



Using the GES Science Archive

Clive Davenhall, Ross Collins, Mike Read,

Eckhard Sutorius and Nigel Hambly

(Wide Field Astronomy Unit, University of Edinburgh),

Anna Hourihane and Clare Worley

(Institute of Astronomy, University of Cambridge)

GES 2014: Gaia-ESO Survey Second Science Meeting

10-13 November 2014, Porto, Portugal

Structure of the talk

- Contents of the archive:
 - which data are stored in the archive?
- Structure and organisation of the archive
 - computing techniques and technologies used to store data,
 - structure of the data; how are items related?
- Accessing and Querying the archive
 - finding items in the archive,
 - obtaining copies of items from the archive,
 - examples of using the archive.
- Future plans and enhancements

Rationale for the Archive

- Provide a static, referable repository of the GES observations and results,
 - bibliographic purposes,
 - replication of results.
- Capture not just the data items,
 - but the relations between those items.
- Permanent and accessible.

Contents of the Archive

- GES project:
 - acquires spectra with the Giraffe and UVES spectrographs,
 - analyses spectra for abundances and physical parameters,
 - using both newly-acquired and archival spectra.
- Archive contains:
 - reduced, stacked spectra from the newly acquired observations,
 - 'metadata' describing these spectra,
 - abundances and physical parameters derived from both newly-acquired and archival spectra,
 - atomic data used in the analyses.
- Archive does not contain:
 - copies of the archival spectra.

Release Structure

- A series of releases are made as the project progresses
 - each release contains recently-acquired observations and their analyses,
 - initially only available within the Consortium.
- Each release is kept in its own database
 - the user selects which release to use.
- **The various releases (and hence their databases) differ significantly in contents and structure.**

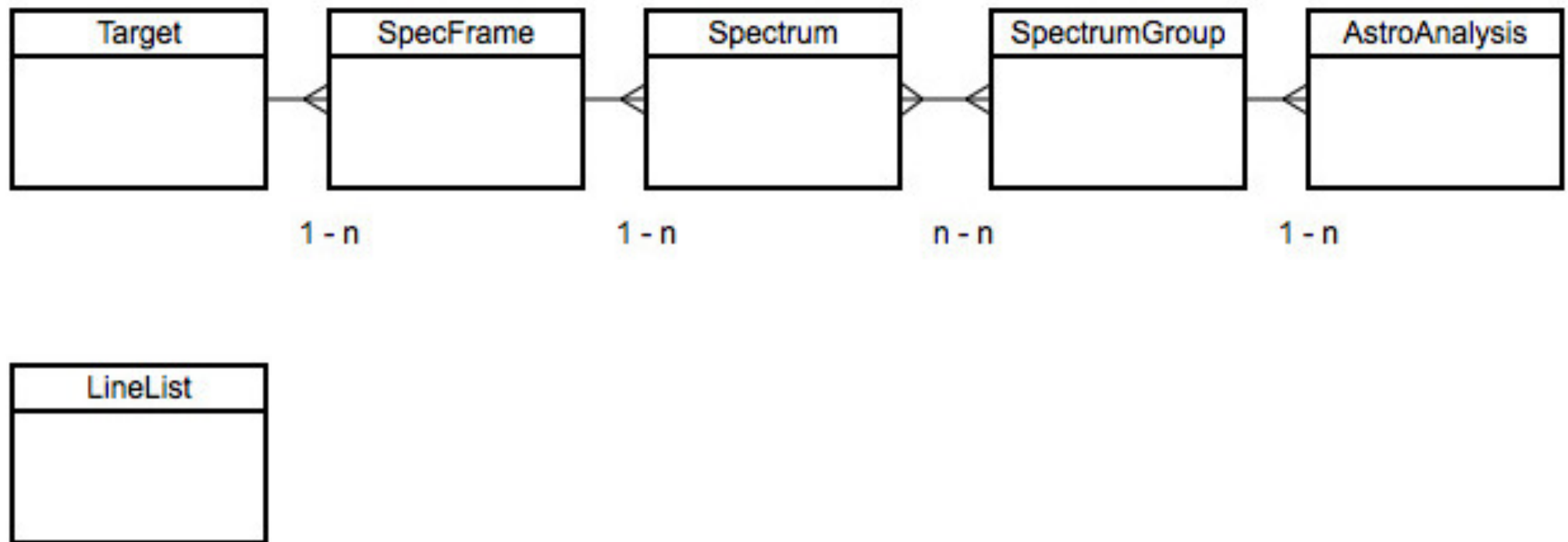
Structure of the Archive

- The archive contains a mixture of bulk data (spectra) and tabular data (metadata, analyses, line lists).
- The Spectra are held as FITS files in a Unix directory structure.
- The tabular data are held in a relational database management system (RDBMS):
 - Microsoft SQL Server,
 - accessed or queried using SQL,
 - SQL is the standard query language for relational databases,
 - many dialects of SQL; SQL server uses T-SQL,
 - examples later.

Important Tables

- **Target**
 - list of stars observed as part of the survey.
- **SpecFrame**
 - list of frames, fields or observing blocks.
- **Spectrum**
 - list of spectra (potentially several per target)
- **AstroAnalysis**
 - list of analyses (usually several per spectrum)
- **Linelist**
 - list of atomic and molecular lines

Relation Between Tables



Accessing the Archive

- You must be registered to use the archive
 - and registration is only offered to members of the Consortium.
- Users are allocated to communities,
 - typically one community per institution.
- The archive is accessed solely via a Web page:
<http://ges.roe.ac.uk>
 - where lots of additional information is available.
- Many pages are publicly available, with unrestricted access.
- You must log on to:
 - access some pages,
 - submit queries.

Accessing the Archive



[GES Home](#)

[Start Here](#)

[Data Overview](#)

[Known Issues](#)

[the Surveys](#)

[Schema browser](#)

[Data access](#)

[Login](#)

[Freeform SQL](#)

[Example Queries](#)

[Q&A](#)

[Glossary](#)

[Release History](#)


[Gallery](#)

[Publications](#)

[Monitor](#)

[Downtime](#)

[Links](#)

[Home](#) | [Overview](#) | [Browser](#) | [Access](#) | [Login](#) | [Examples](#) 

Gaia-ESO Survey Science Archive

The Gaia-ESO Survey science archive comprises calibrated one- and two-dimensional spectra for stars observed in the **Gaia-ESO Survey** (GES), and a variety of astrophysical parameters (heliocentric radial velocity, effective temperature, surface gravity, metallicity *etc*) derived from these spectra.

GES is a public spectroscopic survey of approximately 100,000 stars, systematically covering all the major components of the Milky Way, from the halo to star-forming regions and providing the first homogeneous overview of the distributions of kinematics and elemental abundances. The target stars were observed using the **FLAMES spectrograph** on the **ESO VLT** at Paranal in Chile. The survey was conducted in support of the **ESA Gaia** astrometric satellite, but will have numerous other uses.

Release notes give details of the **latest release** and the history of archive releases, updates and bug fixes is recorded under the **release history** page.

Please note that all use of parameters obtained from the archive in publications and analyses leading to publications must conform with the **PI Policy Statement** on the use of iDR2 parameters and abundances.


[Home](#) | [Overview](#) | [Browser](#) | [Access](#) | [Login](#) | [Examples](#)

[Links](#) | [Credits](#)

WFAU, Institute for Astronomy,
Royal Observatory, Blackford Hill
Edinburgh, EH9 3HJ, UK
Tel +44 131 668 8356 (office)
or +44 131 668 8100 (switchboard)

ges-support@roe.ac.uk
15/7/2014

Accessing the Archive

[Home](#) | [Overview](#) | [Browser](#) | [Access](#) | [Login](#) | [Examples](#) 



Gaia-ESO Survey Science Archive

The Gaia-ESO Survey science archive comprises calibrated one- and two-dimensional spectra for stars observed in the **Gaia-ESO Survey** (GES), and a variety of astrophysical parameters (heliocentric radial velocity, effective temperature, surface gravity, metallicity *etc*) derived from these spectra.

GES is a public spectroscopic survey of approximately 100,000 stars, systematically covering all the major components of the Milky Way, from the halo to star-forming regions and providing the first homogeneous overview of the distributions of kinematics and elemental abundances. The target stars were observed using the **FLAMES spectrograph** on the **ESO VLT** at Paranal in Chile. The survey was conducted in support of the **ESA Gaia** astrometric satellite, but will have numerous other uses.

Release notes give details of the **latest release** and the history of archive releases, updates and bug fixes is recorded under the **release history** page.

Please note that all use of parameters obtained from the archive in publications and analyses leading to publications must conform with the **PI Policy Statement** on the use of iDR2 parameters and abundances.

[GES Home](#)
[Start Here](#)
[Data Overview](#)
[Known Issues](#)
[the Surveys](#)
[Schema browser](#)
[Data access](#)
[Login](#)
[Freeform SQL](#)
[Example Queries](#)
[Q&A](#)
[Glossary](#)
[Release History](#)
[Gallery](#)
[Publications](#)
[Monitor](#)
[Downtime](#)
[Links](#)

[Home](#) | [Overview](#) | [Browser](#) | [Access](#) | [Login](#) | [Examples](#)


[Links](#) | [Credits](#)

WFAU, Institute for Astronomy,
Royal Observatory, Blackford Hill
Edinburgh, EH9 3HJ, UK
Tel +44 131 668 8356 (office)
or +44 131 668 8100 (switchboard)

ges-support@roe.ac.uk
15/7/2014



Logging in to the Archive



[Home](#) | [Overview](#) | [Browser](#) | [Access](#) | [Login](#) | [Examples](#) **GES**

GES Login

Only registered users are allowed to access GES data prior to their public release. To register for access to proprietary data releases you must be part of the GES Consortium and you should ask your community contact, who will normally be a GES co-investigator working at your institute and nominated as the person responsible for administering usernames/passwords for access by Consortium members at your institute. If you do not know who your institution-based community contact is, or you don't have one and wish to volunteer, please contact Clare Worley ccworley@ast.cam.ac.uk and Anna Hourihane aph@ast.cam.ac.uk in the first instance.

Enter your username and password. If you do not login your queries will be directed to any world accessible databases that contains data no longer within their propriety period. Note that usernames and passwords are case sensitive.

Username:

Password:

Community:

Accept - By logging in to gain access to Gaia-ESO survey products stored in the GES Science Archive, you are agreeing to the rules contained within the consortium's [Publication Policy](#) and [Private Data Policy](#). *Note in particular the [PI Policy Statement](#) on the use of iDR2 parameters and abundances.*

List of communities

Login sessions time-out after 4 hours if inactive. The login status is shown at the top of Web forms which query the archive. New browser windows that have been opened from within a logged in browser should be passed the login status.

[Home](#) | [Overview](#) | [Browser](#) | [Access](#) | [Login](#) | [Examples](#)


GES Home
Start Here
Data Overview
Known Issues
the Surveys
Schema browser
Data access
Login
Freeform SQL
Example Queries
Q&A
Glossary
Release History
Gallery
Publications
Monitor
Downtime
Links

Querying the Archive

- Search (or 'query') the archive to find spectra and results of interest.
- Currently only SQL queries are supported.
- SQL is the standard language for querying relational databases.
- But beware: most relational database management systems come with their own dialect of SQL;
 - SQL Server has T-SQL.
- Powerful and flexible once you get used to it...
- ... but most astronomers are not familiar with SQL.
- Plenty of examples and help are available on the Web site.



Querying the Archive

[Home](#) | [Overview](#) | [Browser](#) | [Access](#) | [Login](#) | [Examples](#) 



Gaia-ESO Survey Science Archive

The Gaia-ESO Survey science archive comprises calibrated one- and two-dimensional spectra for stars observed in the **Gaia-ESO Survey** (GES), and a variety of astrophysical parameters (heliocentric radial velocity, effective temperature, surface gravity, metallicity *etc*) derived from these spectra.

GES is a public spectroscopic survey of approximately 100,000 stars, systematically covering all the major components of the Milky Way, from the halo to star-forming regions and providing the first homogeneous overview of the distributions of kinematics and elemental abundances. The target stars were observed using the **FLAMES spectrograph** on the **ESO VLT** at Paranal in Chile. The survey was conducted in support of the **ESA Gaia** astrometric satellite, but will have numerous other uses.

Release notes give details of the **latest release** and the history of archive releases, updates and bug fixes is recorded under the **release history** page.

Please note that all use of parameters obtained from the archive in publications and analyses leading to publications must conform with the **PI Policy Statement** on the use of iDR2 parameters and abundances.

[GES Home](#)
[Start Here](#)
[Data Overview](#)
[Known Issues](#)
[the Surveys](#)
[Schema browser](#)
[Data access](#)
[Login](#)
[Freeform SQL](#)
[Example Queries](#)
[Q&A](#)
[Glossary](#)
[Release History](#)
[Gallery](#)
[Publications](#)
[Monitor](#)
[Downtime](#)
[Links](#)

[Home](#) | [Overview](#) | [Browser](#) | [Access](#) | [Login](#) | [Examples](#)

[Links](#) | [Credits](#)

WFAU, Institute for Astronomy,
Royal Observatory, Blackford Hill
Edinburgh, EH9 3HJ, UK
Tel +44 131 668 8356 (office)
or +44 131 668 8100 (switchboard)

ges-support@roe.ac.uk
15/7/2014

Querying the Archive



- GES Home
- Start Here
- Data Overview
- Known Issues
- the Surveys
- Schema browser
- Data access
- Login
- Freeform SQL
- Example Queries
- Q&A
- Glossary
- Release History
- Gallery
- Publications
- Monitor
- Downtime
- Links



Freeform SQL Query

This form allows you to submit an SQL query to the GES database ([notes and tips](#)).

An [enhanced version of this form](#) allows the upload of a file to a temporary database table. This table (#userTable) can then form part of the query being executed.

Programme: GES (GAIA-ESO Survey)

Database release to use:

Upload SQL query from file into this form: No file selected.

or enter
SQL statement:

```
SELECT TOP 10 cname, ra, dec, bmag FROM Target;
```

ensure one of the file formats is selected below if you want to save your results.



Querying the Archive

GES Database - SQL Query Results

Connecting to gesiDR2 database

QUERY STARTED: Wed Nov 05 22:44:09 GMT 2014 [1 active, 875 total]

Please keep this browser window open and wait for your results or further information to appear below...

timeout: 3600

Connected to database

Submitted query: SELECT TOP 10 cname, ra, dec, bmag FROM Target;

• OK

	cname	ra	dec	bmag
1	NONE	-9.9999950E008	-9.9999950E008	-9.999995E008
2	16153746-0822162	+243.9060833	-8.3711667	-9.999995E008
3	19013537-0028186	+285.3973750	-0.4718333	+18.435000
4	19013631-0027447	+285.4012917	-0.4624167	+17.888000
5	19013651-0027021	+285.4021250	-0.4505833	+18.188000
6	19013910-0027114	+285.4129167	-0.4531667	+18.036000
7	19013997-0028213	+285.4165417	-0.4725833	+18.324000
8	19014004-0028129	+285.4168333	-0.4702500	+17.948000
9	19014127-0026444	+285.4219583	-0.4456667	+17.955000
10	19014194-0028172	+285.4247500	-0.4714444	+18.118000

(Query returned 10 result rows, all rows are shown in the displayed table.)

Please check the gesiDR2 entry in the [release history](#) for documentation pertaining to this release

QUERY FINISHED: Wed Nov 05 22:44:10 GMT 2014

Simple Examples

- Some simple SQL queries, using table Target:

```
SELECT COUNT(*) FROM Target;
```

```
SELECT * FROM Target;
```

```
SELECT TOP 10 * FROM Target;
```

```
SELECT TOP 10 cname, ra, dec, bmag FROM Target;
```

```
SELECT TOP 10 cname, ra, dec, bmag FROM Target  
WHERE bmag > 18.0 AND bmag < 18.5;
```

```
SELECT TOP 10 cname, ra, dec, bmag FROM Target  
WHERE bmag > 18.0 AND bmag < 18.5  
ORDER BY bmag;
```

Retrieving Copies of Spectra

Connecting to gesiDR2 database

QUERY STARTED: Wed Nov 05 23:02:07 GMT 2014 [1 active, 877 total]

Please keep this browser window open and wait for your results or further information to appear below...

timeout: 3600

Connected to database

Submitted query: SELECT TOP 10 spec.cName, spec.specID, spg.specID, spg.fileName FROM Spectrum spec, SpectrumGroup spg WHERE spec.specID = spg.specID;

- OK

The getFLink column can be used to download the referenced FITS file.


	getFLink	cName	specID	specID	fileName
1	download	00184577-4700293	8799	8799	/disk40/ges/ingest/fits/giraffe/stacked_v2.10/GES_MW_002000_470000/gir_00184577-4700293_H548.8.fit
2	download	00184577-4700293	8886	8886	/disk40/ges/ingest/fits/giraffe/stacked_v2.10/GES_MW_002000_470000/gir_00184577-4700293_H875.7.fit
3	download	00185752-0059321	8648	8648	/disk40/ges/ingest/fits/giraffe/stacked_v2.10/GES_MW_002000_010000/gir_00185752-0059321_H548.8.fit
4	download	00185752-0059321	8724	8724	/disk40/ges/ingest/fits/giraffe/stacked_v2.10/GES_MW_002000_010000/gir_00185752-0059321_H875.7.fit
5	download	00185813-0059099	8649	8649	/disk40/ges/ingest/fits/giraffe/stacked_v2.10/GES_MW_002000_010000/gir_00185813-0059099_H548.8.fit
6	download	00185813-0059099	8725	8725	/disk40/ges/ingest/fits/giraffe/stacked_v2.10/GES_MW_002000_010000/gir_00185813-0059099_H875.7.fit
7	download	00190068-0053372	8650	8650	/disk40/ges/ingest/fits/giraffe/stacked_v2.10/GES_MW_002000_010000/gir_00190068-0053372_H548.8.fit
8	download	00190068-0053372	8726	8726	/disk40/ges/ingest/fits/giraffe/stacked_v2.10/GES_MW_002000_010000/gir_00190068-0053372_H875.7.fit
9	download	00190307-0059267	8651	8651	/disk40/ges/ingest/fits/giraffe/stacked_v2.10/GES_MW_002000_010000/gir_00190307-0059267_H548.8.fit
10	download	00190307-0059267	8727	8727	/disk40/ges/ingest/fits/giraffe/stacked_v2.10/GES_MW_002000_010000/gir_00190307-0059267_H875.7.fit

(Query returned 10 result rows, all rows are shown in the displayed table.)

Please check the gesiDR2 entry in the [release history](#) for documentation pertaining to this release

QUERY FINISHED: Wed Nov 05 23:02:08 GMT 2014

Examples and Tutorials

[Home](#) | [Overview](#) | [Browser](#) | [Access](#) | [Login](#) | [Examples](#) 



Gaia-ESO Survey Science Archive

The Gaia-ESO Survey science archive comprises calibrated one- and two-dimensional spectra for stars observed in the **Gaia-ESO Survey** (GES), and a variety of astrophysical parameters (heliocentric radial velocity, effective temperature, surface gravity, metallicity *etc*) derived from these spectra.

GES is a public spectroscopic survey of approximately 100,000 stars, systematically covering all the major components of the Milky Way, from the halo to star-forming regions and providing the first homogeneous overview of the distributions of kinematics and elemental abundances. The target stars were observed using the **FLAMES spectrograph** on the **ESO VLT** at Paranal in Chile. The survey was conducted in support of the **ESA Gaia** astrometric satellite, but will have numerous other uses.

Release notes give details of the **latest release** and the history of archive releases, updates and bug fixes is recorded under the **release history** page.

Please note that all use of parameters obtained from the archive in publications and analyses leading to publications must conform with the **PI Policy Statement** on the use of iDR2 parameters and abundances.

- [GES Home](#)
- [Start Here](#)
- [Data Overview](#)
- [Known Issues](#)
- [the Surveys](#)
- [Schema browser](#)
- [Data access](#)
- [Login](#)
- [Freeform SQL](#)
- [Example Queries](#)
- [Q&A](#)
- [Glossary](#)
- [Release History](#)
- [Gallery](#)
- [Publications](#)
- [Monitor](#)
- [Downtime](#)
- [Links](#)

[Home](#) | [Overview](#) | [Browser](#) | [Access](#) | [Login](#) | [Examples](#)

[Links](#) | [Credits](#)

WFAU, Institute for Astronomy,
Royal Observatory, Blackford Hill
Edinburgh, EH9 3HJ, UK
Tel +44 131 668 8356 (office)
or +44 131 668 8100 (switchboard)

ges-support@roe.ac.uk
15/7/2014



Examples and Tutorials



[Home](#) | [Overview](#) | [Browser](#) | [Access](#) | [Login](#) | [Examples](#) 

Example Queries

The **freeform SQL** gives you a flexible way of querying the archive. You can query any table or combination of tables and have control over the columns returned.

The following documentation is available to assist querying the archive. However, the GES data model (that is, the tables and views comprising the database and the columns that they contain) has changed significantly between releases. Thus, the details of querying the database also vary between releases. Below different sets of examples are given for the different releases and you should choose the ones appropriate to the release that you are using (which will usually be the most recent).

Release IDR2 (July 2014; *most recent*)

- a few **simple examples** to get started,
- some **more extensive examples**, which are also available as a PDF file for **download** (180 Kbyte),
- a **SQL cookbook** with a general introduction to SQL. *This document pertains to release IDR1 but is nonetheless useful as an introduction to SQL.*

The **startHere** page gives additional details of the GES archive. The archive database structure (tables and columns *etc*), is documented in the **schema browser**.

Release IDR1 (August 2013)

- a few **simple examples** to get started,
- some **more extensive examples**, which are also available as a PDF file for **download** (140 Kbyte),
- a **SQL cookbook** with a general introduction to SQL.

Release IDR1Prelim (May 2013)

Use the examples for the iDR1 release (above), but proceed with caution as some details are different.

[GES Home](#)
[Start Here](#)
[Data Overview](#)
[Known Issues](#)
[the Surveys](#)
[Schema browser](#)
[Data access](#)
[Login](#)
[Freeform SQL](#)
[Example Queries](#)
[Q&A](#)
[Glossary](#)
[Release History](#)
[Gallery](#)
[Publications](#)
[Monitor](#)



Future Plans

- Continue to make Consortium releases as the project progresses.
- Public releases:
 - will eventually need to make public releases (with unrestricted access),
 - no detailed plans yet.
- Further improve the examples and tutorials, and the Web pages generally:
 - suggestions welcome!
- Enhancements to the functionality.

Enhancements

- Improvements that are desirable but not strictly necessary:
 - 'wouldn't it be nice if...'
- Provide Web pages where common types of queries can be submitted by completing forms,
 - rather than typing SQL.
- Table of clusters observed in the survey,
 - linked to the stars in the Target table that are part of the cluster.
- Other suggestions most welcome...



Using the GES Science Archive

Clive Davenhall, Ross Collins, Mike Read,

Eckhard Sutorius and Nigel Hambly

(Wide Field Astronomy Unit, University of Edinburgh),

Anna Hourihane and Clare Worley

(Institute of Astronomy, University of Cambridge)

GES 2014: Gaia-ESO Survey Second Science Meeting

10-13 November 2014, Porto, Portugal