Leibniz-Institut für
Astrophysik Potsdam

Daiquiri - Python based framework for the publication of astrophysical data

A. Galkin, K. Makan, W. A. Ahmed, DRI group at AIP / Astro-CC European Data Provider Forum, Heidelberg, Germany / March 2026

Outline

- Data services at AIP
- Daiquiri features in our archives
- Dockerized setup for a Daiquiri instance

Data services at AIP

AIP has developed significant expertise in long-term operation and the curation of astronomical data archives.

- AIP is one of the partner data centers for the ESA Gaia mission - gaia.aip.de
- The range of data is huge: from digitized photographic plates (APPLAUSE) to spectroscopic and photometric data (STELLA, RAVE, 4MOST, MUSE-Wide, CARS), solar data (GREGOR, CoSee-Cat), X-ray satellite data (XMMSSC) to pure simulation data (CosmoSim).
- This diversity is made possible by Daiquiri, a web-based platform developed at the institute. It supports standardized protocols from the International Virtual Observatory Alliance (IVOA) for data access and is available as open-source under the Apache2 license.

Data publications at AIP:
data.aip.de

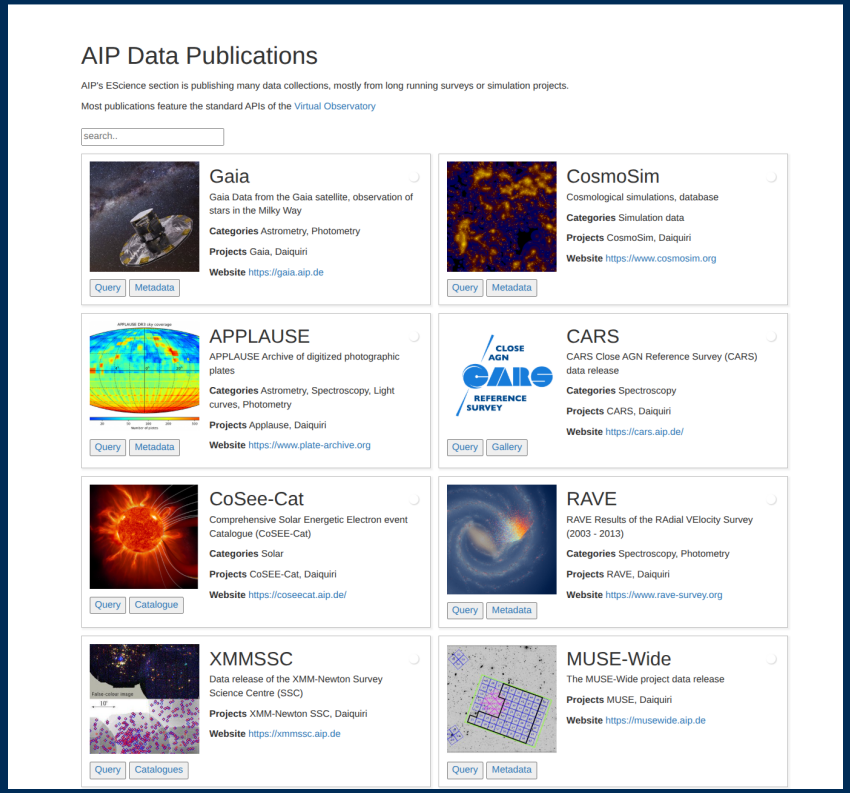
Daiquiri software stack:
github.com/django-daiquiri

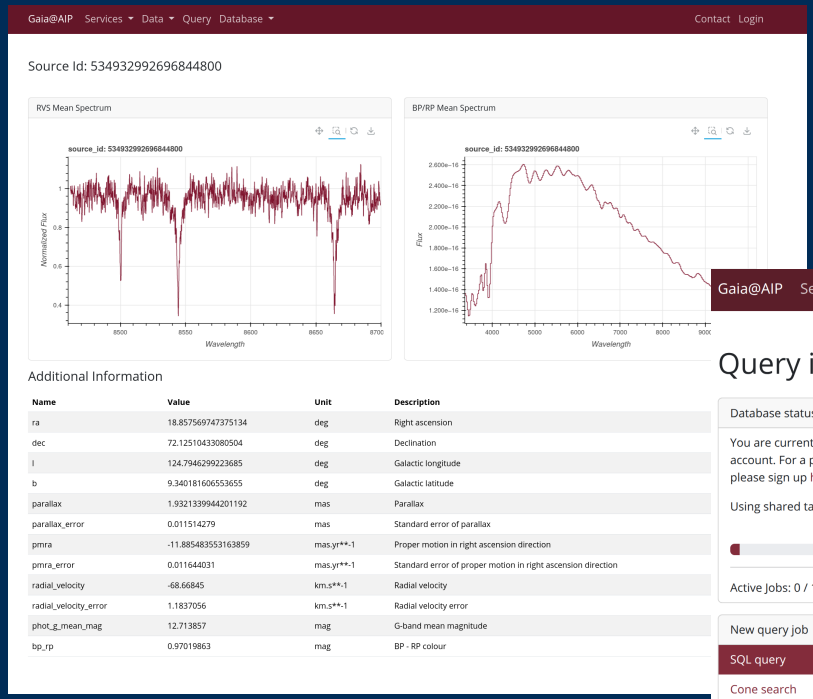
Data services at AIP

publications projects data imprint

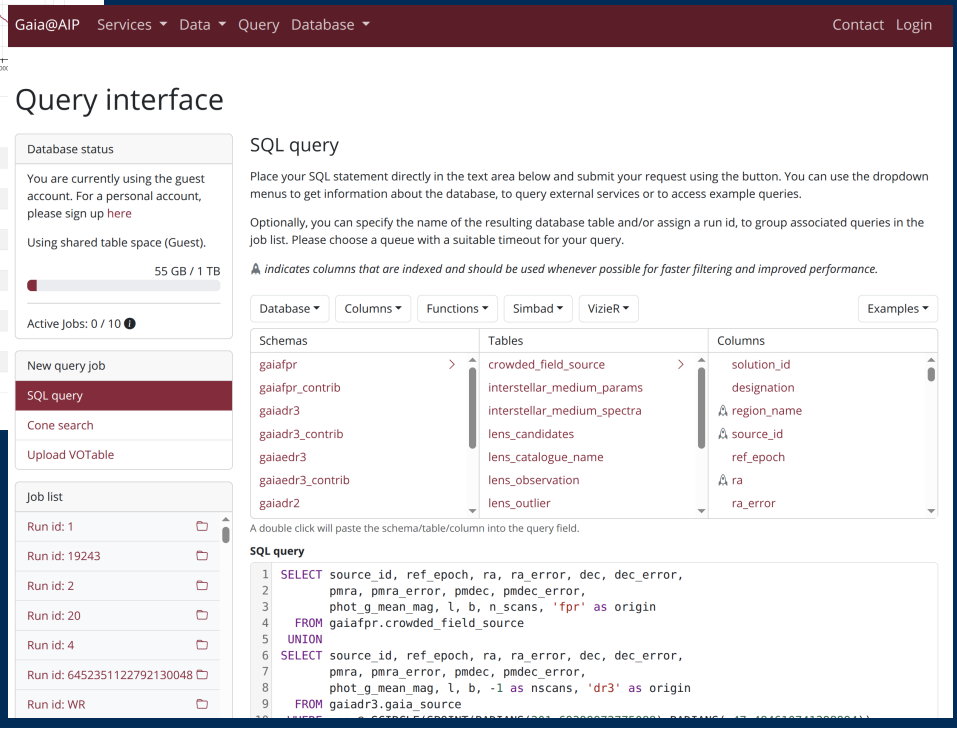
While most of the AIP archives are published with the Daiquiri framework, there are also several smaller, dedicated projects.

data.aip.de

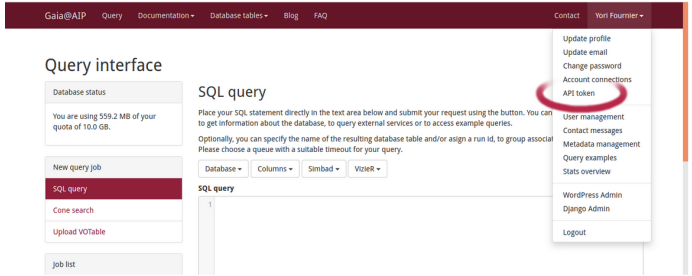




The Gaia mission published the positions and and motions of stars in our galaxy. The query interface is the core functionality of Daiquiri that allows users to query the tabular data in an SQL database.
However, each archive has specific features that are tailored to it. Here the spectra viewer for Gaia@AIP.



gaia.aip.de



You will see a long alphanumerical word. Just copy it where ever you see `<your-token>` ; in the following examples.

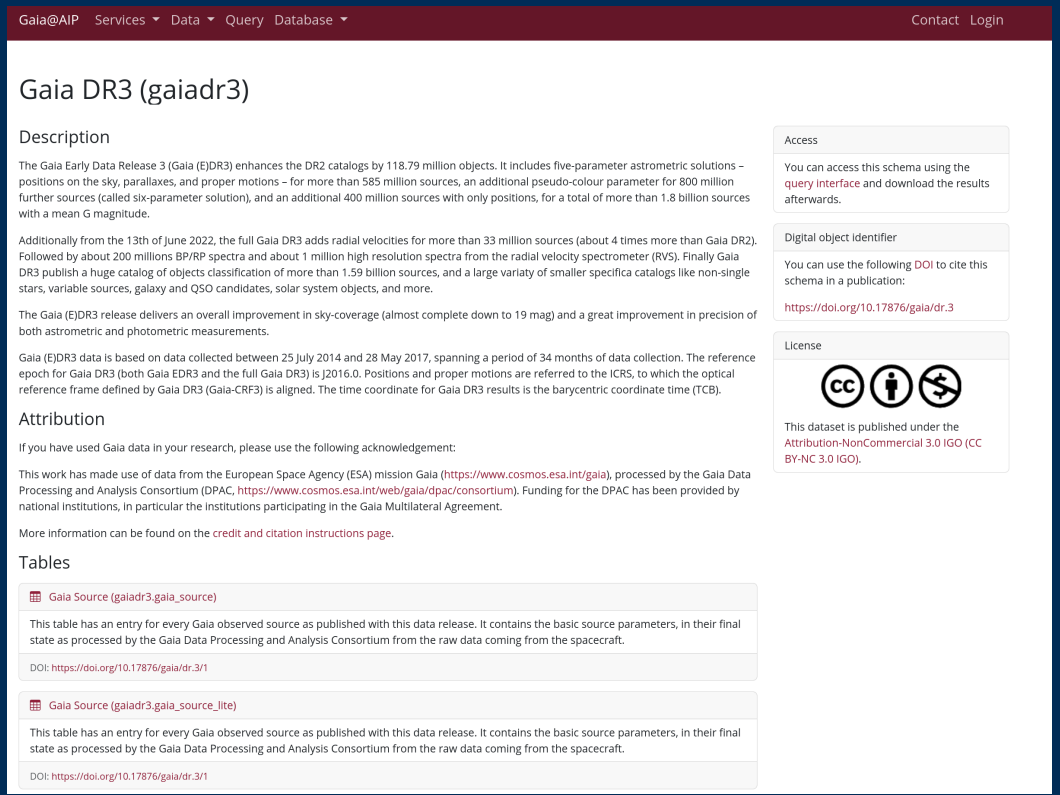
The `API Token` identifies you and provides access to the results tables of your queries.

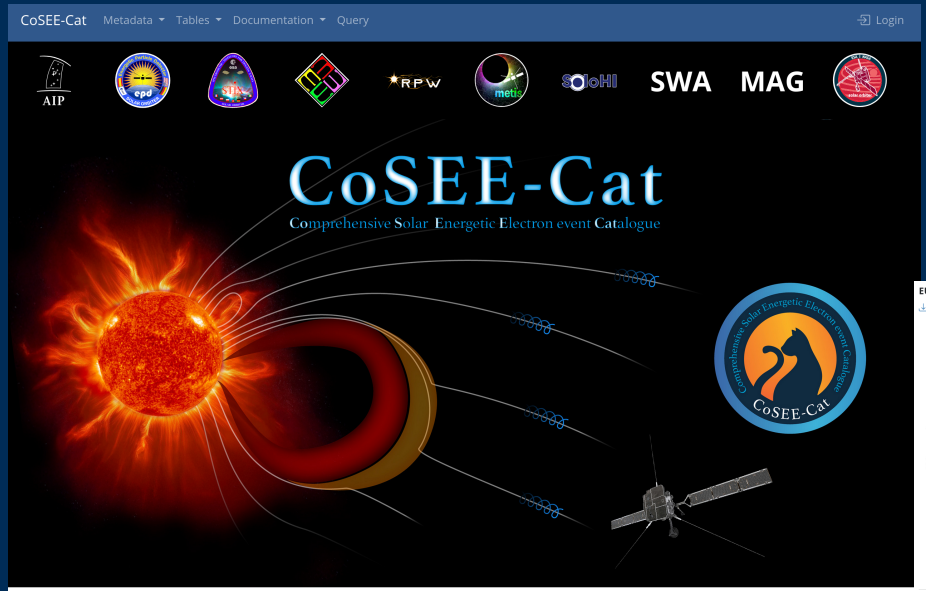
The connection to the TAP service can be done that way:

```
import requests
import pyvo

#
# Setup tap_service connection
#
service_name = "Gaia@AIP"
url = "https://gaia.aip.de/tap"
token = 'Token <your-token>'

print('TAP service %s \n' % (service_name,))

# Setup authorization
tap_session = requests.Session()
tap_session.headers['Authorization'] = token

tap_service = pyvo.dal.TAPService(url, session=tap_session)
```

gaia.aip.de

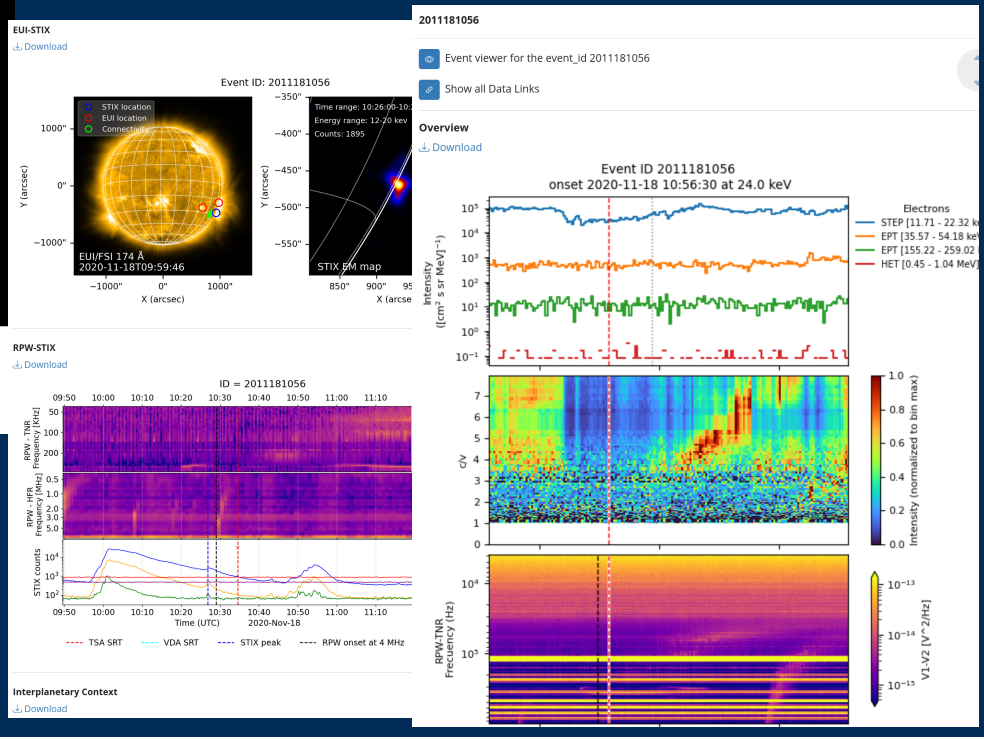
The TAP protocol is a central part of every Daiquiri archive to allow scripted access to the data, including data which is not public (yet). The data release and each table has a Digital Object identifier (DOI). Daiquiri supports export of metadata for DOI minting (OAI).





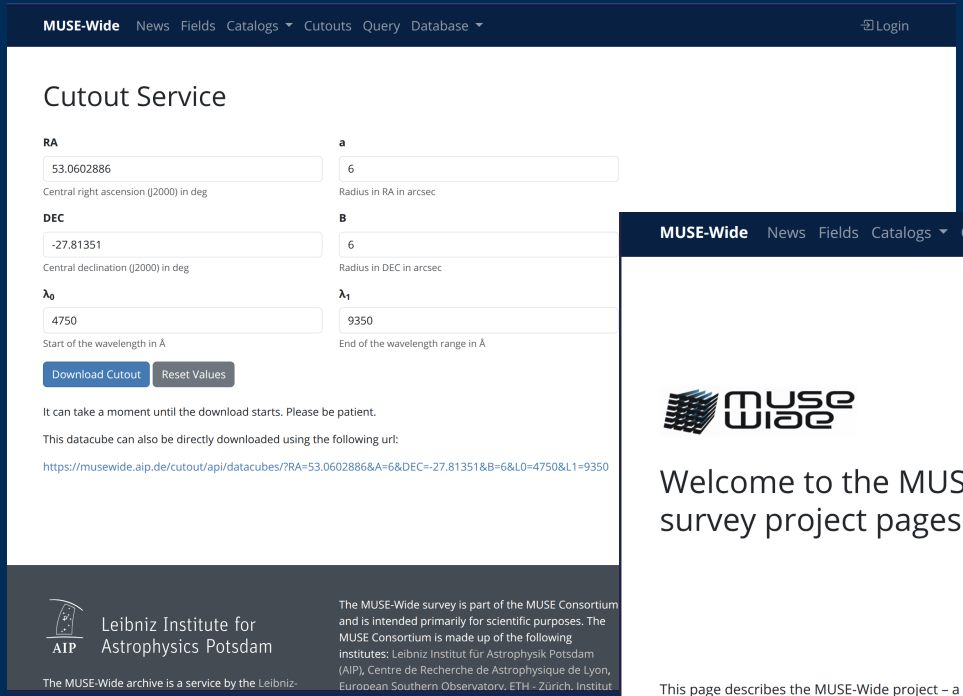
The Comprehensive Solar Energetic Electron event Catalogue (CoSEE-Cat)

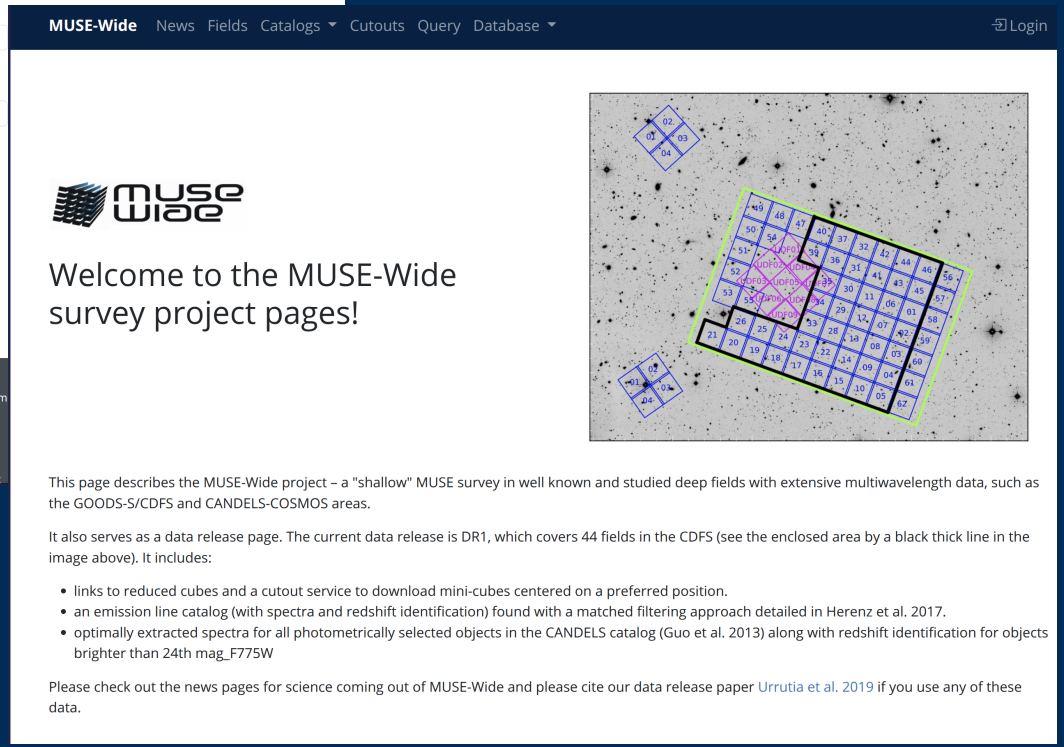
The Comprehensive Solar Energetic Electron event Catalogue (CoSEE-Cat) publishes solar events and associated phenomena by the Solar Orbiter.
CoSEE-CAT archive imlements the Datalink protocol.



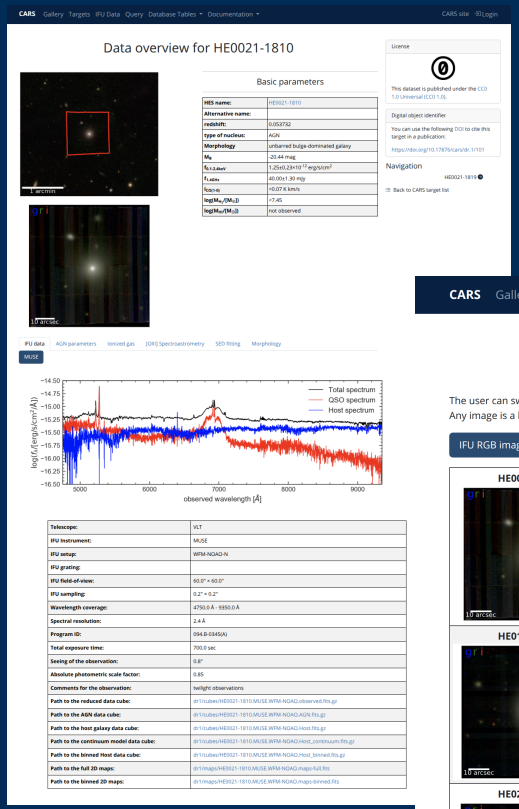
CoSEE-Cat event catalogue

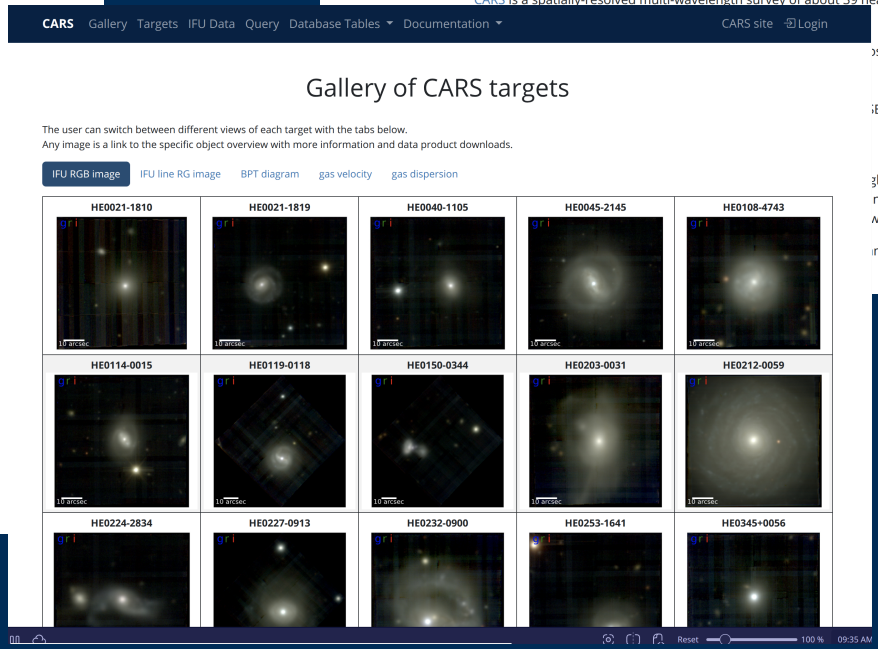
The MUSE-Wide survey published deep fields data cubes, so the archive integrates a cut-out service as a Python script because Astropy is already integrated into the Daiquiri software.

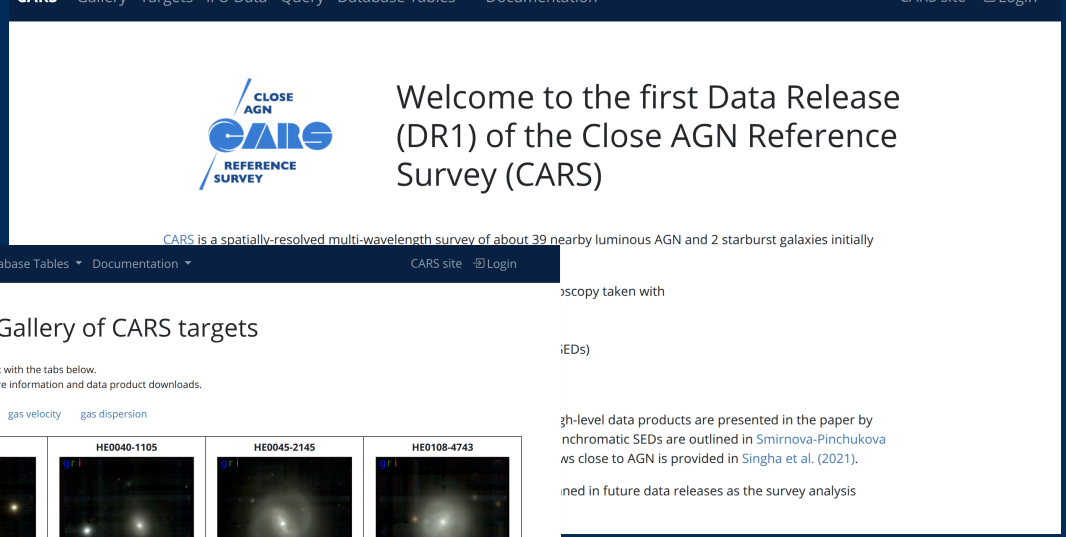




musewide.aip.de

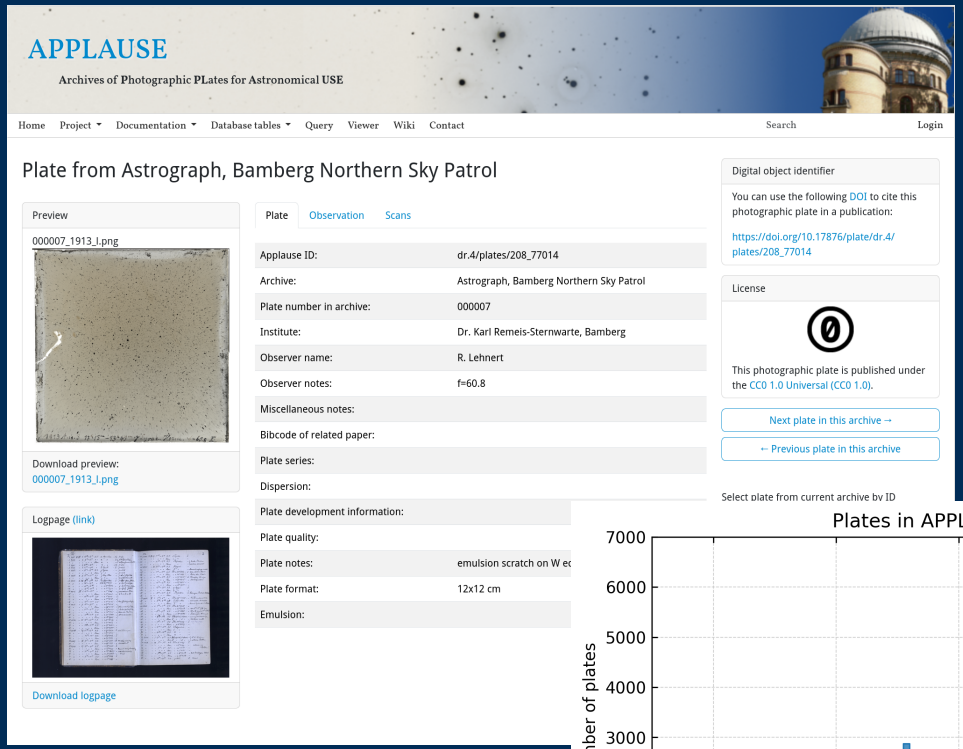


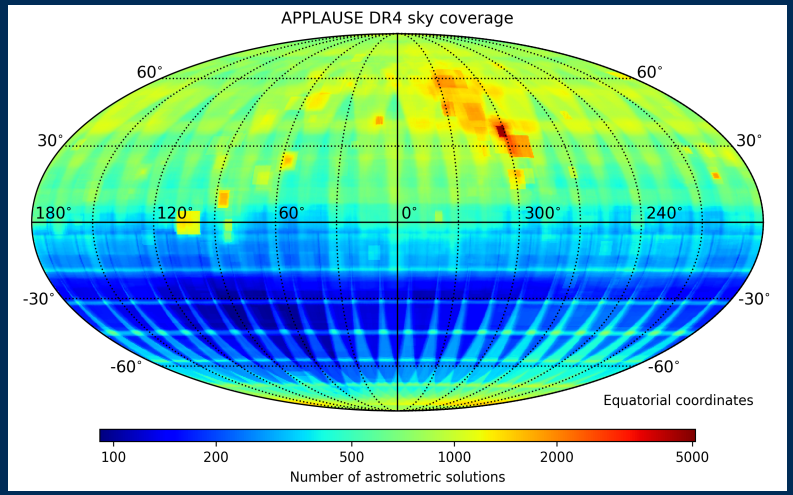


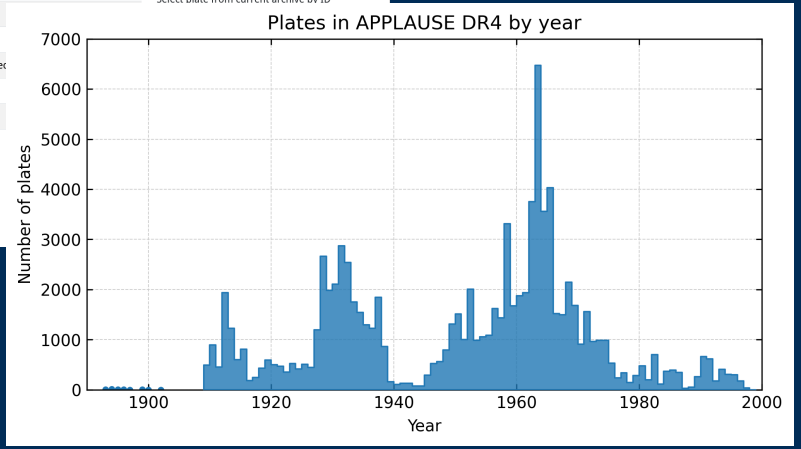


cars.aip.de

Since metadata is handled in a database and Daiquiri is based on Django, specific views can be created for the data. For example, there is an object viewer and a gallery of CARS targets, which is a spatially resolved, multi-spectroscopic survey.

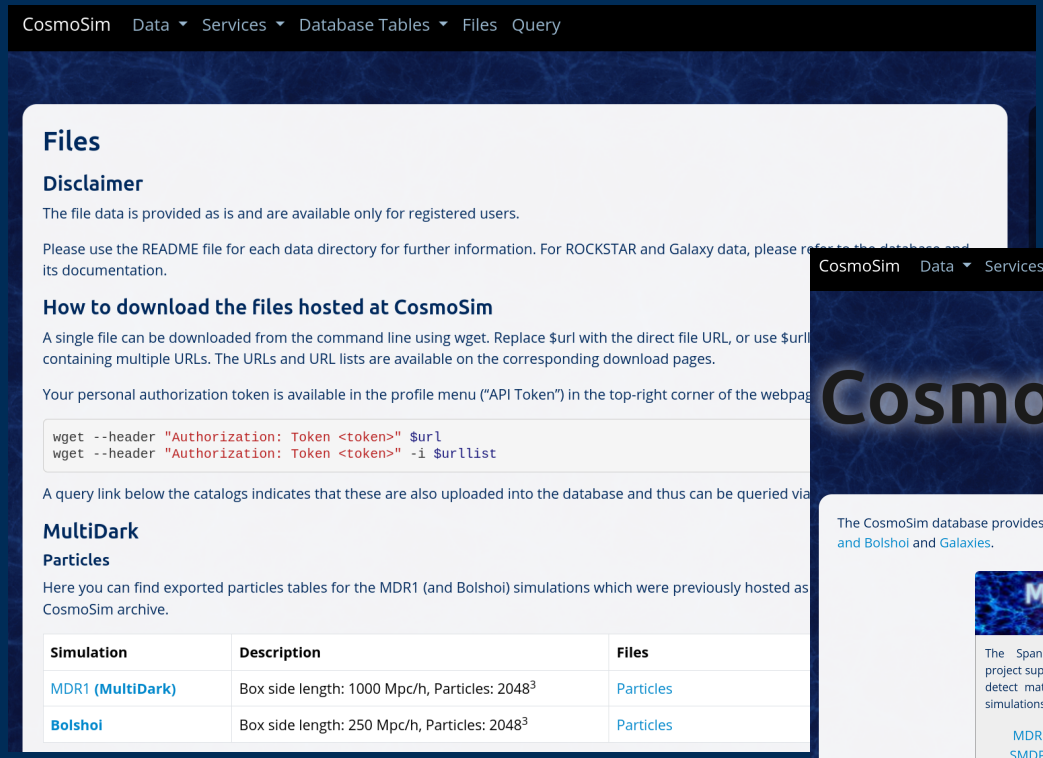




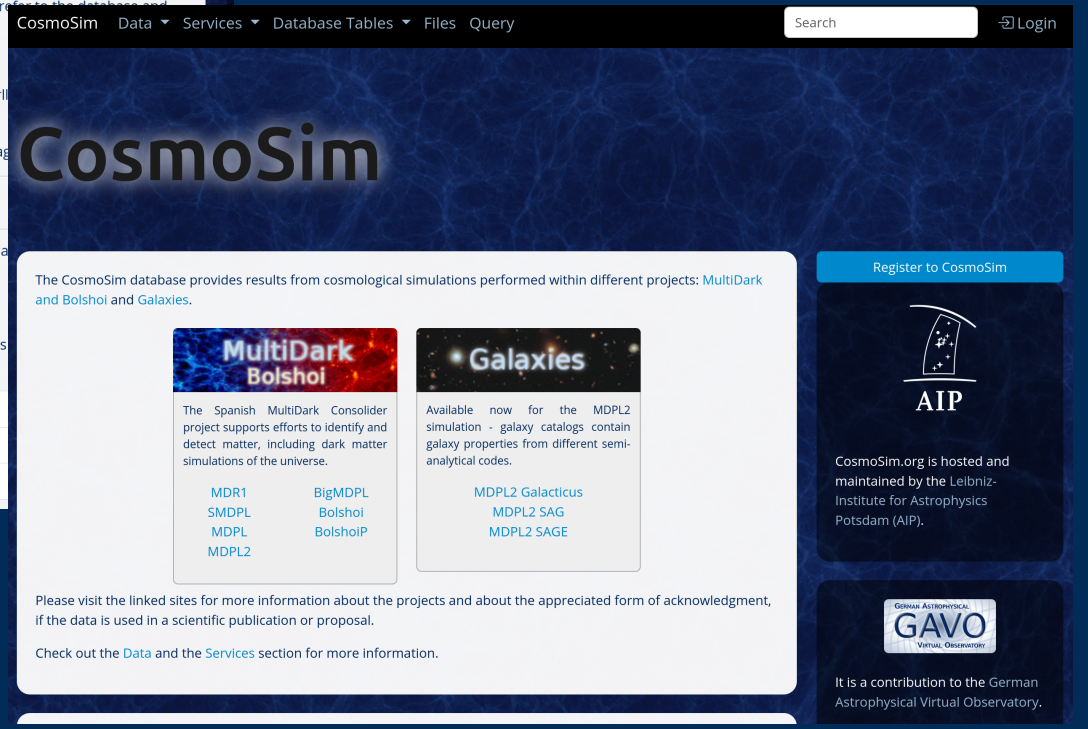


APPLAUSE archive

The APPLAUSE archive publishes digitized historical photographic plates. The archive includes viewers for plates and logbooks, as well as tables of extracted sources and light curves. The project has extensive documentaion which is maintained as Markdown and media files.



The CosmoSim database provides results from cosmological simulations. Alongside the tables, it provides particle files for download.



CosmoSim database

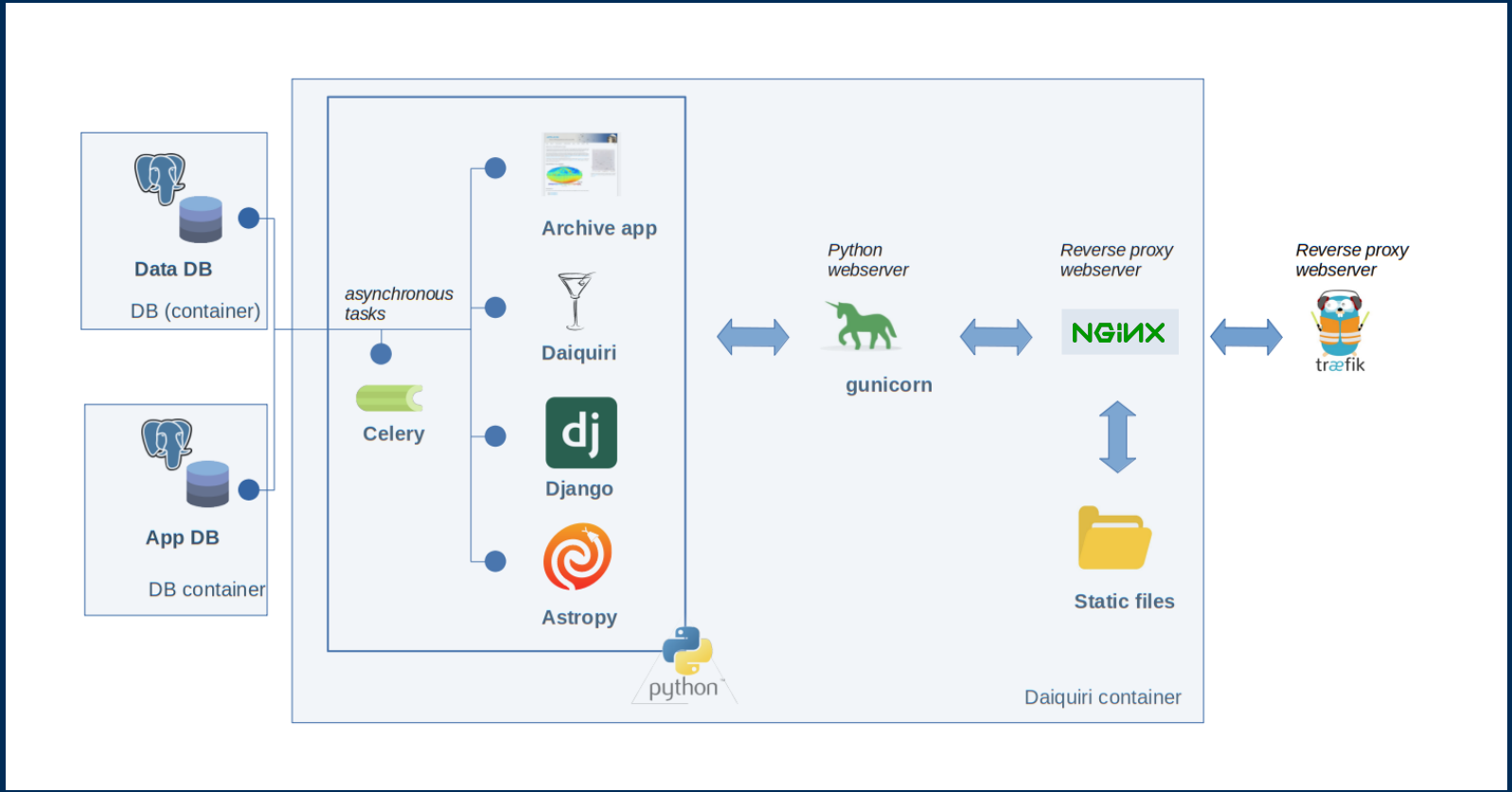
Daiquiri features

For users:

- SQL Query – web interface
- Scripted access and Topcat access via TAP protocol
- User storage and DB space for logged-in users (depending on the data provider's resources)
- File download

For data providers:

- Easy publication of tabular data
- Different data access levels – private, group, internal and public
- Metadata management
- User management
- Support for exporting of metadata in a format suitable for DOI minting (OAI)
- Integration of documentation and customized looks for your project



Dockerized setup for a Daiquiri instance: two database docker containers, Daiquiri docker container and the web proxy

Please join the hands-on session on Daiquiri:
4:00 to 5:30 pm

Questions?

Daiquiri software stack:
github.com/django-daiquiri

Data publications at AIP:
data.aip.de

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