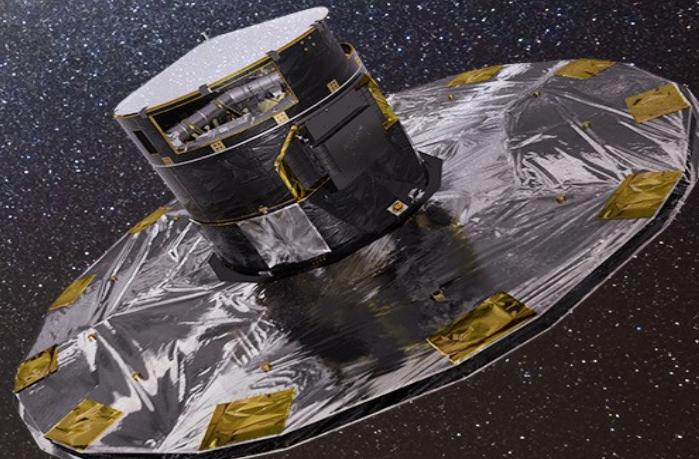




Gaia Data Release 3:

Accessing Gaia DR3 data

Nigel Hambly (on behalf of Nick Rowell)
University of Edinburgh



National Astronomy Meeting

15th July 2024

Data access points



The Gaia Archive at ESA

<https://gea.esac.esa.int/archive/>

Data access points



The Gaia Archive at ESA

<https://gea.esac.esa.int/archive/>

Partner data centres:



CDS

<http://cdsweb.u-strasbg.fr/gaia>



Space Science Data Center

<http://gaiaportal.asdc.asi.it>



ARI (Heidelberg)

<https://gaia.ari.uni-heidelberg.de>



AIP (Potsdam)

<https://gaia.aip.de>



Flatiron

<https://flathub.flatironinstitute.org/gaiadr3>



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The Gaia Archive at ESA

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HOME SEARCH SINGLE OBJECT VISUALISATION HELP

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 **Partners**
Partner data centres also serving Gaia data.

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	13-May-2022 15:44	-
	13-May-2022 13:09	-
	09-May-2022 08:15	-
	09-May-2022 08:33	-
	07-Feb-2023 11:12	-
	09-May-2022 08:20	-
	13-May-2022 13:09	-
	09-May-2022 08:29	-
	13-May-2022 13:08	-
	09-May-2022 08:30	-
	09-May-2022 08:36	-
	07-Feb-2023 11:18	-
	09-May-2022 10:48	-
	07-Feb-2023 12:11	2293
	09-May-2022 14:59	160
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07-Feb-2023 11:12
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13-May-2022 13:09
09-May-2022 08:29
13-May-2022 13:08
09-May-2022 08:30

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13-May-2022 15:44 -
13-May-2022 13:09 -

 Download

Spectroscopy:

21G	rvs_mean_spectrum
3.7T	xp_continuous_mean_spectrum
115G	xp_sampled_mean_spectrum
9.8G	xp_summary

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The Gaia Archive at ESA

The screenshot shows the 'gaia archive help' page. At the top, there's a navigation bar with links for 'HOME', 'SEARCH', 'SINGLE OBJECT', 'VISUALISATION', and 'HELP'. The 'HELP' link is highlighted with a yellow box. The main content area is titled 'gaia archive help' and contains three columns: 'Getting Data', 'Documentation', and 'Questions'. The 'Getting Data' column includes sections for 'Demos and tutorials' (with a list of 10 items) and 'Data credits and license'. The 'Documentation' column includes sections for 'Gaia Data Release 3', 'Gaia Focused Product Release', 'Gaia Early Data Release 3', 'Gaia Data Release 2', and 'Gaia Data Release 1'. The 'Questions' column includes sections for 'Additional Resources', 'Report a data issue', 'FAQ', and 'Gaia Helpdesk'. The bottom of the page features logos for 'THE UNIVERSITY OF EDINBURGH' and 'Gaia DPAC'.

gaia archive

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HOME SEARCH SINGLE OBJECT VISUALISATION HELP

gaia archive help

esa

esa

≡

Getting Data

Demos and tutorials

- How to extract data
- How to extract data programmatically
- How to collaborate / user account
- How to combine with other data
- How to extract DataLink products
- How to visualise the data
- Writing queries
- Use cases

Data credits and license

Archive release notes

To the data

Documentation

Gaia Data Release 3

- Overview
- Online documentation & PDF version
- Data model
- Papers
- Software tools (GaiaXPy, etc.)
- Auxiliary data (passbands, etc.)
- Known issues

Gaia Focused Product Release

- Overview
- Online documentation & PDF version
- Papers
- Known issues

Gaia Early Data Release 3

Gaia Data Release 2

Gaia Data Release 1

Questions

Additional Resources

Report a data issue

FAQ

Gaia Helpdesk

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The Gaia Archive at ESA



The screenshot shows the homepage of the Gaia Archive at ESA. At the top right, there is a 'SIGN IN' button with a bell icon. A large orange box highlights this area. Below the header, there is a section titled 'Welcome to the Gaia ESA Archive' with a brief description of the mission. The main content area is titled 'Top Features' and includes five sections: 'Gaia Mission', 'Gaia DR3', 'Gaia FPR', 'Software Tools', and 'Auxiliary Data'. Each section has a small icon and a brief description. At the bottom, there is a note about contacting the Gaia Helpdesk and links for cookie policy and version information.

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User account offers:

- Save queries & results
- Create/share user tables
- VO Space



Single object search

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gaia archive

HOME SEARCH **SINGLE OBJECT** VISUALISATION HELP

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Single object search

European Space Agency  About ESAC  SIGN IN 

gaia archive

HOME SEARCH SINGLE OBJECT **VISUALISATION** HELP

Target/Coordinates
Gaia DR3 4111834567779557376 

?

Gaia DR3 4111834567779557376

Astrometry Photometry Spectroscopy Astrophysical parameters

Description	Value	Unit
Equatorial ICRS (RA,DEC) at epoch 2016	256.5229102004, -26.5805651308	deg
Galactic (l, b) at epoch 2016	357.0803450631, 8.5731964881	deg
Parallax	1.1538 ± 0.0241	mas
RA proper motion	0.3896 ± 0.0256	mas yr ⁻¹
DEC proper motion	-0.2893 ± 0.0165	mas yr ⁻¹
Renormalised unit weight error	0.837	

Epoch Photometry  Expand

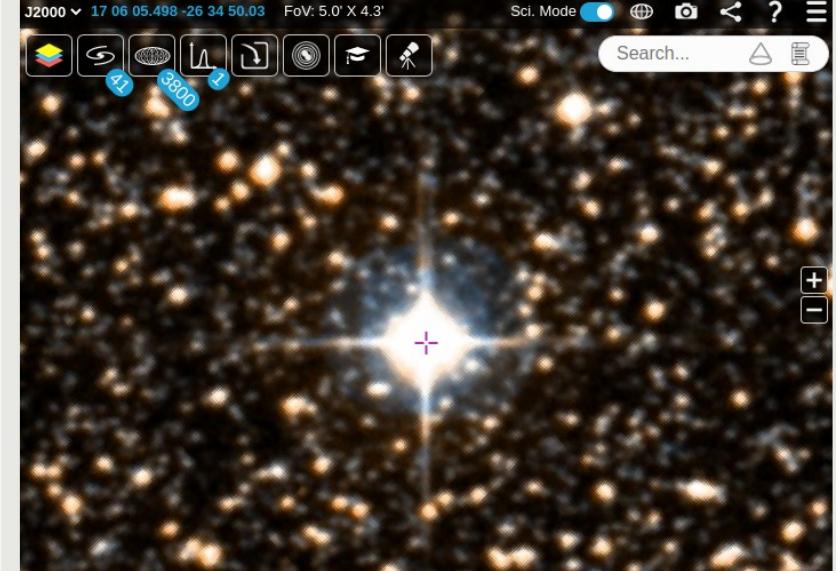
Gaia DR3 4111834567779557376

Magnitude

● G Mag
● BP Mag
● RP Mag

ESASky

J2000 17 06 05.498 -26 34 50.03 FoV: 5.0' X 4.3' Sci. Mode   



Single object search

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gaia archive

HOME SEARCH SINGLE OBJECT **VISUALISATION** HELP

Target/Coordinates
Gaia DR3 4111834567779557376 

?

Gaia DR3 4111834567779557376

Astrometry Photometry Spectroscopy **Astrophysical parameters**

Description	Value	Unit
T _{eff}	5934 [5874, 6013]	K
log(g)	1.769 [1.736, 1.811]	log(cm s ⁻²)
[M/H]	-0.511 [-0.581, -0.426]	dex
A _G	0.8745 [0.8282, 0.9123]	mag
E(BP-RP)	0.4736 [0.4482, 0.4934]	mag
d(GSP-Phot)	1024 [984, 1053]	pc

Epoch Photometry  Expand

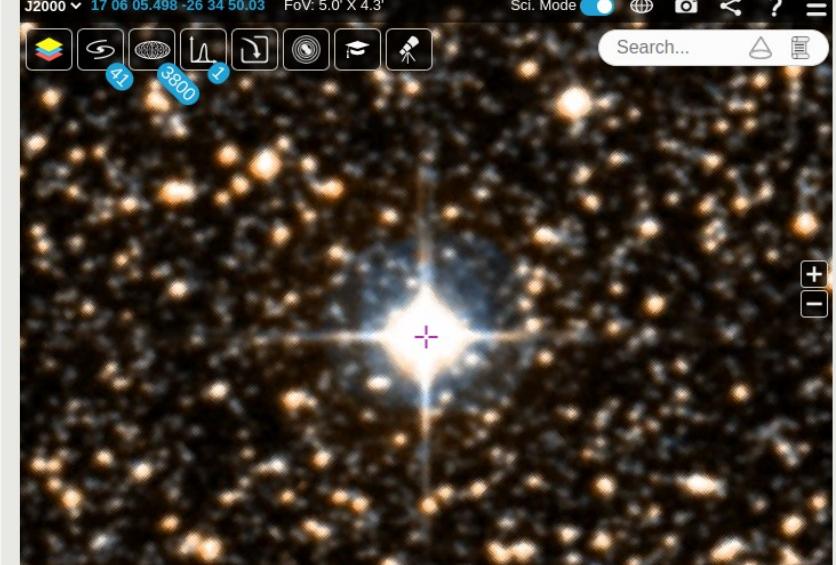
Gaia DR3 4111834567779557376

Magnitude

● G Mag
● BP Mag
● RP Mag

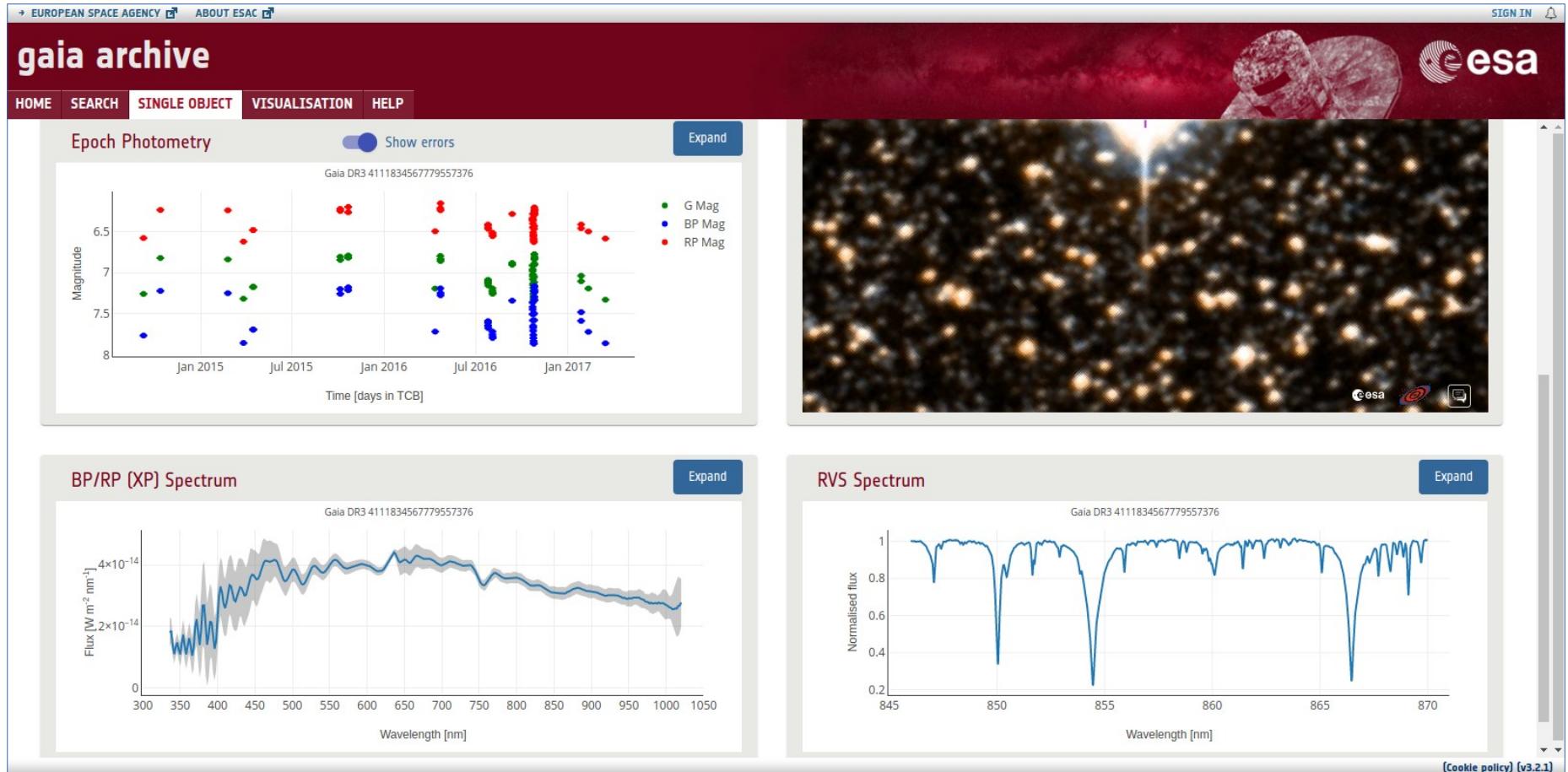
ESASky

J2000 v 17 06 05.498 -26 34 50.03 FoV: 5.0' X 4.3'   

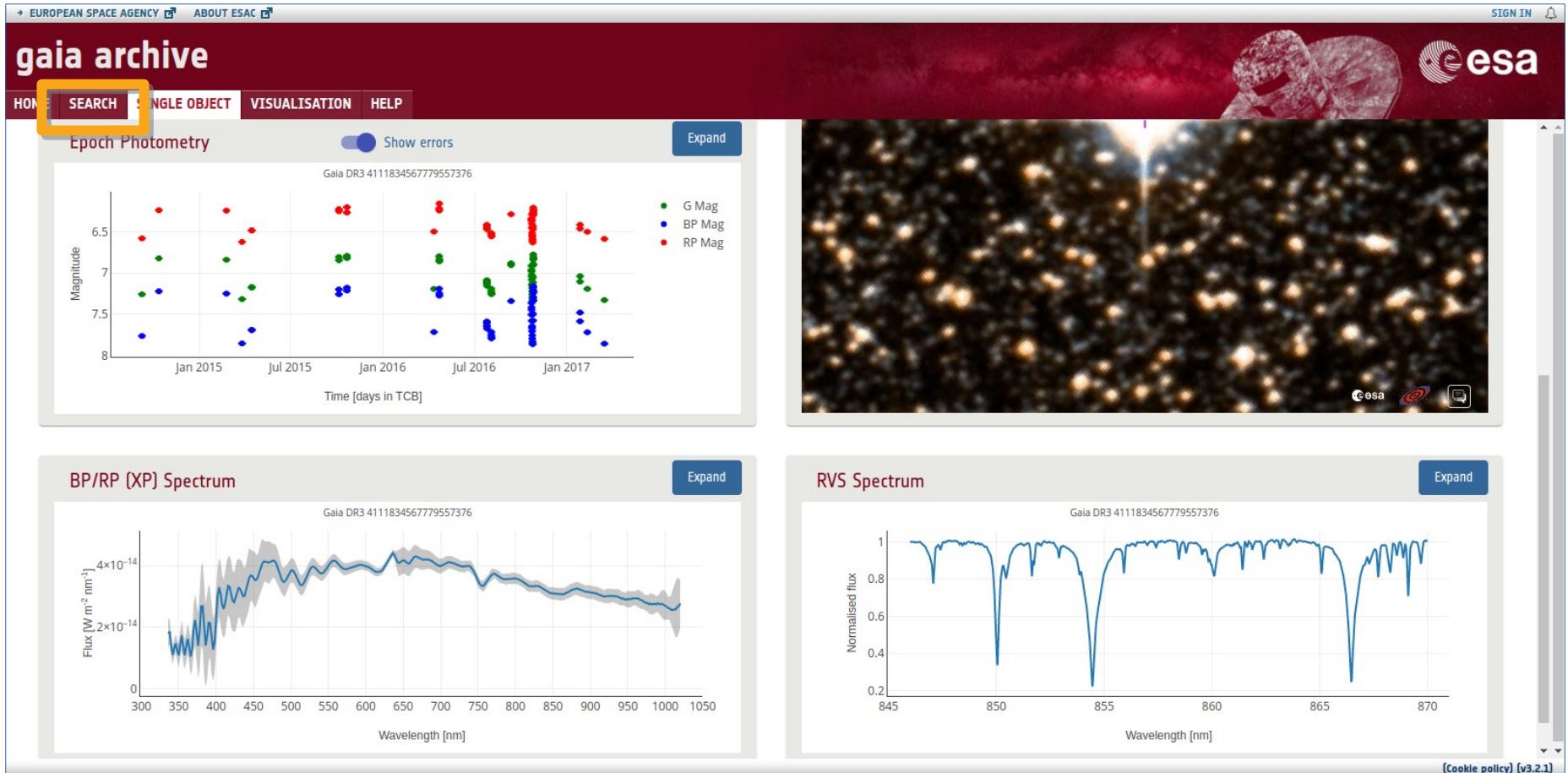


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Single object search



Single object search



Basic search

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gaia archive

HOME SEARCH SINGLE OBJECT VISUALISATION HELP

Basic Advanced (ADQL) Query Results

Position File

Name Equatorial

Target in Circle Box

Name Radius arc sec 

Search in: 

▶ Extra conditions

▶ Display columns

 Reset Form  Show Query  Submit Query

Output is limited to 2,000 sources

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Basic search

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HOME SEARCH SINGLE OBJECT VISUALISATION HELP

Basic Advanced (ADQL) Query Results

Position File

Name Equatorial

Target in Circle Box

Name GW Vir resolved by Sesame Strasbourg (Simbad-NED-VizieR)

Radius arc sec

Search in:

▶ Extra conditions

▶ Display columns

 Reset Form  Show Query  Submit Query

Output is limited to 2,000 sources

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Basic search

The screenshot shows the Gaia archive search interface. At the top, there is a navigation bar with links to the European Space Agency, About ESAC, Sign In, and a bell icon. The main header says "gaia archive". Below the header is a menu bar with links to HOME, SEARCH, SINGLE OBJECT, VISUALISATION, and HELP. The "SEARCH" link is highlighted.

The search form has tabs for "Basic", "Advanced (ADQL)", and "Query Results", with "Basic" selected. It includes fields for "Position" (radio buttons for "Name" and "Equatorial") and "File" (radio buttons for "Target in Circle" and "Box"). The "Name" field contains "GW Vir", which is resolved by Sesame Strasbourg (Simbad-NED-VizieR). A "Radius" field set to "5 arc sec" is also present.

The "Search in:" dropdown is set to "gaiadr3.gaia_source". A dropdown menu lists several options under "gaiadr3.gaia_source": "gaiadr3.gaia_source", "gaiadr3.gaia_source_lite", "gaiadr3.nss_two_body_orbit", "gaiadr3.nss_acceleration_astro", "gaiadr3.nss_vim_fi", "gaiadr3.gaia_source", "gaiadr3.gaia_source_simulation", and "gaiadr3.gaia_source_simulation".

Below the search form are buttons for "Reset Form" and "Show". A note says "Output is limited to 1000 rows".

At the bottom right of the search interface, there is a link to "(Cookie policy) (v3.2.1)".



Basic search

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HOME SEARCH SINGLE OBJECT VISUALISATION HELP

Basic Advanced (ADQL) Query Results

Position File

Name Equatorial

Target in Circle Box

Name GW Vir resolved by Sesame Strasbourg (Simbad-NED-VizieR)

Radius arc sec

Search in:

▼ Extra conditions

Filter: If all conditions

parallax_over_error Remove

► Display columns

 Reset Form  Show Query  Submit Query

Output is limited to 2,000 sources

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Basic Advanced (ADQL) Query Results

Position File

Name Equatorial

Target in Circle Box

Name GW Vir resolved by Sesame Strasbourg (Simbad-NED-VizieR)

Radius arc sec

Search in: gaiadr3.gaia_source

▼ Extra conditions

Filter: If all conditions

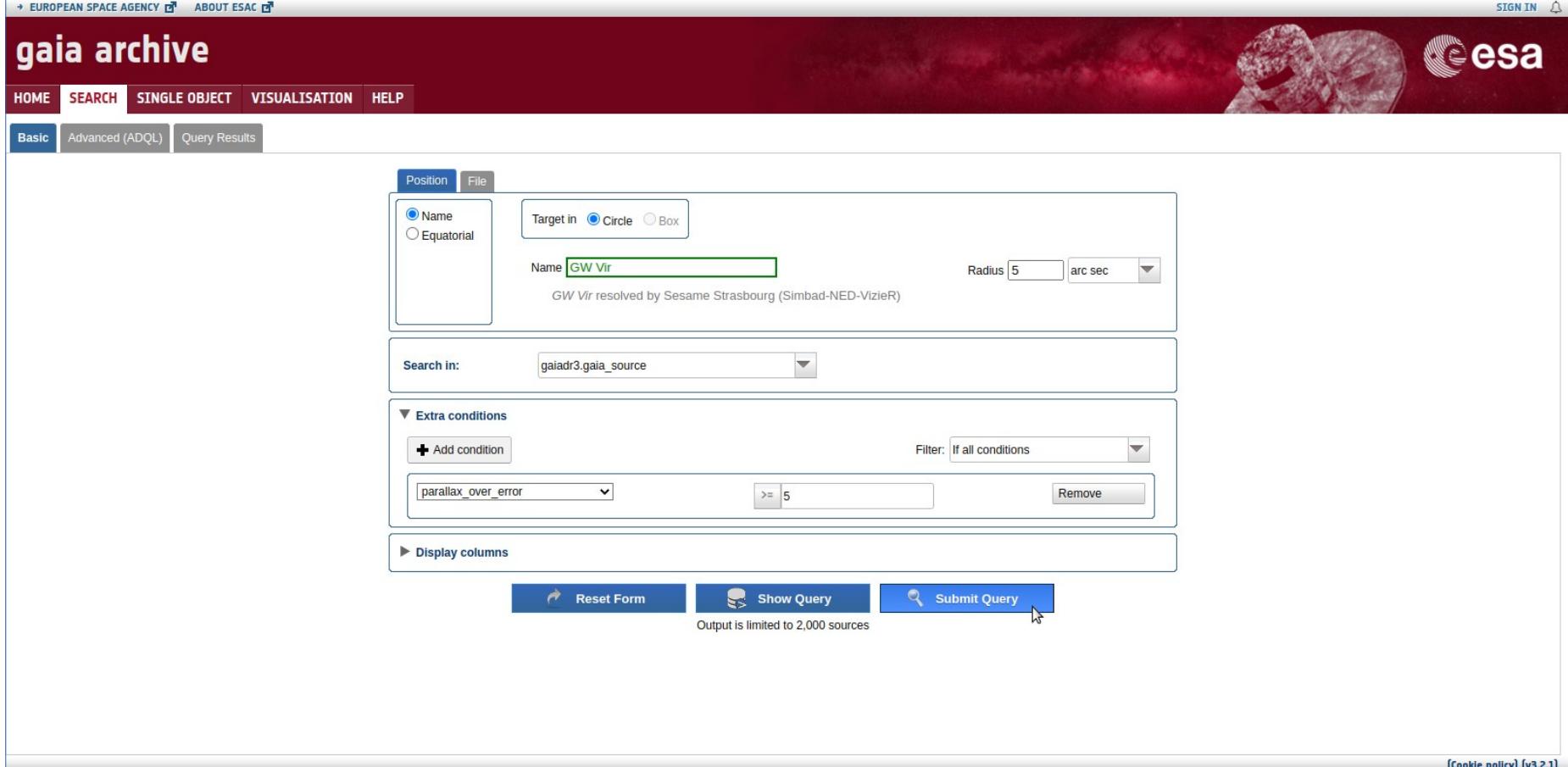
parallax_over_error Remove

► Display columns

 Reset Form  Show Query  Submit Query

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Basic search

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HOME SEARCH SINGLE OBJECT VISUALISATION HELP

Basic Advanced (ADQL) Query Results

No job id 

source_id	ra	dec	parallax	pmra	pmdec	ruwe	phot_g_mean_mag	bp_rp	radial_velocity	phot_variable_flag	non_single_!
	deg	deg	mas	mas.yr**.1	mas.yr**.1		mag	mag	km.s**.1		
3600841623951744640	180.44149038371253	-3.761299993392756	1.690528449644709	-14.49502582661574	-3.2066194007912543	1.1294713	14.693249	-0.59538555	NOT_AVAILABLE	0	

1-1 of 1 Gaia DR3 Data Model Show query in ADQL form VOTable Download results 



Advanced search

The screenshot shows the Gaia Archive search interface. At the top, there is a navigation bar with links to the European Space Agency and About ESAC, and a sign-in button. The main header says "gaia archive" and features the ESA logo. Below the header, there is a menu bar with links to HOME, SEARCH, SINGLE OBJECT, VISUALISATION, and HELP. The "SEARCH" link is highlighted with a yellow box. A sub-menu for "Basic" and "Advanced (ADQL)" is shown, with "Advanced (ADQL)" also highlighted with a yellow box. To the right of the sub-menu is a "Query Results" section. On the left, there is a sidebar with a search input field containing "gala" and a list of categories under "Gaia Data Release 3". The categories include galadr3.gaia_source, galadr3.gaia_source_lite, Astrophysical parameters, Auxiliary, Cross match, Extra-galactic, Non-single stars, Performance verification, Reference frame, Science alerts, Simulation, Solar system, Spectroscopy, Variability, Gaia Early Data Release 3, and Gaia Focused Product Release. Below the sidebar is a "Job name:" input field and a "Ctrl+Space for query autocompletion" placeholder. On the right, there are "Reset Form" and "Submit Query" buttons. Below these buttons, it says "No results found". There is a table with columns: Status, Job, Creation date, Num. rows, and Size. At the bottom, there are buttons for "Download format: VOTable (gzip)", "Apply jobs filter", "Filter this session", "Select all jobs", and "Delete selected jobs". A footer at the bottom of the page includes a link to the Gaia Helpdesk, a "Cookie policy" link, and a version number "(v3.5.3)".



Advanced search

→ EUROPEAN SPACE AGENCY  ABOUT ESAC 

SIGN IN 

gaia archive

HOME SEARCH SINGLE OBJECT VISUALISATION HELP

Basic Advanced (ADQL) Query Results

gaia

Job name:

Query examples

1

Ctrl+Space for query autocompletion

Reset Form  Submit Query 

No results found

Status	Job	Creation date	Num. rows	Size

◀ ▶ 1-1 of 0

Download format: VOTable (gzip) Filter this session Select all jobs Delete selected jobs

If you find an issue with the data, please contact the Gaia Helpdesk

(Cookie policy) (v3.5.3)

THE UNIVERSITY OF EDINBURGH 

RAS NAM 15th July 2024 • Gaia Data Release 3: Accessing Gaia DR3 Data • Nick Rowell & the Gaia collaboration



Advanced search

→ EUROPEAN SPACE AGENCY  ABOUT ESAC 

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gaia archive

HOME SEARCH SINGLE OBJECT VISUALISATION HELP

Basic Advanced (ADQL) Query Results

gaia

Job name:

Query examples

1

Ctrl+Space for query autocompletion

Reset Form  Submit Query 

No results found

Status	Job	Creation date	Num. rows	Size

gaia dr3.gaia_source
gaia dr3.gaia_source_lite
Astrophysical parameters
Auxiliary
Cross match
Extra-galactic
Non-single stars
Performance verification
Reference frame
Science alerts
Simulation
Solar system
Spectroscopy
Variability

gaia Early Data Release 3
Gaia Focused Product Release

1-1 of 0

Download format: VOTable (gzip) Filter this session Select all jobs Delete selected jobs

If you find an issue with the data, please contact the Gaia Helpdesk

(Cookie policy) (v3.5.3)



Advanced search

The screenshot shows the Gaia Archive search interface. On the left, there's a sidebar with various categories like 'Gaia DR3', 'Astrophysical parameters', and 'Auxiliary'. The 'gaiadr3.gaia_source' item is highlighted with a yellow box and an arrow pointing to it in the main search results area. The main area displays a list of search results, many of which are also highlighted with a yellow box. The results include:

- solution_id
- designation
- source_id
- random_index
- ref_epoch
- ra
- ra_error
- dec
- dec_error
- parallax
- parallax_error
- parallax_over_error
- pm
- pmra
- pmra_error
- pmdec
- pmdec_error
- ra_dec_corr
- ra_parallax_corr

At the bottom right, there are buttons for 'Reset Form' and 'Submit Query', and options for 'Download format' (VOTable (gzip)), 'Apply jobs filter', 'Filter this session', 'Select all jobs', and 'Delete selected jobs'. The version of the interface shown is v3.5.3.



Advanced search

The screenshot shows the Gaia Archive's Advanced (ADQL) search interface. The search term 'gaia' has been entered in the search bar. A dropdown menu displays a list of search terms starting with 'gaia', including:

- has_epoch_photometry
- has_epoch_rv
- has_mcmc_gspphot
- has_mcmc_msc
- in_andromeda_survey
- classprob_dsc_combmod
- classprob_dsc_combmod
- classprob_dsc_combmod
- teff_gspphot
- teff_gspphot_lower
- teff_gspphot_upper
- logg_gspphot
- logg_gspphot_lower
- logg_gspphot_upper
- mh_gspphot
- mh_gspphot_lower
- mh_gspphot_upper
- distance_gspphot
- distance_gspphot_lower

The 'gaia' item in the dropdown is highlighted with an orange box and an arrow points from it to the dropdown menu. The search results table below shows 'No results found'.



Creation date	Num. rows	Size
<hr/>		

Download format: VOTable (gzip) Filter this session Select all jobs Delete selected jobs

Contact the Gaia Helpdesk [\(Cookie policy\)](#) [\(v3.5.3\)](#)

Advanced search

→ EUROPEAN SPACE AGENCY  ABOUT ESAC 

SIGN IN 

gaia archive

HOME SEARCH SINGLE OBJECT VISUALISATION

Basic Advanced (ADQL) Query Results

gaia

Job name:

Ctrl-Space for quer

1

No results found

Status

Cross match

Extra-galactic

Non-single stars

Performance verification

Reference frame

Science alerts

Simulation

Solar system

Spectroscopy

Variability

Gaia Early Data Release 3

Gaia Focused Product Release

1-1 of 0

Query examples

+  gaiadr3.allwise_best_neighbour

+  gaiadr3.allwise_neighbourhood

+  gaiadr3.apassdr9_best_neighbour

+  gaiadr3.apassdr9_join

+  gaiadr3.apassdr9_neighbourhood

+  gaiadr3.dr2_neighbourhood

+  gaiadr3.gsc23_best_neighbour

+  gaiadr3.gsc23_join

+  gaiadr3.gsc23_neighbourhood

+  gaiadr3.hipparcos2_best_neighbour

+  gaiadr3.hipparcos2_neighbourhood

+  gaiadr3.panstarrs1_best_neighbour

+  gaiadr3.panstarrs1_join

+  gaiadr3.panstarrs1_neighbourhood

+  gaiadr3.ravedr5_best_neighbour

+  gaiadr3.ravedr5_join

+  gaiadr3.ravedr5_neighbourhood

Reset Form  Submit Query

Creation date Num. rows Size

Download format: VOTable (gzip) Apply jobs filter Filter this session Select all jobs Delete selected jobs

Helpdesk  (v3.5.3)

g Gaia DR3 Data • Nick Rowell & the Gaia collaboration

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Advanced search

→ EUROPEAN SPACE AGENCY  ABOUT ESAC 

SIGN IN 

gaia archive

HOME SEARCH SINGLE OBJECT VISUALISATION HELP

Basic Advanced (ADQL) Query Results

gaia

Job name:

Query examples

1

Ctrl+Space for query autocompletion

Reset Form  Submit Query

No results found

Status

Num. rows Size

 [gaiadr3.nss_acceleration_astro](#)

 [gaiadr3.nss_non_linear_spectro](#)

 [gaiadr3.nss_two_body_orbit](#)

 [gaiadr3.nss_vim_fl](#)

Download format: VOTable (gzip) Filter this session Select all jobs Delete selected jobs

If you find an issue with the data, please contact the Gaia Helpdesk

(Cookie policy) (v3.5.3)

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DPAC 

Advanced search

→ EUROPEAN SPACE AGENCY  ABOUT ESAC 

SIGN IN 

gaia archive

HOME SEARCH SINGLE OBJECT VISUALISATION HELP

Basic Advanced (ADQL) Query Results

gaia

Job name:

Query examples

1

Ctrl+Space for query autocompletion

Write your ADQL query here

Reset Form Submit Query

No results found

Status	Job	Creation date	Num. rows	Size
		=		

1-1 of 0

Download format: VOTable (gzip) Apply jobs filter Filter this session Select all jobs Delete selected jobs

If you find an issue with the data, please contact the Gaia Helpdesk

(Cookie policy) (v3.5.3)



ADQL primer

- The advanced search facility allows users to perform queries on the database using Astronomical Data Query Language (ADQL)
- ADQL is a language for querying relational databases that is tailored to astronomical datasets
- It supports common astronomical operations e.g. cone searches, proper motion propagation, and it knows different reference frames
- Good references:
 - ADQL cookbook: www.gaia.ac.uk/data/gaia-data-release-1/adql-cookbook
 - Gaia Archive help pages: www.cosmos.esa.int/web/gaia-users/archive/writing-queries
- Basic query construction:

```
SELECT * FROM gaiadr3.gaia_source
```



ADQL primer

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- Basic query construction:

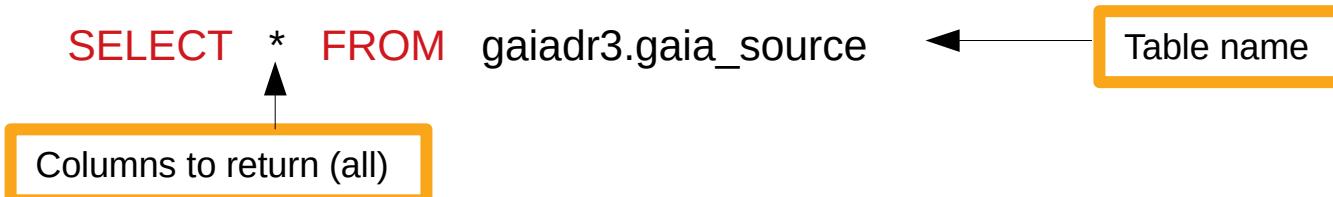
```
SELECT * FROM gaiadr3.gaia_source
```

Table name



ADQL primer

- The advanced search facility allows users to perform queries on the database using Astronomical Data Query Language (ADQL)
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- It supports common astronomical operations e.g. cone searches, proper motion propagation, and it knows different reference frames
- Good references:
 - ADQL cookbook: www.gaia.ac.uk/data/gaia-data-release-1/adql-cookbook
 - Gaia Archive help pages: www.cosmos.esa.int/web/gaia-users/archive/writing-queries
- Basic query construction:



ADQL primer

- The advanced search facility allows users to perform queries on the database using Astronomical Data Query Language (ADQL)
- ADQL is a language for querying relational databases that is tailored to astronomical datasets
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 - Gaia Archive help pages: www.cosmos.esa.int/web/gaia-users/archive/writing-queries
- Basic query construction:

```
SELECT * FROM gaiadr3.gaia_source
```

```
SELECT ra, dec FROM gaiadr3.gaia_source WHERE phot_g_mean_mag < 10
```



Only RA & dec



Only bright stars

Advanced search

→ EUROPEAN SPACE AGENCY  ABOUT ESAC 

Nicholas Rowell [nrowell]  

gaia archive

esa

HOME SEARCH SINGLE OBJECT VISUALISATION HELP VOSPACE SHARE

Basic Advanced (ADQL) Query Results

Job name: ADQL example NAM 2024

Query examples

```
1 SELECT DISTANCE(POINT(266.41683, -29.00781), POINT(ra, dec)) AS separation, *
2   FROM gaiadr3.gaia_source
3
4   WHERE 1 = CONTAINS(
5     POINT(266.41683, -29.00781),
6     CIRCLE(ra, dec, 0.25))
7
8   AND
9     -- Retrieve only sources with associated DataLink products
10    has_epoch_photometry = 'True' AND
11    has_xp_sampled = 'True'
12
13 ORDER BY separation ASC
```

Ctrl+Space for query autocompletion

Reset Form Submit Query

No results found

Status	Job	Creation date	Num. rows	Size
=				

Download format: VOTable (gzip) Edit jobs filter Select all jobs Delete selected jobs

If you find an issue with the data, please contact the Gaia Helpdesk

(Cookie policy) (v3.5.3)



Advanced search

EUROPEAN SPACE AGENCY  ABOUT ESAC 

Nicholas Rowell [nrowell]  

gaia archive

HOME SEARCH SINGLE OBJECT VISUALISATION HELP VOSPACE SHARE

Basic Advanced (ADQL) Query Results

Job name: ADQL example NAM 2024

Query examples

gaia

Job name: ADQL example NAM 2024

```
1 SELECT DISTANCE(POINT(266.41683, -29.00781), POINT(ra, dec)) AS separation, *
2   FROM gaiadr3.gaia_source
3   WHERE 1 = CONTAINS(
4     POINT(266.41683, -29.00781),
5     CIRCLE(ra, dec, 0.25))
6   AND
7     -- Retrieve only sources with associated DataLink products
8     has_epoch_photometry = 'True' AND
9     has_xp_sampled = 'True'
10    ORDER BY separation ASC
```

Ctrl+Space for query autocompletion

Reset Form Submit Query

Status Job Creation date Num. rows Size

Status	Job	Creation date	Num. rows	Size
	ADQL example NAM 2024	12-Jul-2024, 17:22:11	0	0 KB

Download format: VOTable (gzip) Select all jobs Delete selected jobs (v3.5.3)

If you find an issue with the data, please contact the Gaia Helpdesk

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Advanced search

EUROPEAN SPACE AGENCY  ABOUT ESAC 

Nicholas Rowell (nrowell) 

gaia archive

HOME SEARCH SINGLE OBJECT VISUALISATION HELP VOSPACE SHARE

Basic Advanced (ADQL) Query Results

Job name: ADQL example NAM 2024

Query examples

```
1 SELECT DISTANCE(POINT(266.41683, -29.00781), POINT(ra, dec)) AS separation, *
2   FROM gaiadr3.gaia_source
3
4 WHERE 1 = CONTAINS(
5   POINT(266.41683, -29.00781),
6   CIRCLE(ra, dec, 0.25))
7 AND
8   -- Retrieve only sources with associated DataLink products
9   has_epoch_photometry = 'True' AND
10  has_xp_sampled = 'True'
11
12 ORDER BY separation ASC
```

Ctrl+Space for query autocompletion

Reset Form Submit Query

Status	Job	Creation date	Num. rows	Size	Actions
✓	ADQL example NAM 2024	12-Jul-2024, 17:22:11	26	17 KB	     

1-1 of 1

Download format: VOTable (gzip) Select all jobs Delete selected jobs

If you find an issue with the data, please contact the Gaia Helpdesk

(Cookie policy) (v3.5.3)



Advanced search

The screenshot shows the Gaia archive's Advanced (ADQL) search interface. The left sidebar includes links for Home, Search, Single Object, Visualisation, Help, Vospace, Share, and a detailed tree view of Gaia datasets. The main area features an ADQL query editor with a code example:

```
1 SELECT DISTANCE(POINT(266.41683, -29.00781), POINT(ra, dec)) AS separation, *
2   FROM gaiadr3.gaia_source
3   WHERE 1 = CONTAINS(
4     POINT(266.41683, -29.00781),
5     CIRCLE(ra, dec, 0.25)
6   )
7   AND
8     -- Retrieve only sources with associated DataLink products
9     has_epoch_photometry = 'True' AND
10    has_xp_sampled = 'True'
11
12 ORDER BY separation ASC
```

The results table shows one job entry:

Status	Job	Creation date	Num. rows	Size
✓	ADQL example NAM 2024	12-Jul-2024, 17:22:11	26	17 KB

A large orange box highlights the "Download results" button, which is located in the bottom right corner of the results table area.



Advanced search

The screenshot shows the Gaia archive search interface. On the left, there's a sidebar with various categories like 'Other', 'Gaia Data Release 1', 'Gaia Data Release 2', and 'Gaia Data Release 3'. The 'Gaia Data Release 3' section is expanded, showing 'gaiadr3.gaia_source', 'gaiadr3.gaia_source_lite', 'Astrophysical parameters', 'Auxiliary', 'Cross match', 'Extra-galactic', 'Non-single stars', 'Performance verification', 'Reference frame', 'Science alerts', 'Simulation', 'Solar system', 'Spectroscopy', and 'Variability'. Below this is 'Gaia Early Data Release 3', 'Gaia Focused Product Release', and 'User tables'. A 'Basic' tab is selected at the top, followed by 'Advanced (ADQL)' which is highlighted in blue.

The main area has a job name 'ADQL example NAM 2024' and a code editor containing the following ADQL query:

```
1 SELECT DISTANCE(POINT(266.41683, -29.00781), POINT(ra, dec)) AS separation, *
2   FROM gaiadr3.gaia_source
3   WHERE 1 = CONTAINS(
4     POINT(266.41683, -29.00781),
5     CIRCLE(ra, dec, 0.25)
6   )
7   AND
8     -- Retrieve only sources with associated DataLink products
9     has_epoch_photometry = 'True' AND
10    has_xp_sampled = 'True'
11
12 ORDER BY separation ASC
```

Below the code editor, there are buttons for 'Reset Form' and 'Submit Query'. The results table shows one job entry:

Status	Job	Creation date	Num. rows	Size	Actions
✓	ADQL example NAM 2024	12-Jul-2024, 17:22:11	26	17 KB	  

An orange box highlights the download icon for the job. An arrow points from this icon down to a large orange box containing the text 'Create user table'.

At the bottom, there's a note about reporting issues to the Gaia Helpdesk and download options ('VOTable (gzip)').



Advanced search

The screenshot shows the Gaia archive's Advanced (ADQL) search interface. On the left, a sidebar provides navigation and access to various datasets and services. The main area features an ADQL query editor with a sample query, a results table showing one job entry, and a download section. A large orange box highlights the 'Upload to VOSSpace' button next to the download icons.

Job name: ADQL example NAM 2024

```
1 SELECT DISTANCE(POINT(266.41683, -29.00781), POINT(ra, dec)) AS separation, *
2   FROM gaiadr3.gaia_source
3
4 WHERE 1 = CONTAINS(
5   POINT(266.41683, -29.00781),
6   CIRCLE(ra, dec, 0.25))
7 AND
8   -- Retrieve only sources with associated DataLink products
9   has_epoch_photometry = 'True' AND
10  has_xp_sampled = 'True'
11
12 ORDER BY separation ASC
```

Ctrl+Space for query autocompletion

Reset Form Submit Query

Status	Job	Creation date	Num. rows	Size	Actions
✓	ADQL example NAM 2024	12-Jul-2024, 17:22:11	26	17 KB	

Download format: VOTable (gzip)

If you find an issue with the data, please contact the Gaia Helpdesk

Upload to VOSSpace



Advanced search

The screenshot shows the Gaia archive search interface. At the top, there's a navigation bar with links to European Space Agency, About ESAC, and user profile (Nicholas Rowell). The main header says "gaia archive". Below it is a menu bar with HOME, SEARCH (which is selected), SINGLE OBJECT, VISUALISATION, HELP, VOSPACE, and SHARE.

The left sidebar contains a search input field with "gaia" and a dropdown arrow, followed by several icons for different data categories. A tree view lists data releases: Other, Gaia Data Release 1, Gaia Data Release 2, Gaia Data Release 3 (expanded to show gaia3.gaia_source, gaia3.gaia_source_lite, Astrophysical parameters, Auxiliary, Cross match, Extra-galactic, Non-single stars, Performance verification, Reference frame, Science alerts, Simulation, Solar system, Spectroscopy, Variability), and Gaia Early Data Release 3, Gaia Focused Product Release, User tables.

The main content area has tabs for Basic, Advanced (ADQL) (selected), and Query Results. The Advanced tab shows a code editor with the following ADQL query:

```
1 SELECT DISTANCE(POINT(266.41683, -29.00781), POINT(ra, dec)) AS separation, *
2   FROM gaiadr3.gaia_source
3
4 WHERE 1 = CONTAINS(
5   POINT(266.41683, -29.00781),
6   CIRCLE(ra, dec, 0.25)
7 )
8 AND
9   -- Retrieve only sources with associated DataLink products
10  has_epoch_photometry = 'True' AND
11  has_xp_sampled = 'True'
12
13 ORDER BY separation ASC
```

Below the code editor is a note: "Ctrl+Space for query autocompletion". To the right are "Reset Form" and "Submit Query" buttons. The results table below shows one job entry:

Status	Job	Creation date	Num. rows	Size	Actions
✓	ADQL example NAM 2024	12-Jul-2024, 17:22:11	26	17 KB	

An orange box highlights the "Copy" icon in the actions column. An orange arrow points from this box down to a callout box containing the text "Display top 2000 results". At the bottom of the results table, there are download options: "Download format: VOTable (gzip)" and "Edit job".

At the very bottom, there's a footer with links to "Cookie policy" and "v3.5.3", and the text "If you find an issue with the data, please contact the Gaia Helpdesk".

Advanced search

EUROPEAN SPACE AGENCY  ABOUT ESAC 

Nicholas Rowell [nrowell] 

gaia archive

esa

HOME SEARCH SINGLE OBJECT VISUALISATION HELP VOSPACE SHARE

Basic Advanced (ADQL) Query Results

ADQL example NAM 2024 

separation	solution_id	designation	source_id	random_index	ref_epoch	ra	ra_error	dec	dec_error	parallax
					yr	deg	mas	deg	mas	mas
0.03270200629433478	1636148068921376768	Gaia DR3 4057482061536827008	4057482061536827008	1036091491	2016	266.3811239852798	0.015942628	-28.998103554565258	0.012455022	0.68971897337322
0.049213899988096534	1636148068921376768	Gaia DR3 4057491580494165888	4057491580494165888	115402482	2016	266.3961349068716	0.013481404	-29.05357658659583	0.01079274	0.4079738531270782
0.08203452901999679	1636148068921376768	Gaia DR3 4057488250585684480	4057488250585684480	639110292	2016	266.47653159355485	0.086195916	-28.944549604098608	0.06732362	0.3478533573251864
0.08777788506733702	1636148068921376768	Gaia DR3 4057483646380771584	4057483646380771584	1456435063	2016	266.39121152764295	0.023304338	-28.922942023840754	0.018219754	1.4690969053625107
0.08936608863253366	1636148068921376768	Gaia DR3 4057483062268391296	4057483062268391296	662270120	2016	266.33105889399053	0.022994984	-28.959261662972395	0.018822692	1.5417420967363484
0.10672667244796251	1636148068921376768	Gaia DR3 4057476563972698112	4057476563972698112	44164892	2016	266.51750059850445	0.04265731	-28.94752153873395	0.03436231	0.3182926041036272
0.12045438780355776	1636148068921376768	Gaia DR3 4057469146571463808	4057469146571463808	283536635	2016	266.5435273625594	0.020575272	-29.055111563219167	0.016335908	0.4689398602818703
0.1262952929724264	1636148068921376768	Gaia DR3 4057486601318288768	4057486601318288768	1452725847	2016	266.342473216923	0.018852646	-28.899563492970323	0.0142724365	0.427341266822602
0.13943080698048615	1636148068921376768	Gaia DR3 4057466908885996032	4057466908885996032	34937530	2016	266.47715558098196	0.018564114	-29.136887611646937	0.014320312	0.30998569170816115
0.1407109949599665	1636148068921376768	Gaia DR3 4057467497303664512	4057467497303664512	1712131209	2016	266.37131422837365	0.01872735	-29.14282269956864	0.014262437	0.9352141534416208
0.1499330807435972	1636148068921376768	Gaia DR3 405746157273822464	405746157273822464	65679287	2016	266.5754026654681	0.017654184	-29.06489165511335	0.013717432	0.4610922744250312
0.15112493353116369	1636148068921376768	Gaia DR3 4057480584061931008	4057480584061931008	784379780	2016	266.26190766306576	0.026456567	-29.07484504447642	0.020849852	1.007006793856833
0.1647846900949157	1636148068921376768	Gaia DR3 4057477045010171392	4057477045010171392	152272813	2016	266.5719251525894	0.017257813	-28.914325157291735	0.013818254	0.5661554554287637
0.1694041220503768	1636148068921376768	Gaia DR3 4057105238280140160	4057105238280140160	189862392	2016	266.24772918534273	0.052990068	-29.090541529330988	0.04148615	0.5958964620977629
0.1764690588736407	1636148068921376768	Gaia DR3 4057105517457073664	4057105517457073664	15478832	2016	266.2246716990601	0.022782516	-29.061794959208704	0.017884005	0.5152913885299929
0.20780737605618965	1636148068921376768	Gaia DR3 4057091150787104896	4057091150787104896	769056925	2016	266.3555325864866	0.015402617	-29.208597692320964	0.012133942	1.172773665088278
0.21499289697246812	1636148068921376768	Gaia DR3 4057463305415513984	4057463305415513984	1135726189	2016	266.43567645127746	0.018145058	-29.222171485841216	0.014143117	0.788391924219534
0.22112011712445814	1636148068921376768	Gaia DR3 4057464297546651680	4057464297546651680	187090956	2016	266.56821817791536	0.014919228	-29.18499708855427	0.011407923	0.37174307134658796
0.22125122793016275	1636148068921376768	Gaia DR3 4057091837981870848	4057091837981870848	775793940	2016	266.31142903086993	0.016488204	-29.208985925923443	0.012932718	0.6879597942649961

1-20 of 26    

Gaia DR3 Data Model Show query in ADQL form  Download results

If you find an issue with the data, please contact the Gaia Helpdesk

(Cookie policy) (v3.5.3)



Advanced search

The screenshot shows the Gaia archive search interface. At the top, there's a navigation bar with links to the European Space Agency and About ESAC, and a user profile for Nicholas Rowell. The main header says "gaia archive". Below the header is a menu bar with links to Home, Search (which is highlighted), Single Object, Visualisation, Help, Vospace, and Share.

The search interface includes a sidebar on the left with categories like Other, Gaia Data Release 1, Gaia Data Release 2, Gaia Data Release 3 (expanded to show gaia3.gaia_source, gaia3.gaia_source_lite, Astrophysical parameters, Auxiliary, Cross match, Extra-galactic, Non-single stars, Performance verification, Reference frame, Science alerts, Simulation, Solar system, Spectroscopy, Variability, Gaia Early Data Release 3, Gaia Focused Product Release, and User tables). There are also icons for file operations like download, copy, and share.

The main area contains a code editor for ADQL queries. The current query is:

```
1 SELECT DISTANCE(POINT(266.41683, -29.00781), POINT(ra, dec)) AS separation, *
2   FROM gaiadr3.gaia_source
3   WHERE 1 = CONTAINS(
4     POINT(266.41683, -29.00781),
5     CIRCLE(ra, dec, 0.25)
6   )
7   AND
8     -- Retrieve only sources with associated DataLink products
9     has_epoch_photometry = 'True' AND
10    has_xp_sampled = 'True'
11
12 ORDER BY separation ASC
```

Below the code editor, there are buttons for "Reset Form" and "Submit Query".

The results section shows a table with one row of data:

Status	Job	Creation date	Num. rows	Size	Actions
✓	ADQL example NAM 2024	12-Jul-2024, 17:22:11	26	17 KB	

A yellow box highlights the "Edit icon" in the actions column, with a callout bubble pointing to it labeled "Search in DataLink".

At the bottom, there are links for "Cookie policy" and "v3.5.3", and a note about reporting issues to the Gaia Helpdesk.



Advanced search

The screenshot shows the Gaia Job DataLink interface. At the top, there's a banner for the European Space Agency (ESA) and a user profile for Nicholas Rowell. The main area has tabs for 'Basic' and 'Advanced (ADQL)' (which is selected), with a 'Query Results' tab.

Job name: ADQL example NAM 2024

```
1 SELECT DISTANCE(POINT(266.41683, -29.00781)
2   FROM gaiadr3.gaia_source
3   WHERE 1 = CONTAINS(
4     POINT(266.41683, -29.00781),
5     CIRCLE(ra, dec, 0.25))
6   AND
7     -- Retrieve only sources with associated
8     has_epoch_photometry = 'True' AND
9     has_xp_sampled = 'True'
10    ORDER BY separation ASC
```

Status: ✓ **Job:** ADQL example NAM 2024

Data release: Gaia DR3 **Data structure:** INDIVIDUAL

Download format: VOTable **Save All Data**

Information about the DataLink protocol and ancillary products can be found in the Archive Help

Job ID: 17208013310730

IDs Column: designation **Show Data**

MCMC MSC -- designation (26)

XP mean sampled spectra -- designation (26)

XP mean continuous spectra -- designation (26)

Epoch photometry -- designation (26)

MCMC GSP-Phot -- designation (11)

Depending on the amount and type of data retrieved, Archive response times range from seconds to minutes.

Close

Query examples

Num. rows: 26 **Size:** 17 KB

Download format: VOTable (gzip) **Edit jobs filter** **Select all jobs** **Delete selected jobs**

If you find an issue with the data, please contact the Gaia Helpdesk

(Cookie policy) (v3.5.3)



Advanced search

→ EUROPEAN SPACE AGENCY  ABOUT ESAC 

Nicholas Rowell (nrowell) 

gaia archive

HOME **SEARCH** SINGLE OBJECT VISUALISATION HELP VOSPACE SHARE

Basic Advanced (ADQL) Query Results

gaia

Job name: ADQL example NAM 2024

1 SELECT DISTANCE(POINT(266.41683
2 FROM gaiadr3.gaia_source
3 WHERE 1 = CONTAINS(
4 POINT(266.41683, -29.00781),
5 CIRCLE(ra, dec, 0.25))
6 AND
7 -- Retrieve only sources with
8 has_epoch_photometry = 'True'
9 has_xp_sampled = 'True'
10 ORDER BY separation ASC
11
12
13

Ctrl+Space for query autocomplete

Other
Gaia Data Release 1
Gaia Data Release 2
Gaia Data Release 3
galadr3.gaia_source
galadr3.gaia_source_lite
Astrophysical parameters
Auxiliary
Cross match
Extra-galactic
Non-single stars
Performance verification
Reference frame
Science alerts
Simulation
Solar system
Spectroscopy
Variability
Gaia Early Data Release 3
Gaia Focused Product Release
User tables

Status Job

✓ AD

Download format: VOTable

Depending on the amount and type of data retrieved,
Archive response times range from seconds to minutes.

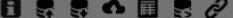
Close

Information about the DataLink protocol and
ancillary products can be found in the Archive Help

Gaia Job DataLink

Query examples

Reset Form  Submit Query

Num. rows Size
26 17 KB 

If you find an issue with the data, please contact the Gaia Helpdesk

(Cookie policy) (v3.5.3)

Download format: VOTable (gzip) Select all jobs Delete selected jobs

THE UNIVERSITY of EDINBURGH  RAS NAM 15th July 2024 • Gaia Data Release 3: Accessing Gaia DR3 Data • Nick Rowell & the Gaia collaboration



Advanced search

The screenshot shows the Gaia Job DataLink interface. At the top, there's a navigation bar with links to the European Space Agency, About ESAC, and user information (Nicholas Rowell). Below the navigation bar is the Gaia archive logo and a main menu with options: HOME, SEARCH (highlighted in red), SINGLE OBJECT, VISUALISATION, HELP, VOSPACE, and SHARE.

The left sidebar contains a search bar with the text "gaia" and a dropdown menu. It lists categories under "Gaia Data Release 3": galadr3.gaia_source, galadr3.gaia_source_lite, Astrophysical parameters, Auxillary, Cross match, Extra-galactic, Non-single stars, Performance verification, Reference frame, Science alerts, Simulation, Solar system, Spectroscopy, Variability, and others like Early Data Release 3, Focused Product Release, and User tables. A status indicator at the bottom of the sidebar shows a checkmark.

The central part of the interface features a terminal window titled "Gaia Job DataLink". Inside the terminal, a command-line session is shown:

```
nrowell@hydra:~/dr3/datalink$ ls
'XP_CONTINUOUS-Gaia DR3 4057091150787104896.xml'
'XP_CONTINUOUS-Gaia DR3 4057091837981870848.xml'
'XP_CONTINUOUS-Gaia DR3 4057105238280140160.xml'
'XP_CONTINUOUS-Gaia DR3 4057105517457073664.xml'
'XP_CONTINUOUS-Gaia DR3 4057463305415513984.xml'
'XP_CONTINUOUS-Gaia DR3 4057464297546951680.xml'
'XP_CONTINUOUS-Gaia DR3 4057466157273822464.xml'
'XP_CONTINUOUS-Gaia DR3 4057466908885996032.xml'
'XP_CONTINUOUS-Gaia DR3 4057467497303664512.xml'
'XP_CONTINUOUS-Gaia DR3 4057469146571463808.xml'
'XP_CONTINUOUS-Gaia DR3 4057470589679983744.xml'
'XP_CONTINUOUS-Gaia DR3 4057470589679988096.xml'
'XP_CONTINUOUS-Gaia DR3 4057471001996870400.xml'
'XP_CONTINUOUS-Gaia DR3 4057476563972698112.xml'
'XP_CONTINUOUS-Gaia DR3 4057477045010171392.xml'
'XP_CONTINUOUS-Gaia DR3 4057477289829464576.xml'
'XP_CONTINUOUS-Gaia DR3 4057477702146339584.xml'
'XP_CONTINUOUS-Gaia DR3 4057478419399734528.xml'
'XP_CONTINUOUS-Gaia DR3 4057480584061931008.xml'
'XP_CONTINUOUS-Gaia DR3 4057481580494165888.xml'
'XP_CONTINUOUS-Gaia DR3 4057482061536827008.xml'
'XP_CONTINUOUS-Gaia DR3 4057483062268391296.xml'
'XP_CONTINUOUS-Gaia DR3 4057483646380771584.xml'
'XP_CONTINUOUS-Gaia DR3 4057486601318288768.xml'
'XP_CONTINUOUS-Gaia DR3 4057488250585684480.xml'
'XP_CONTINUOUS-Gaia DR3 4057532707785238272.xml'
```

Below the terminal window, there's a "Query examples" section with a "Form" button and a "Submit Query" button. At the bottom of the interface, there are social media sharing icons and buttons for "Edit jobs filter", "Select all jobs", and "Delete selected jobs".

At the very bottom, a footer bar includes a link to the Gaia Helpdesk, a "Cookie policy" link, and a version number "(v3.5.3)".



Non-tabular data in Gaia DR3

- Many of the new DR3 products are of non-tabular nature
 - BP/RP spectra, epoch photometry, MCMC samples, ...
 - For practical reasons these are not stored as tables in the archive relational database
 - Not accessible using TAP+ services; fields cannot be used in ADQL queries
 - This is possible via the UK Gaia Data Mining Platform [see Nigel's talk to follow]
- These are accessed using DataLink services
 - Archive queries provide links to additional data products outside of the main catalogue
 - TOPCAT can access DataLink products (as well as tabular data via TAP+)
 - Python module astroquery.gaia provides programmatic access to DataLink products
- There are tutorials and many examples on the Gaia Archive pages
 - <https://www.cosmos.esa.int/web/gaia-users/archive/datalink-products>



Additional software tools

- TOPCAT
 - Accessing, visualising, manipulating tabular data (see Mark Taylor's talk)
 - www.star.bris.ac.uk/~mbt/topcat/
- astroquery.gaia
 - Python module for accessing Gaia tabular and non-tabular data
 - <https://astroquery.readthedocs.io/en/latest/gaia/gaia.html>
- Several software tools for working with Gaia data have been released with DR3
 - <https://www.cosmos.esa.int/web/gaia/dr3-software-tools>
- GaiaXPy for manipulating BP/RP spectra
 - <https://gaia-dpc.github.io/GaiaXPy-website/>



Summary

- The ESA Gaia Archive is the main access point for all Gaia data release products
 - <https://gea.esac.esa.int/archive/>
- Issues discovered since each data release are reported on the known issues pages
 - <https://www.cosmos.esa.int/web/gaia/dr3-known-issues>
- There are numerous ways to access the data either directly through the Archive, partner data centres or via third party applications
- There are tabular and non-tabular data
 - Tabular data can be used in selections when making queries
 - Non-tabular data must be downloaded
- Many useful tutorials are available on the Archive help pages

