Query interface' and is divided into several sections:

- Database status:** A box containing text about the guest user's account, including a link to sign up and information about the 190.6 MB quota and one-week archival period.
- New query job:** A vertical menu with options for 'SQL query' (highlighted in blue), 'Source cone search', 'Plate cone search', and 'Upload VOTable'.
- Job list:** A table showing two entries: 'Run id: 1' and 'Run id: 123', each with a folder icon to its right.
- SQL query section:** Contains instructions on how to submit a query, a dropdown menu for 'Database', and buttons for 'Columns', 'Simbad', and 'VizieR'. Below this is a text area with a pre-filled SQL query:

```
1 SELECT DISTINCT e.plate_id, e.ut_start, e.year_start, p.air_temperature
2 FROM applause_dr3.plate as p, applause_dr3.exposure as e
3 WHERE p.plate_id = e.plate_id
4 AND p.air_temperature IS NOT NULL
5 AND p.site_name = 'Potsdam-Telegrafenberg'
6 order by e.year_start;
```
- Submission controls:** Includes input fields for 'Table name', 'Run id', and 'Queue' (set to '1 minute'), a 'Query language' dropdown (set to 'PostgreSQL'), a 'Submit new SQL Query' button, and a 'Clear Input window' button.

# Daiquiri features: interactive query interface

- Supports ADQL and PostgreSQL
- Asynchronous database queries, up-to several hours
- Lists the query results



**APPLAUSE**  
Archives of Photographic PLates for Astronomical USE

Home Project Documentation Database tables Query Viewer Contact Wiki Login

### Query interface

Database status

You are using the guest user. For a personal account, please sign up [here](#).

The guest user is using 190.6 MB of its quota of 100.0 GB.

The query jobs of the guest user will be automatically archived after one week.

New query job

- SQL query
- Source cone search
- Plate cone search
- Upload VOTable

Job list

- 2022-09-12-10-46-10-933801 ✓
- 2022-09-12-10-39-47-885866 ✓
- 2022-09-02-10-48-42-691606 ⚠

### Query job `2022-09-12-10-46-10-933801`

Job overview Results table Plot Download

Search

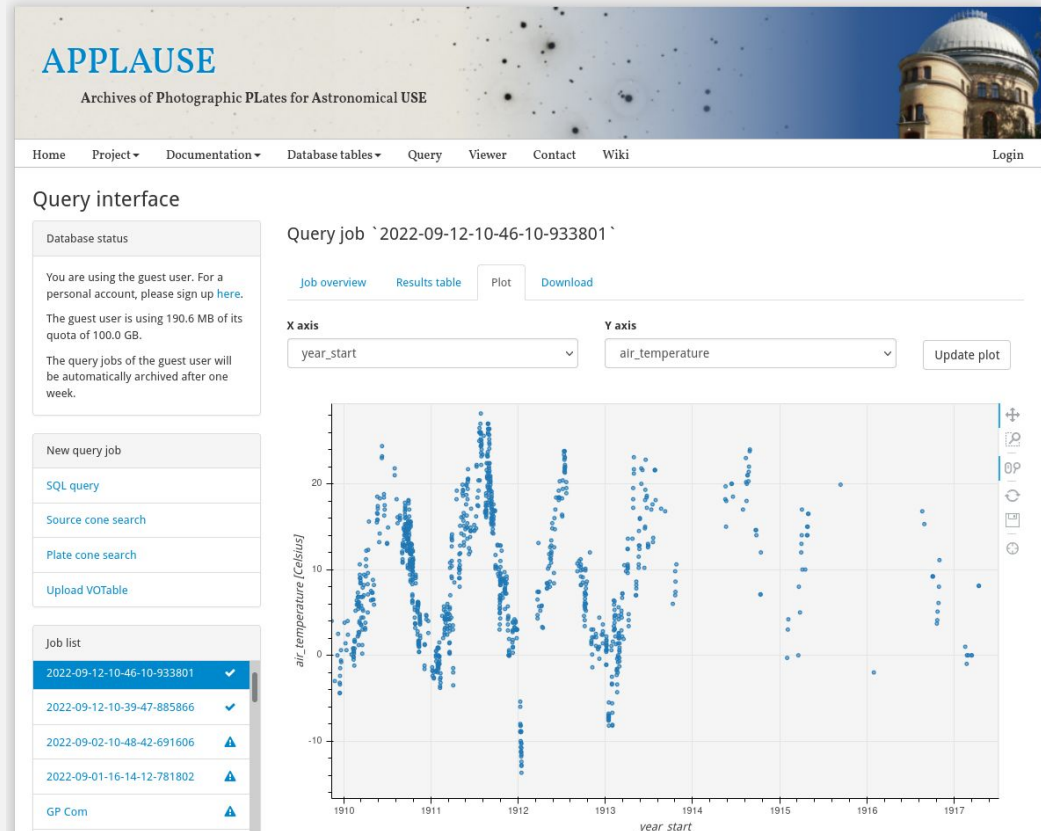
First Previous Next Last Reset

plate_id	ut_start	year_start	air_temperature
19935	1909-11-11T18:04:09	1909.86243089	4
19936	1909-11-25T00:23:30	1909.8987442	-3
19939	1909-12-05T22:25:38	1909.92863646	0
19941	1909-12-08T18:20:17	1909.93638353	2.5
19943	1909-12-15T17:11:00	1909.95541676	-3.2
19944	1909-12-15T23:09:42	1909.95609875	-4.4
19945	1909-12-16T00:01:59	1909.95619816	-4.4
19946	1909-12-16T19:09:08	1909.95837922	-2.4
19947	1909-12-16T21:43:57	1909.95867357	-3.4
19948	1909-12-17T17:05:00	1909.96088106	-1.5

Page 1 of 350 (3497 rows total)

# Daiquiri features: interactive query interface

- Supports ADQL and PostgreSQL
- Asynchronous database queries, up-to several hours
- Lists the query results
- Simple data visualization



The screenshot displays the APPLAUSE web interface. At the top, the logo 'APPLAUSE' is shown with the tagline 'Archives of Photographic PLates for Astronomical USE'. A navigation menu includes 'Home', 'Project', 'Documentation', 'Database tables', 'Query', 'Viewer', 'Contact', and 'Wiki'. A 'Login' link is located in the top right corner.

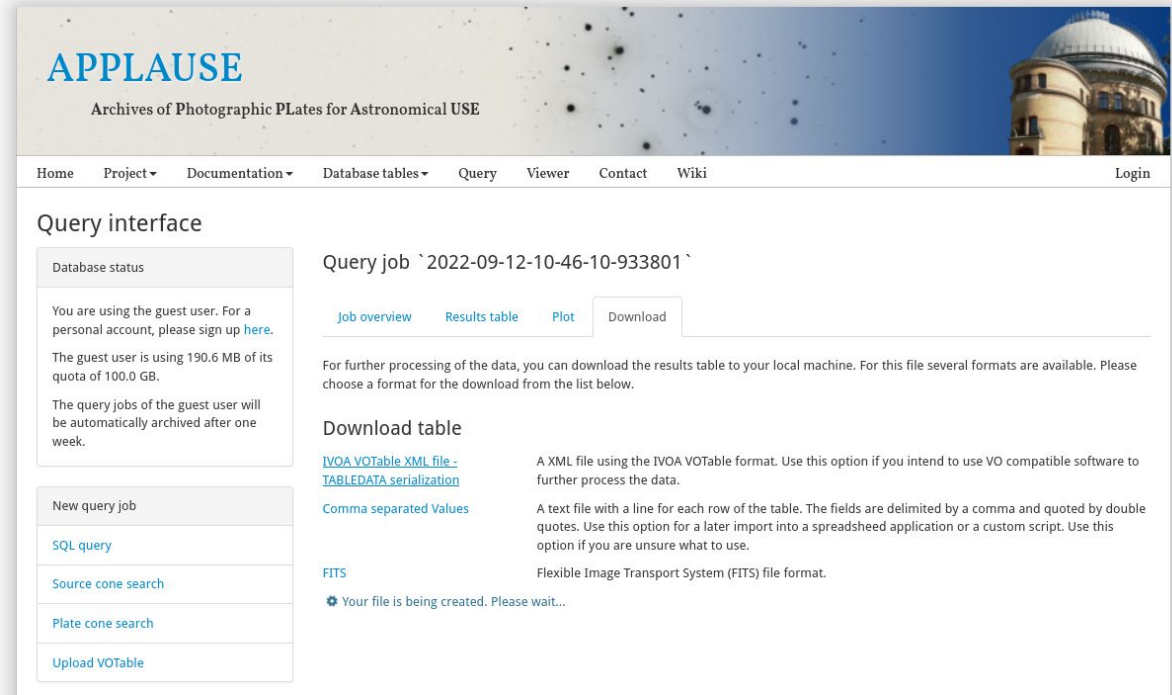
The main content area is titled 'Query interface'. On the left, there is a 'Database status' section with a message: 'You are using the guest user. For a personal account, please sign up here. The guest user is using 190.6 MB of its quota of 100.0 GB. The query jobs of the guest user will be automatically archived after one week.' Below this is a 'New query job' section with links for 'SQL query', 'Source cone search', 'Plate cone search', and 'Upload VOTable'. At the bottom left is a 'Job list' table:

Job list
2022-09-12-10-46-10-933801 ✓
2022-09-12-10-39-47-885866 ✓
2022-09-02-10-48-42-691606 ▲
2022-09-01-16-14-12-781802 ▲
GP Com ▲

The main part of the interface shows a 'Query job `2022-09-12-10-46-10-933801`' with tabs for 'Job overview', 'Results table', 'Plot', and 'Download'. The 'Plot' tab is active, displaying a scatter plot of 'air\_temperature [celsius]' on the Y-axis (ranging from -10 to 20) against 'year\_start' on the X-axis (ranging from 1910 to 1917). The plot shows a clear seasonal cycle with temperature peaks around 20°C and troughs around -10°C. A vertical toolbar on the right side of the plot includes icons for zooming, panning, and other interactive functions.

# Daiquiri features: interactive query interface

- Supports ADQL and PostgreSQL
- Asynchronous database queries, up-to several hours
- Lists the query results
- Simple data visualization
- Download of the data in various formats, e.g., FITS, CSV



The screenshot displays the APPLAUSE web interface. At the top, the header reads "APPLAUSE Archives of Photographic PLates for Astronomical USE" with a background image of a starry sky and a building dome. A navigation menu includes "Home", "Project", "Documentation", "Database tables", "Query", "Viewer", "Contact", "Wiki", and "Login". The main content area is titled "Query interface" and shows a "Query job `2022-09-12-10-46-10-933801`". On the left, a "Database status" box informs the user they are using a guest user with a 100.0 GB quota. Below it, a "New query job" section offers links for "SQL query", "Source cone search", "Plate cone search", and "Upload VOTable". On the right, tabs for "Job overview", "Results table", "Plot", and "Download" are visible. The "Download" tab is active, showing options for "IVOA VOTable XML file - TABLEDATA serialization" and "Comma separated Values". Descriptions for each format are provided, and a status message at the bottom indicates "Your file is being created. Please wait..."

## More Daiquiri features

- Rich metadata management, e.g., including DOI, UCD, etc.  
*Daiquiri provides scripts for management of very large metadata sets*
- User management system supporting custom permissions for individual data collections
- Easy to implement custom services (e.g., spectral-viewer for GAIA DR3 or object-viewer for APPLAUSE)

## New additions to the Daiquiri features

- IVOA Datalink
- Better data visualization of the query results
- Spectral Viewer (only for GAIA DR3)



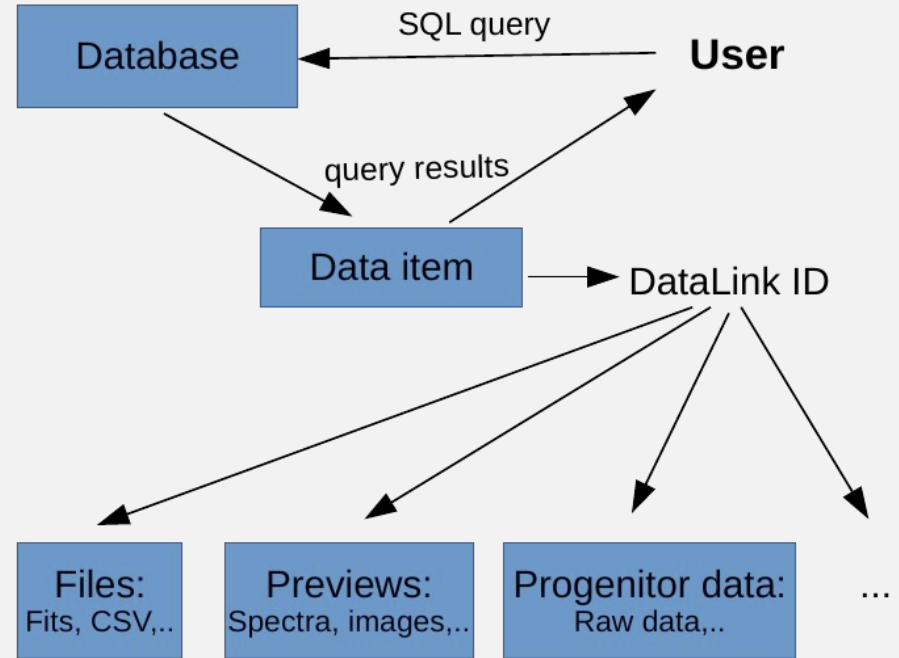
In short, the DataLink protocol allows to get more information on resources belonging to a discovered data item

The resources might include

- various files available for download
- progenitor data sets
- alternate representations, previews
- and others...

DataLink protocol is implemented into Daiquiri according to the IVOA Recommendations

- only the pre-constructed DataLink tables are required



# Overhauled visualization of the query results

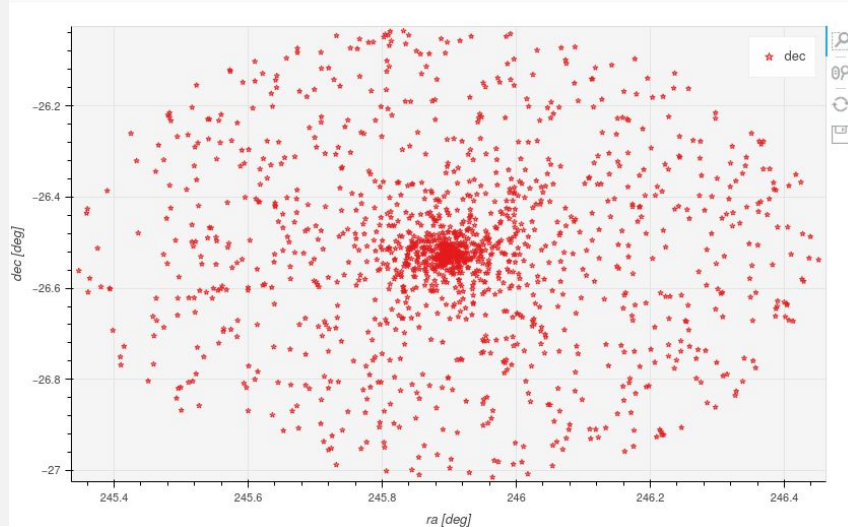
Previously:

- Daiquiri provided only a simple scatter plot



New implementation (currently in development):

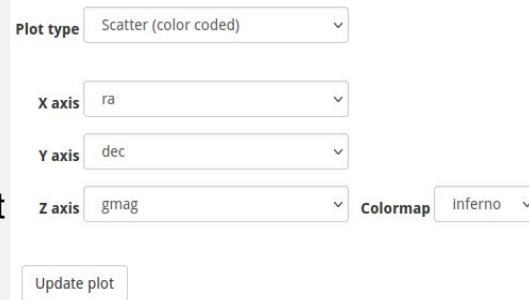
- New plot-types
- Improved customization



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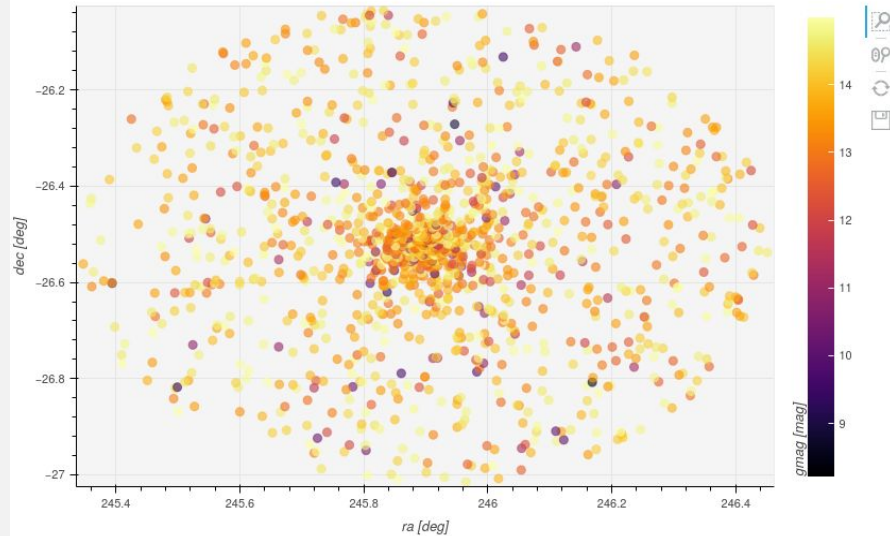
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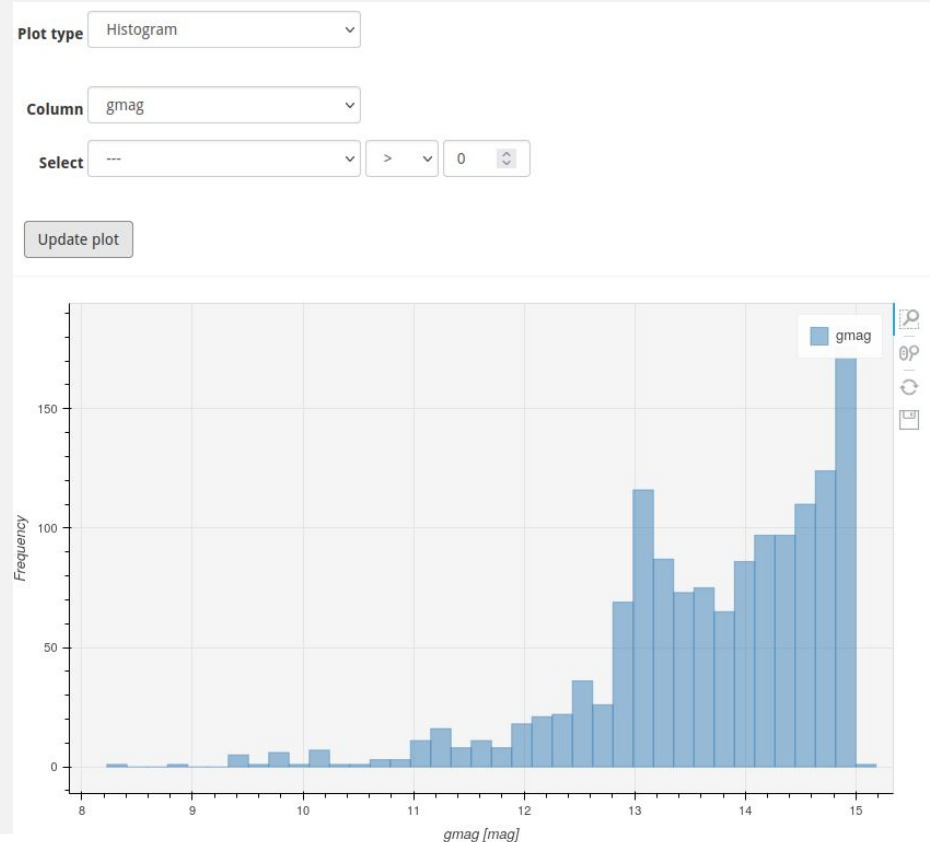
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# Spectral-Viewer for Gaia DR3 (RVS Mean Spectrum)



- Preview of the RVS Mean Spectra in the web interface
- First attempt of the interactive spectral viewer in Daiquiri
- Solid foundation for the upcoming spectral data releases, e.g, 4MOST



- **Daiquiri is a powerful web framework for publication of scientific data**
  - Supports a large number of protocols
  - Easy to deploy
- **Large number of data collections of various types are already published using the Daiquiri framework and hosted at AIP**
  - Data collections include simulation data (CosmoSim), astrometrical data (Gaia), scans of photographic plates (APPLAUSE) and others...
- **Daiquiri framework is continuously improved:**
  - more features in the future!
  - e.g., customizable DataLink Viewer