Using the GES Science Archive

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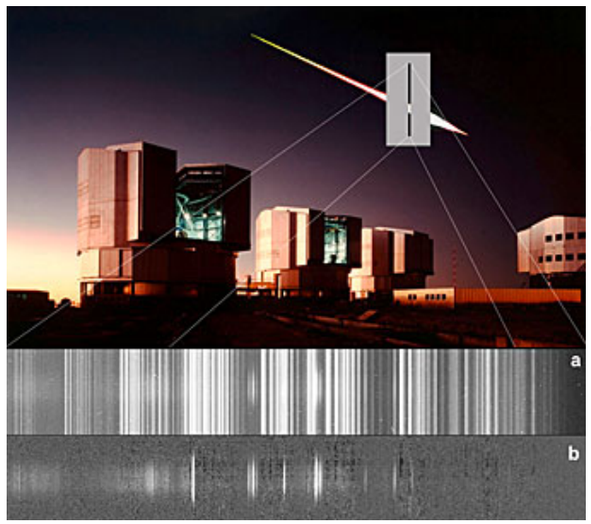
GES Science Archive: Data Flow

Where does the GES Science Archive fit into the Gaia-ESO Survey?



UVES / Giraffe Spectra

Spectra data reduction pipeline Cambridge etc. velocities etc.

iDR X Reduced Spectra

Node / Working Groups 10-15 Analysis for Astrophysical Parameters and Abundances

iDR X Analyses

GES Archive

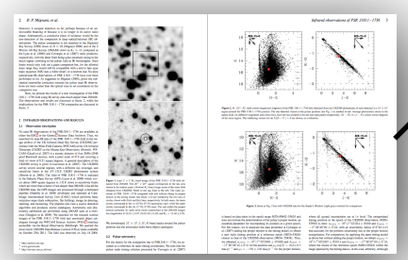
GES Consortium

iDR X

Version Y Line List

Atomic / Molecular Line Lists

Science



Reference to GES Archive iDR X

Public Release

Wider Astronomy Community

GES Science Archive

What is a Science Archive?

- Not a simple repository of dumped data output from a survey
- Data in a science archive should be:
    - Well described / documented
    - Versioned
    - Persistent
    - Linked both internally and externally
    - Interactive and easily queried

GES Science Archive

Where is the GES Science Archive?

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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.

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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)

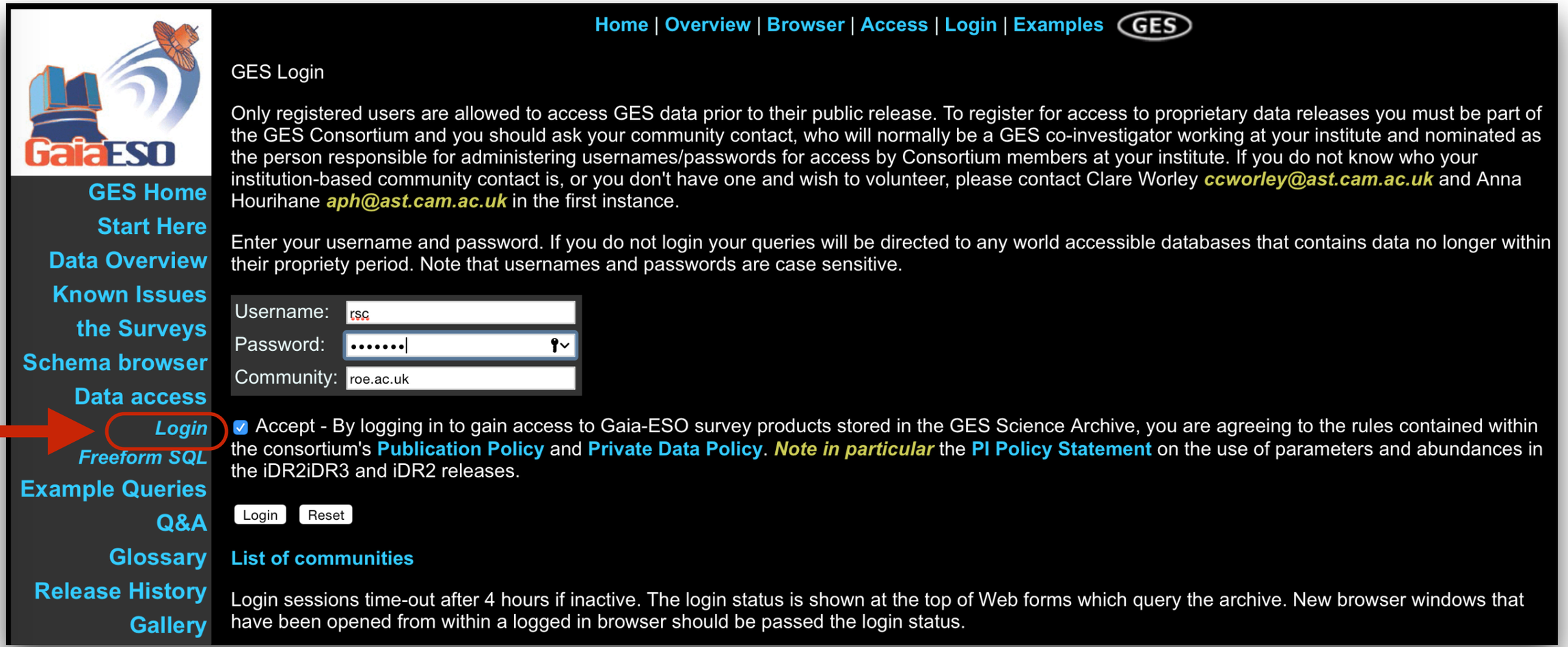
ges-support@roe.ac.uk
20/1/2015

http://ges.roe.ac.uk

GES Science Archive: Data Access

- Access is only granted to consortium members at present (eventually - after the final data release we'll open the archive to the wider public)

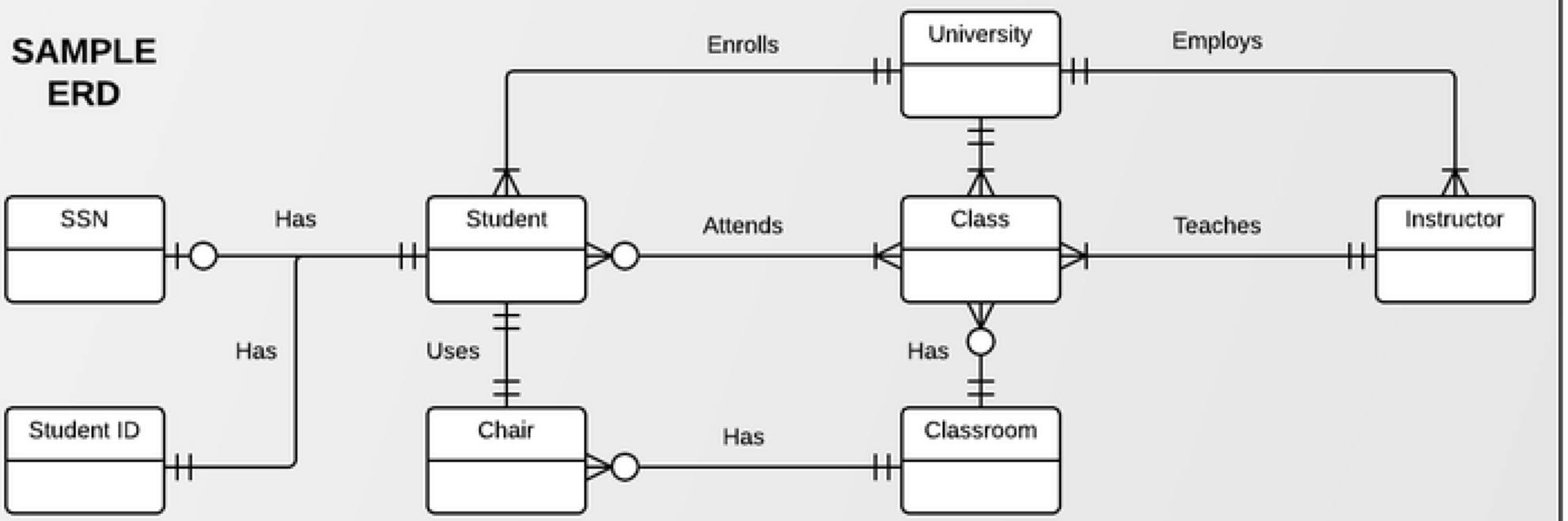
- Authorisation / authentication is distributed amongst community contacts: one per institution



Data Model Diagram Crib Sheet

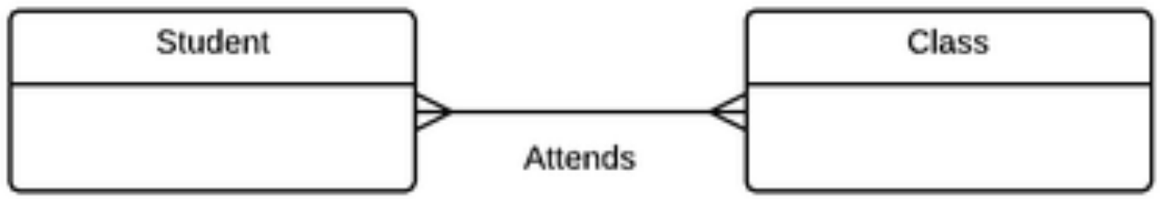
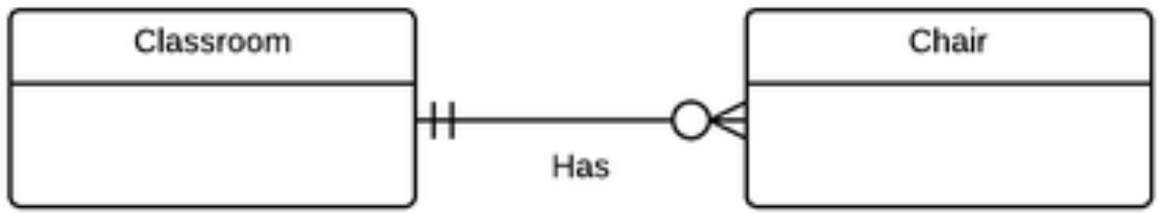
ERD "Crow's Foot" Relationship Symbols [Quick Reference]

Created by Vivek M. Chawla | @VivekMChawla | April 7, 2013

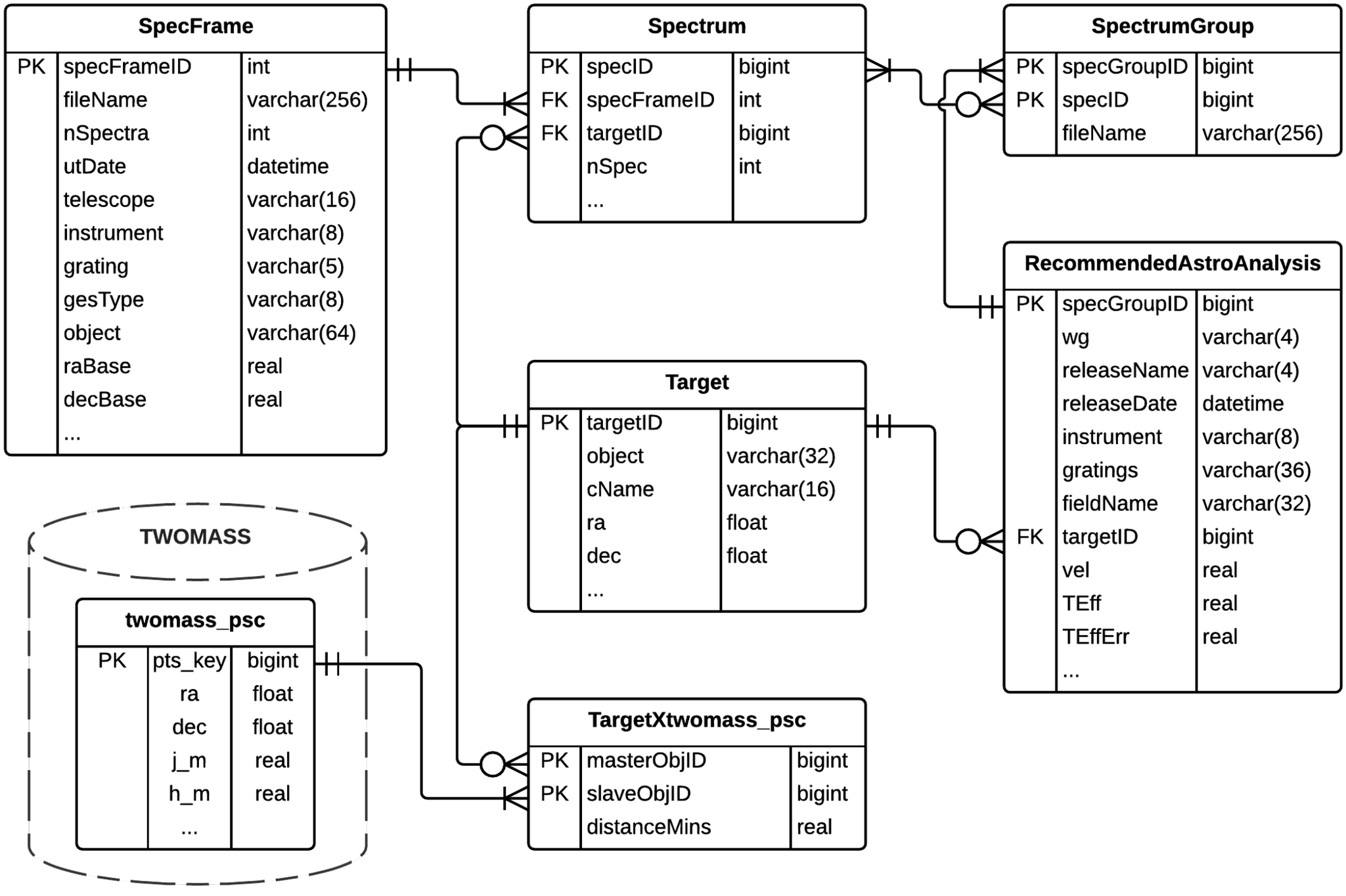


Notation	Meaning	Example
——	Relationship	Student — Enrolls — University
——|	One	Student — Has — Student ID Number

Data Model Diagram Crib Sheet

	Many	
	One and ONLY One	
	Zero or One	
	One or Many	
	Zero or Many	

Main Data Model



Schema Browser

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- SSA
- TWOMASS

TABLE VIEW **RecommendedAstroAnalysis**

Overall recommended astrophysical parameter and abundances analyses

The final, overall astrophysical parameter and abundances for each star recommended by the GES Consortium. These values have been collated and and assembled by GES working group 15. They are the values most likely to be used by individuals not deeply involved in the GES Consortium.

Notes:
All abundances of element X are given in the following format:

$\log \varepsilon(X) = \log(N_X/N_H) + 12.0$

Upper_Combined_X allowed flag values are:
0 = neutral detection;
1 = neutral upper limit;
2 = detection for combined results (neutral & ionised element);
3 = upper limit for combined results (neutral & ionised element)

Upper_X allowed flag values are:
0 = ionised detection
1 = ionised upper limit

Allowed values for limit flags on abundances derived from equivalent widths and photometric temperatures:
0 = detection;
1 = upper limit
The details and SQL SELECT corresponding to this view are available **here**.

Name	Type	Length	Unit	Description	Default Value	Unified Content Descriptor
specGroupID	bigint	8		Spectrum group identifier: unique identifier for each group of spectra that went into the analysis.	-99999999	
nodeID	tinyint	1		Node identifier: unique identifier, only within a given working group, for the node that contributed this analysis (nodeID = 1 for the recommended values from the combined analysis).	0	
nodeName	varchar	32		Name of working group node that contributed this analysis (nodeName = wg for the recommended values from the combined analysis).	'NONE'	
wg	varchar	4		GES working group which provided the data (one of: WG10, WG11, WG12, WG13).	'NONE'	
isWgParams	tinyint	1		Flag; 1 = working group recommend parameters, 0 = node analysis parameters	0	

Default Values

- Our database defines a different set of default values to those found in the homogenised FITS files we receive

- This is to make the business of querying the archive with freeform SQL queries simpler as defaults can be easily excluded in typical range queries

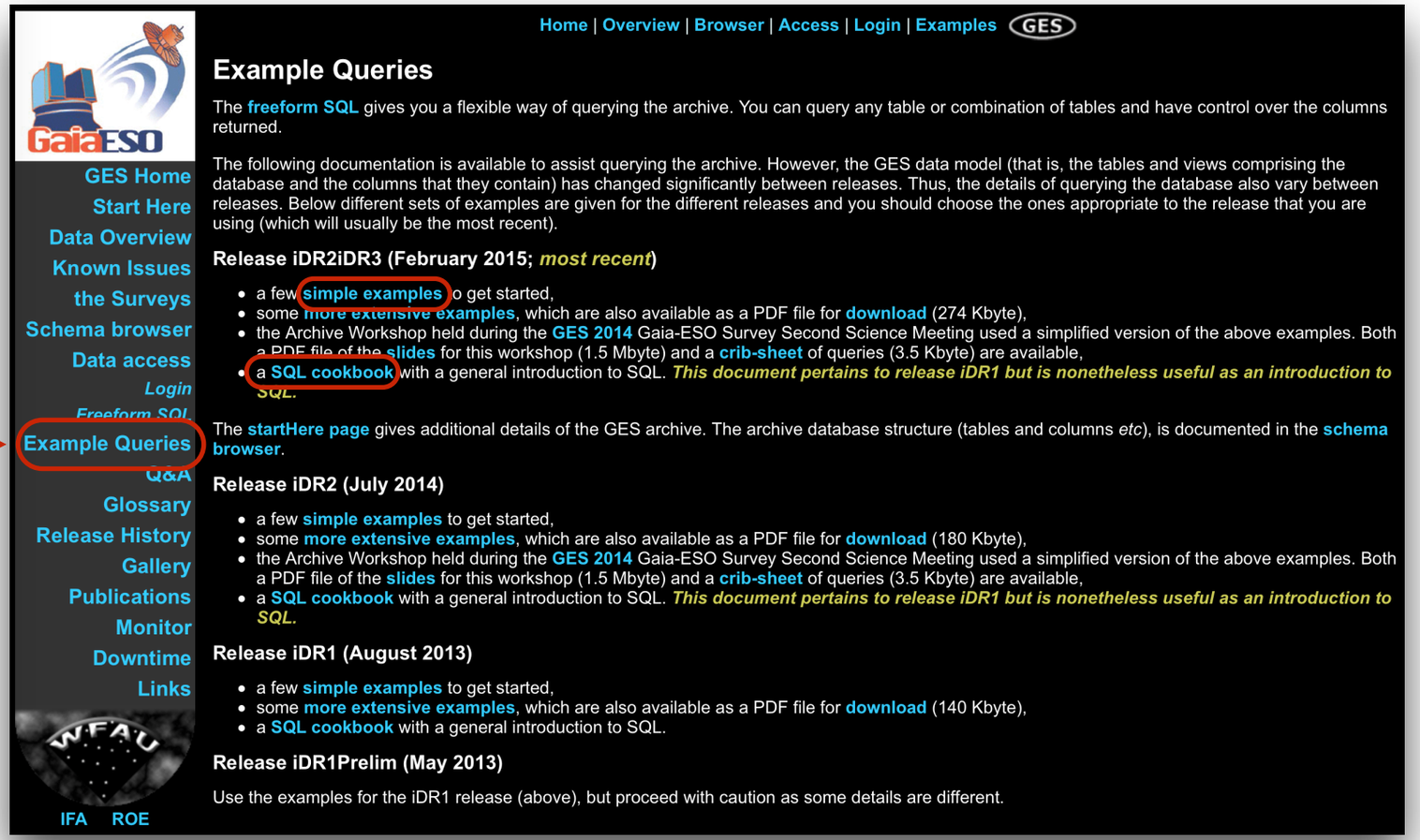
bigint	-99999999	float/real	-9.999995e+08
int	-99999999	datetime	9999-12-31
smallint	-9999	varchar(<4)	---
tinyint	0	varchar(>3)	NONE

- Most table include a row that consists only of default values to aid queries that join tables on keys that may contain default values

SQL Cookbook

- Access to the data in the database is through freeform SQL queries, which gives you a lot of control and power, but can appear daunting at first.

- The SQL Cookbook is designed to hand-hold users through their first queries of the archive as well as providing more advanced examples



Query Interface

Query Results

GES Database - SQL Query Results

Data file generating queries can take a bit longer to execute as they write to a file ALL rows returned by the query.

A web link to your generated output file will appear at the bottom of this page.

Connecting to gesiDR2iDR3 database
QUERY STARTED: Mon Nov 30 14:38:48 GMT 2015 [1 active, 5 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 TEff, logG FROM RecommendedAstroAnalysis WHERE TEff > 0 AND logG > 0

••• OK

	TEff	logG
1	+3997.025000	+4.497327
2	+5396.090000	+4.330000
3	+4930.430000	+4.670000
4	+5210.080000	+4.570000
5	+5692.690000	+4.470000
6	+5293.100000	+4.500000
7	+5615.380000	+4.490000
8	+5701.640000	+4.630000
29	+6867.000000	+4.320000
30	+5191.000000	+4.620000

(Query returned 15558 result rows, only the first 30 rows are shown in the displayed table.)

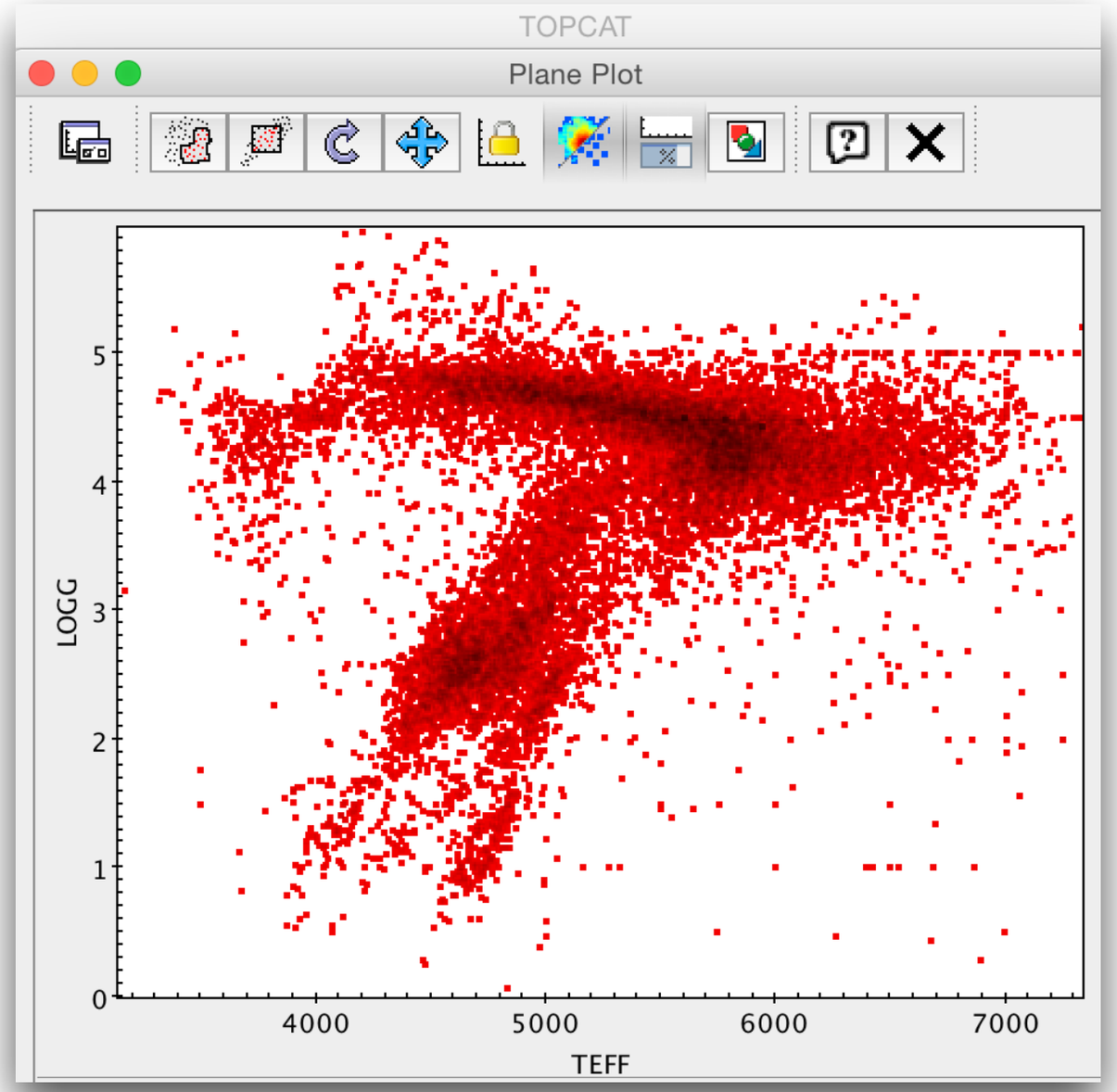
Please check the gesiDR2iDR3 entry in the release history for documentation pertaining to this release

Download Results File , your results in a gzipped FITS file (Contains **15558 rows**, 75.7 KB)

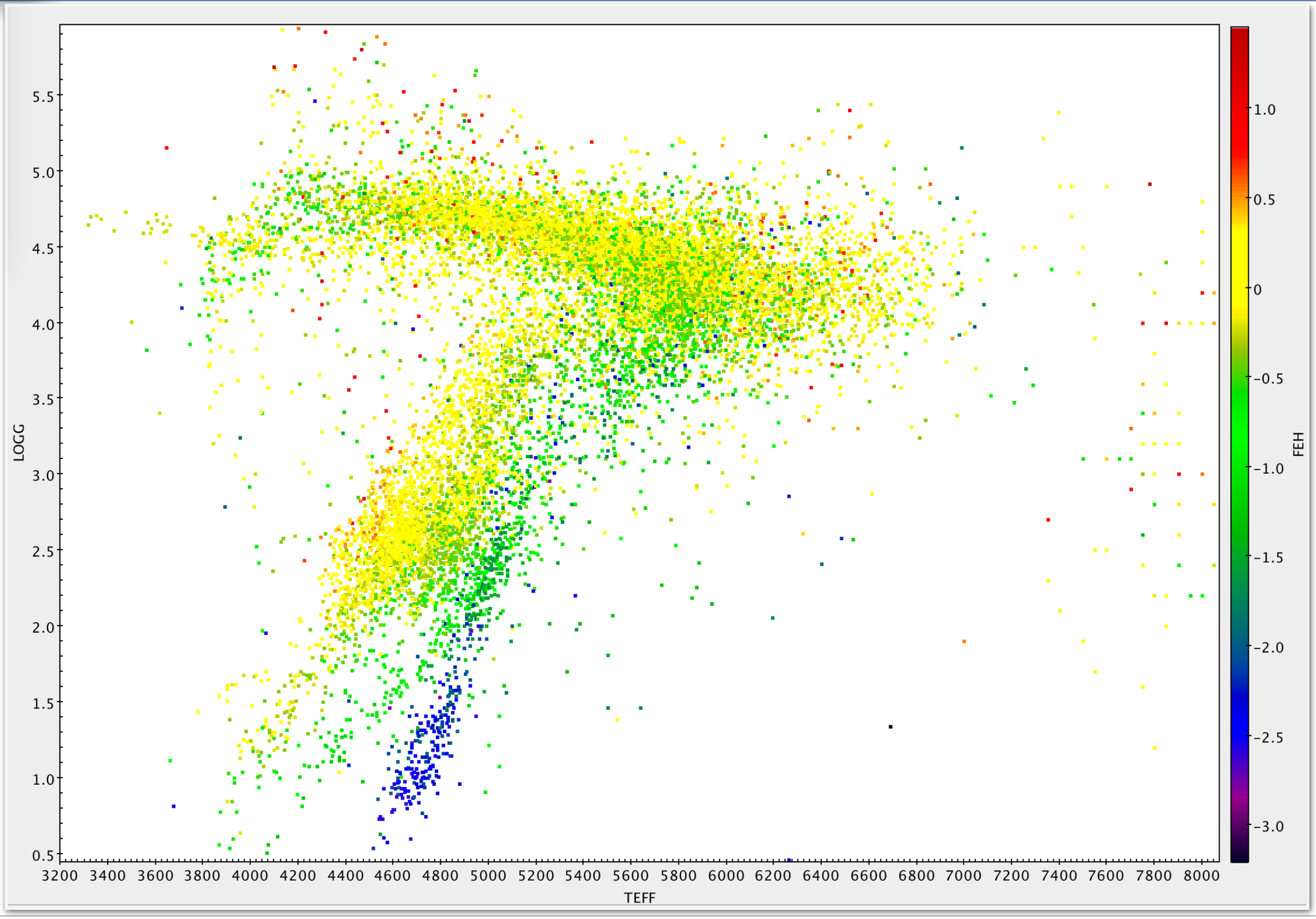
Launch file in Topcat (re es Java 1.5 and Java Web Start, approx 12Mb download for Topcat application)

QUERY FINISHED: Mon Nov 30 14:38:56 GMT 2015

Click your browsers 'BACK' button to try another query...



Adding FeH as 3rd dimension



Downloading the Spectra

GES Database - SQL Query Results

Connecting to gesiDR2iDR3 database
QUERY STARTED: Mon Nov 30 15:13:24 GMT 2015 [1 active, 9 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, TEff, logG, FeH, fileName FROM SpectrumGroup AS G, RecommendedAstroAnalysis AS A WHERE G.specGroupID=A.specGroupID AND fileName LIKE '%ges%'

- OK

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

	getFLink	cName	TEff	logG	FeH	fileName
1	download	19241116+0127147	+7069.343300	+4.279100	+0.128300	/disk50/ges/ingest/fits/giraffe/stacked_v3.03/GES_CRT_192445_012455/gir_19241116+0127147_H548.8.fit
2	download	19241116+0127147	+7069.343300	+4.279100	+0.128300	/disk50/ges/ingest/fits/giraffe/stacked_v3.03/GES_CRT_192445_012455/gir_19241116+0127147_H875.7.fit
3	download	19241441+0117488	+4518.941000	+3.374200	-0.158500	/disk50/ges/ingest/fits/giraffe/stacked_v3.03/GES_CRT_192445_012455/gir_19241441+0117488_H548.8.fit
4	download	19241441+0117488	+4518.941000	+3.374200	-0.158500	/disk50/ges/ingest/fits/giraffe/stacked_v3.03/GES_CRT_192445_012455/gir_19241441+0117488_H875.7.fit
5	download	19241663+0120436	+4573.762700	+2.932500	-0.297100	/disk50/ges/ingest/fits/giraffe/stacked_v3.03/GES_CRT_192445_012455/gir_19241663+0120436_H548.8.fit
6	download	19241663+0120436	+4573.762700	+2.932500	-0.297100	/disk50/ges/ingest/fits/giraffe/stacked_v3.03/GES_CRT_192445_012455/gir_19241663+0120436_H875.7.fit
7	download	19242022+0124433	+4566.779000	+2.741400	-0.237400	/disk50/ges/ingest/fits/giraffe/stacked_v3.03/GES_CRT_192445_012455/gir_19242022+0124433_H548.8.fit
8	download	19242022+0124433	+4566.779000	+2.741400	-0.237400	/disk50/ges/ingest/fits/giraffe/stacked_v3.03/GES_CRT_192445_012455/gir_19242022+0124433_H875.7.fit
9	download	19242607+0113438	+4559.623000	+2.939300	-0.443900	/disk50/ges/ingest/fits/giraffe/stacked_v3.03/GES_CRT_192445_012455/gir_19242607+0113438_H548.8.fit
10	download	19242607+0113438	+4559.623000	+2.939300	-0.443900	/disk50/ges/ingest/fits/giraffe/stacked_v3.03/GES_CRT_192445_012455/gir_19242607+0113438_H875.7.fit

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

Please check the gesiDR2iDR3 entry in the release history for documentation pertaining to this release

QUERY FINISHED: Mon Nov 30 15:13:25 GMT 2015

Click your browsers 'BACK' button to try another query...

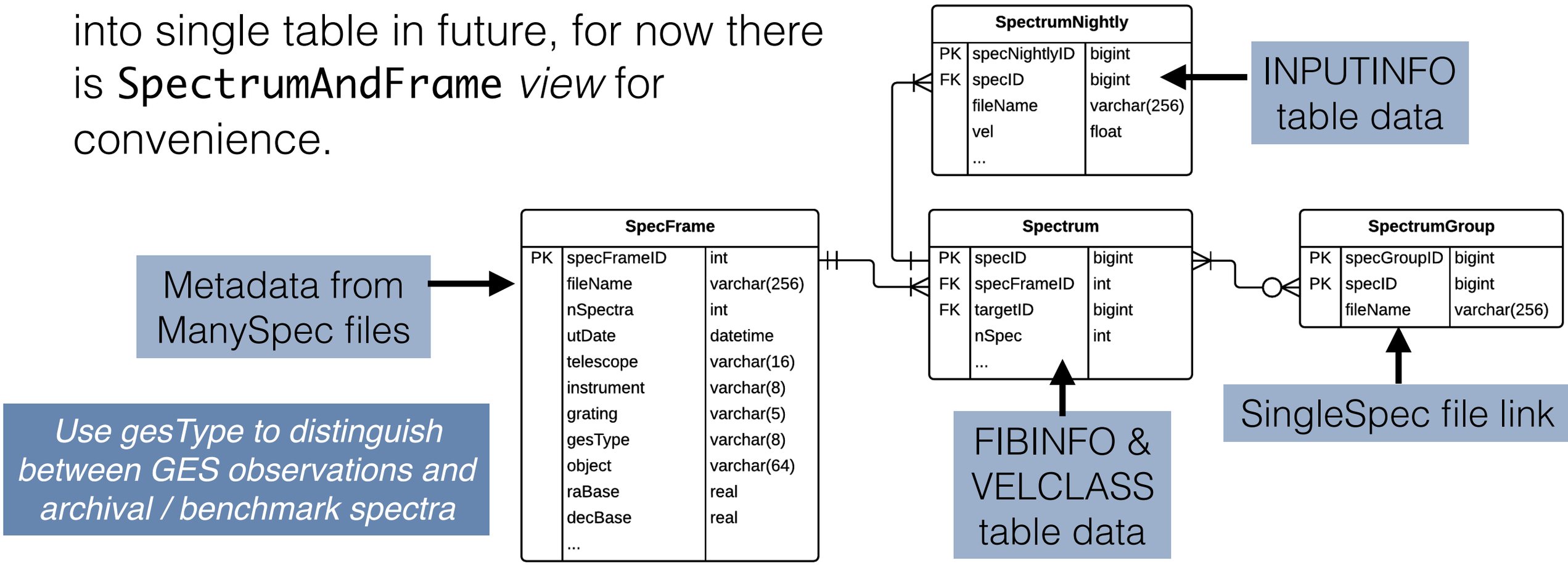
Queries that include a "`fileName`" column (from `SpectrumGroup` or `SpecFrame`) return links to download the spectrum files in the HTML table of results

For downloading lots of spectra at once: see Workshop example

Spectra Types

- ***New for iDR2iDR3***: `SpectrumNightly` table
  - Nightly stacks for each target (from INPUTINFO table in SingleSpec files). Individual measurements to follow…

- May combine `SpecFrame` & `Spectrum` into single table in future, for now there is `SpectrumAndFrame` *view* for convenience.



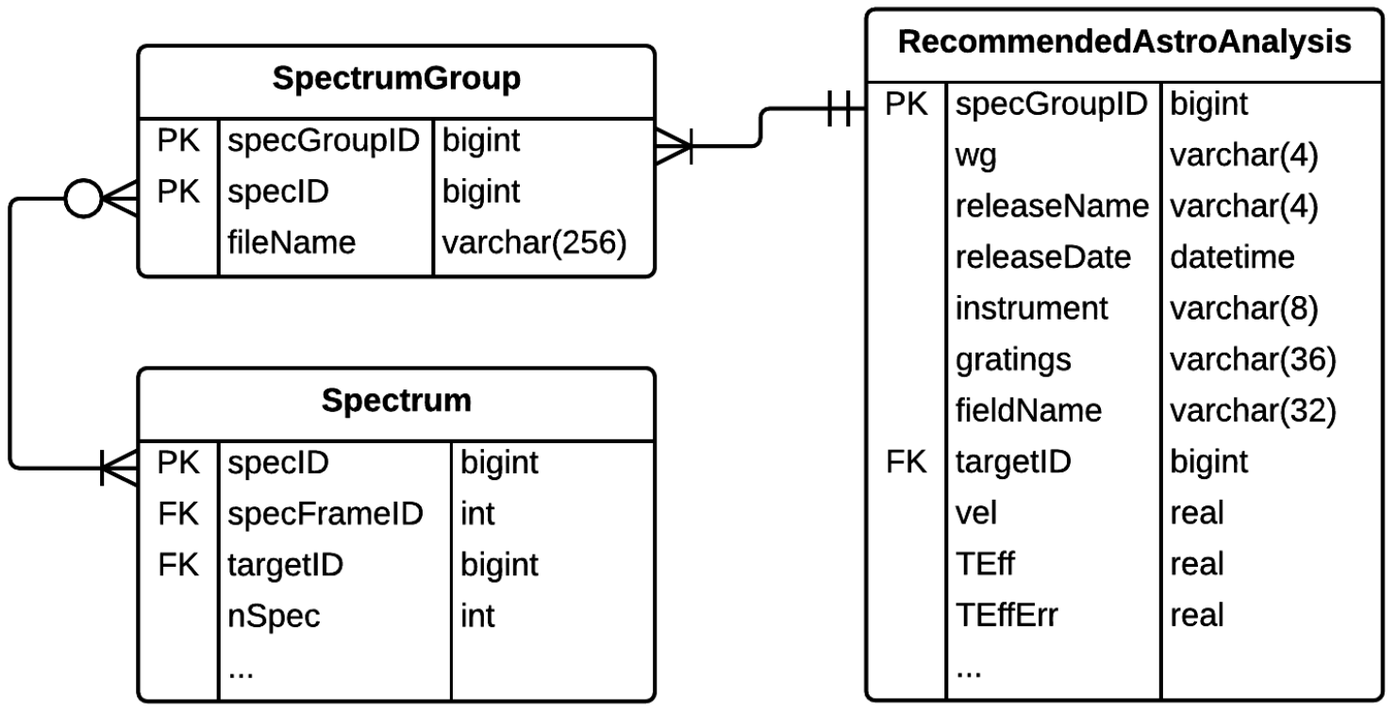
Analysis Tables

- The `AstroAnalysis` table hosts all the analyses of astrophysical parameters and abundances by the nodes and working groups.

- One analysis row can represent the combined analysis of several spectrum files for a given target

- Therefore it relates to `Spectrum` table via `SpectrumGroup` describing the group of spectra that form the analysis

- If the same set of spectra are analysed separately by different working groups or nodes then they will share a `specGroupID`



Analysis Tables

For convenience we have *views* of the `AstroAnalysis` table that just present particular slices of the complete data:

View name	WG	nodeID	isWgParams
`RecommendedAstroAnalysis`	15	1	
• just the WG15 results			
`WgRecommendedAstroAnalysis`	10-14	1	
• WG10-14 recommended values			
`WpNaAstroAnalysis`	*	> 1	1
• WG recommended parameters combined with node abundances			
`NpNaAstroAnalysis`	*	> 1	0
• individual node values			
`SpectrumOutlierAnalysis`	14		
• just the WG14 flags			
`RecommendedOutlierAnalysis`			
• just the WG14 flags for the WG15 recommended results (together with flags values from WG15)			

Line List Tables

- Similarly the `LineList` table hosts all the atomic and molecular line data used in the astrophysical analysis of spectra and there are views to slice the data:

  - `LineAtomNoHfs (ltype=3)` - atomic line, no hyperfine splitting
  - `LineAtomHfs (ltype=2)` - atomic line with hyperfine splitting
  - `LineMol (ltype=1)` - molecular lines
  - `LineMolAtomHfs (ltype=1 or 2)`

- Line lists are released on a separate timetable to the spectra and astrophysical analyses: current version is version 4

- Bibliographic references available via our Schema Browser

Cross-matching with other surveys

- GES Targets are cross-matched to sources in other surveys that are also archived by WFAU. All neighbouring sources within 10".

  - **2MASS** - Two-micron All Sky Survey
  - **SSA** - Super Cosmos Science Archive (visible all sky digitised plate survey)
  - **VHS** - VISTA Hemisphere Survey (infrared digital VIRCAM survey)

- Other surveys are available, without pre-calculated cross matches at present, but can be requested and may well appear in the iDR4 release:

  - all VISTA surveys: VVV, VMC, VIKING, VIDEO
  - UKIDSS (though northern hemisphere only, so less useful)
  - VST visible digital OmegaCAM surveys: ATLAS, VPHAS
  - Local copies of: Sloan SDSS, GLIMPSE etc. all available

Cross-matching example

GESv20150814

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  - gesiDR4GiraffeSpectra
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      - LineMol
      - LineMolAtomHfs
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      - RecommendedAstroAnalysis
      - RecommendedOutlierAnalysis
      - SpecFrame
      - SpecFrameFitsKey
      - Spectrum
      - SpectrumAndFrame
      - SpectrumGroup
      - SpectrumNightly
      - SpectrumOutlierAnalysis
      - Target
      - TargetXatlasSource
      - TargetXSSASource
      - TargetXtwomass_psc
      - TargetXvhsSource

TABLE TargetXvhsSource

Cross-neighbours between the GES Target catalogue and the VISTA VHS.

All the sources in the VISTA VHS Source catalogue within 10 arcsec of each star in the GES Target catalogue are recorded in this cross-neighbour table. The Target table was joined to the VSA..vhsSource table to create these cross-neighbours. Use this table for any cross-querying of GES target stars with VISTA VHS sources.

Required constraints:

- **Primary key** is (masterObjID, slaveObjID)
- (masterObjID) references Target(targetID)
- (slaveObjID) references VSA..vhsSource(sourceID)

Name	Type	Length	Unit	Description	Default Value	Unified Content Descriptor
masterObjID	bigint	8		The unique ID in Target (=targetID)		meta.id;meta.main
slaveObjID	bigint	8		The unique ID of the neighbour in VSA..vhsSource (=sourceID)		meta.id;meta.dataset
distanceMins	real	4	arcminutes	Angular separation between neighbours		pos.angDistance
Total length		**20**				

Join Target with TargetXvhsSource on targetID:

```
SELECT GES.targetID, VHS.sourceID, VHS.jmksPnt
FROM Target AS GES, VHSDR1..vhsSource AS VHS, TargetXvhsSource
WHERE masterObjID=GES.targetID AND slaveObjID=VHS.sourceID
AND distanceMins<0.1
```

Cross-matching results

GES Database - SQL Query Results

Connecting to gesiDR2iDR3 database
QUERY STARTED: Tue Dec 01 12:19:10 GMT 2015 [1 active, 69 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 GES.targetID, VHS.sourceID, VHS.jmksPnt FROM Target AS GES, VHSDR1..vhsSource AS VHS, TargetXvhsSource WHER
masterObjID=GES.targetID AND slaveObjID=VHS.sourceID AND distanceMins<0.1

- OK

	targetID	sourceID	jmksPnt
1	1	472499719655	-9.999995E008
2	1	472499734128	-9.999995E008
3	1	472499734146	-9.999995E008
4	1	472499734147	-9.999995E008
5	1	472499734148	-9.999995E008
6	213	472566793767	+0.294574
7	214	472566803062	-0.028970
8	214	472566803063	+0.791998
9	215	472566804508	-0.053621
10	216	472566799051	+0.353453

Can query on any combination of GES or VHS database parameters and retrieve all the results from all the surveys you are interested in (can even join more than 2 surveys at once). Not just the source catalogue can be queried but the whole archive: light-curves, proper motions etc.

Current Status and the Future

- Database releases are persistent, so previous versions are always available: allows you to cite a database release in your publications and your future readers should also be able to retrieve the same results (you can even include your SQL queries to help them!)

- Presently available:
  - iDR1
  - iDR2
  - iDR2iDR3

- iDR4 is almost ready: just awaiting some final missing data

- iDR5 should be released as soon as WG15 results are available in 2016

Workshop

Live Demo and work through hands-on examples

Prerequisites:

- We need an internet connection
- GES Science Archive login credentials
- Web browser + ideally either TOPCAT or Java Web Start

Link to crib sheet:

http://ges.roe.ac.uk/docs/ges2015_workshop_cribsheet.txt

- First step: everyone log into http://ges.roe.ac.uk
- Then navigate to the ***Freeform SQL Query*** page
- Select the **gesiDR2iDR3** database release

Workshop

Let's do some basic queries of the Target table to test everything is working and to find our feet with the web interface and SQL query language:

```
SELECT COUNT(*) FROM Target
```
⟶ 33887

```
SELECT * FROM Target
```

HINT: Check the Schema Browser for column details

```
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 BETWEEN 18.0 AND 18.5
ORDER BY bMag
```

Default ascending order: DESC for descending order

Retrieving information on a particular target:

```
SELECT * FROM Target WHERE cName = '11053303-7700120'

SELECT * FROM Target
WHERE cName IN ('11034945-7700101', '11044460-7706240')

SELECT * FROM Target
WHERE ra BETWEEN 70 AND 80 AND dec BETWEEN -45 AND -30

SELECT * FROM Spectrum WHERE cName ='11053303-7700120'
```

How many spectra are there for a particular target?

```
SELECT cName, COUNT(cName) AS num_of_spectra
FROM Spectrum
WHERE cName IN ('11034945-7700101','11044460-7706240')
GROUP BY cName
ORDER BY cName
```

→ Two each: UVES U/L CCD pair

Joining tables on their primary keys:

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      - SpecFrameFitsKey
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      - SpectrumGroup
      - SpectrumNightly
      - SpectrumOutlierAnalysis
      - Target
      - TargetXatlasSource
      - TargetXSSASource
      - TargetXtwomass_psc
      - TargetXvhsSource
      - WgRecommendedAstroAnalysis
      - WpNaAstroAnalysis

TABLE **Spectrum**

Details of individual spectra.

The Spectrum table lists details of individual spectra observed during the survey. Note that a given target star may (and often will) be observed more than once during the survey, so a given targetID may have several entries in the table; furthermore, early data releases may well contain several pipeline processed versions of the same data for a given target.

Required constraints:

- **Primary key** is (specID)
- (targetID) references Target(targetID)
- (specFrameID) references SpecFrame(specFrameID)

Name	Type	Length	Unit	Description	Default Value
specID	bigint	8		Spectrum identifier: unique identifier for each spectrum (4 MSB are the specFrameID; 4 LSB are the nSpec)	-99999999
specFrameID	int	4		SpecFrame identifier of the SpecFrame from which the spectrum was extracted	-99999999
targetID	bigint	8		Target identifer of the star being observed	-99999999
nSpec	int	4		The number of the spectrum {catalogue TType keyword: velclass.Nspec+Fibinfo.Nspec,NoName4.NSPEC,NoName3.NSPEC}	-99999999
nSpecOld	int	4		The number of the spectrum before unused fibres were culled (equivalent to the number of the fibre) {catalogue TType keyword: velclass.Nspec_old+Fibinfo.Nspec_old,NoName3.NSPEC_OLD}	-99999999
cName	varchar	16		Object name formed from the coordinates of the object (can be used in place of object to give a unique name) {catalogue TType keyword: Fibinfo.Cname}	'NONE'

Joining **Spectrum** to **SpecFrame** to retrieve ManySpec **fileName** and download link:

```
SELECT cName, rv, instrument, grating, fileName
FROM Spectrum, SpecFrame
WHERE cName IN ('11034945-7700101','11044460-7706240')
AND Spectrum.specFrameID=SpecFrame.specFrameID
```

Joining **RecommendedAstroAnalysis** to **SpectrumGroup** (for SingleSpec **fileName** and download link) and **Spectrum** to obtain pipeline quantities:

```
SELECT TEff, A.FeH, S.FeH AS "FeH (Spectrum)", rv, snr, fileName
FROM RecommendedAstroAnalysis AS A, SpectrumGroup AS G,
     Spectrum AS S
WHERE A.specGroupId = G.specGroupId
  AND G.specId = S.specId
  AND A.cName = '11053303-7700120'
```

Downloading lots of spectrum files at once:

Example, all SingleSpec spectra with WG15 recommended analyses from a particular cluster (select the Data Format ASCII FILE option before submitting query - uncompressed if you don't have gzip):

```
SELECT dbo.fWgetCmd(fileName)
FROM RecommendedAstroAnalysis A, SpectrumGroup G
WHERE fieldName="NGC2264" AND A.specGroupID=G.specGroupID
  AND fileName LIKE '%GES%'
```

Download Results File , your results in a gzipped CSV ASCII file (Contains **1694 rows**, 24.8 KB)

Assuming you have "**wget**" installed (and **gzip**: Macs automatically unpack the **gz** file) and **bash** or another suitable shell:

```
>gunzip results1_13_12_38_10.csv.gz
>bash results1_13_12_38_10.csv
```

← *Don't do this now!*

Looking at the nightly spectra measurements:

```
SELECT cName, instrument, grating,
CASE WHEN nDispElems<60000 THEN 'U' ELSE 'L' END AS "UVES CCD",
spec.rv as "Target Average RV",
sn.rv as "Nightly Average RV"

FROM Spectrum spec, SpectrumNightly sn, SpecFrame frame

WHERE spec.specID = sn.specID AND frame.specFrameID=spec.specFrameID
  AND spec.rv > -1000 AND sn.rv > -1000

ORDER BY cName
```

example of using the CASE statement to produce conditional results

	cName	instrument	grating	UVES CCD	Target Average RV	Nightly Average RV
1	00032138-4707227	UVES	580.0	U	+23.5473000	+23.2600000
2	00032138-4707227	UVES	580.0	U	+23.5473000	+23.3234000
3	00032138-4707227	UVES	580.0	U	+23.5473000	+23.2426000
4	00032138-4707227	UVES	580.0	U	+23.5473000	+23.6605000
5	00032138-4707227	UVES	580.0	U	+23.5473000	+23.5422000
6	00032138-4707227	UVES	580.0	L	+23.5337000	+23.3762000
7	00032138-4707227	UVES	580.0	L	+23.5337000	+23.5160000
8	00032138-4707227	UVES	580.0	L	+23.5337000	+23.6210000
9	00032138-4707227	UVES	580.0	L	+23.5337000	+23.5919000
10	00035412-4708421	UVES	580.0	L	+148.5529000	+148.4174000
11	00035412-4708421	UVES	580.0	L	+148.5529000	+148.5751000

Cross-linking GES with the VHS survey:

```
SELECT GES.targetID, VHS.sourceID, VHS.jmksPnt
FROM Target AS GES, VHSDR1..vhsSource AS VHS, TargetXvhsSource
WHERE masterObjID=GES.targetID AND slaveObjID=VHS.sourceID
  AND distanceMins<0.1
```

Finding the nearest matching source using the MIN function in a sub-query:

```
SELECT GES.targetID, VHS.sourceID, VHS.jmksPnt
FROM Target AS GES, VHSDR1..vhsSource AS VHS,
     TargetXvhsSource AS X
WHERE masterObjID=GES.targetID AND slaveObjID=VHS.sourceID
  AND distanceMins IN (SELECT MIN(distanceMins) FROM
TargetXvhsSource WHERE masterObjID=X.masterObjID)
```

Finding all analyses of particular group of spectra:

All working group recommended:

```
SELECT cName, wg, TEff, peculi
  FROM AstroAnalysis
 WHERE nodeID=1 AND specGroupID=879
```

Including node results too:

```
SELECT cName, wg, nodeName, TEff, peculi
  FROM AstroAnalysis
WHERE specGroupID=879
```

	cName	wg	nodeName	Teff	peculi
1	17463553+0531076	WG10	WG10	+3718.000000	
2	17463553+0531076	WG10	EPINARBO	+3727.000000	
3	17463553+0531076	WG10	OACT	+3709.000000	
4	17463553+0531076	WG12	WG12	+3717.975000	1011A|1013A
5	17463553+0531076	WG12	Arcetri	-9.999995E008	
6	17463553+0531076	WG12	CAUP	-9.999995E008	
7	17463553+0531076	WG12	OACT	+3709.000000	
8	17463553+0531076	WG12	OAPA	+3726.950000	1013A
9	17463553+0531076	WG14	WG14	-9.999995E008	1013A
10	17463553+0531076	WG15	WG15	+3717.975000	1011A|1013A|1013A

Comparing analyses between multiple working groups with a self-join:

```
SELECT WG10.TEff AS 'WG10 TEff', WG12.TEff AS 'WG12.TEff',
       WG10.peculi AS 'WG10.peculi', WG12.peculi as 'WG12.peculi'

  FROM WgRecommendedAstroAnalysis AS WG10,
       WgRecommendedAstroAnalysis AS WG12

WHERE WG10.wg='WG10' AND WG12.wg='WG12'
       AND WG10.specGroupID=WG12.specGroupID
       AND WG10.cName='17463553+0531076'
```

(Query returned 1 result row, all rows are shown in the displayed table.)

	WG10 TEff	WG12.TEff	WG10.peculi	WG12.peculi
1	+3718.000000	+3717.975000		1011A|1013A

Looking for peculiar objects' spectra using LIKE:

```
SELECT DISTINCT(WG14.specID), WG15.specGroupID, WG15.cName, WG15.Teff,
       WG15.peculi AS 'wg15_peculi', WG14.peculi AS 'wg14_peculi',
       WG14.fileName

  FROM RecommendedAstroAnalysis AS WG15, SpectrumOutlierAnalysis AS WG14,
       SpectrumGroup

 WHERE WG15.specGroupID=SpectrumGroup.specGroupID AND
       WG14.specID=SpectrumGroup.specID AND
       WG15.peculi LIKE '%2%c%' AND WG14.peculi LIKE '%2%a%' AND
       WG14.fileName LIKE '%ges%' AND WG15.TEff > 0

ORDER BY WG15.specGroupID
```

WG14 dictionary reference:
http://ges.roe.ac.uk/docs/outliers-classes-18062013.pdf

Retrieving ManySpec file name for multiple analyses:

```
SELECT A.specGroupID, A.cName, TEff, peculi, G.specID, ManySpec.fileName
  FROM RecommendedAstroAnalysis A, SpectrumGroup G, Spectrum S,
       SpecFrame ManySpec
 WHERE A.specGroupID=G.specGroupID AND G.specID=S.specID AND
       S.specFrameID=ManySpec.specFrameID AND
       A.specGroupID BETWEEN 364 AND 373
```

Analysis of 18035684-3002449 with unique ID 364 refers to spectra files that are not in the archive at present. The presence of a default row in each table means this query can still join all the tables and return results for every row, just providing defaults where entries are missing (this query is much more complex if we used null values)

(Query returned 4 result rows, all rows are shown in the displayed table.)

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

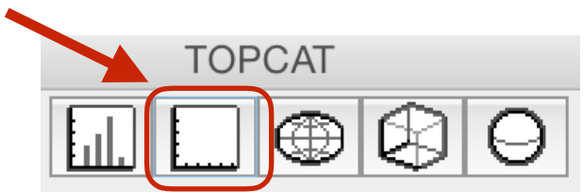
	getFLink	specGroupID	cName	TEff	peculi	specID	fileName
1		364	18035684-3002449	+4585.111300		-99999999	NONE
2		364	18035684-3002449	+4585.111300		-99999999	NONE
3	download	372	19241116+0127147	+7069.343300		52073	/disk50/ges/ingest/fits/giraffe/stacked_v3.03/GES_CRT_192445_012455/C20130822_00010_fn.fit
4	download	372	19241116+0127147	+7069.343300		52297	/disk50/ges/ingest/fits/giraffe/stacked_v3.03/GES_CRT_192445_012455/C20130915_00013_fn.fit

TOPCAT Plotting (HR Diagram example):

```
SELECT TEff, logG, FeH, fieldName
FROM RecommendedAstroAnalysis
WHERE TEff > 0 AND logG > 0 AND FeH > -10
```

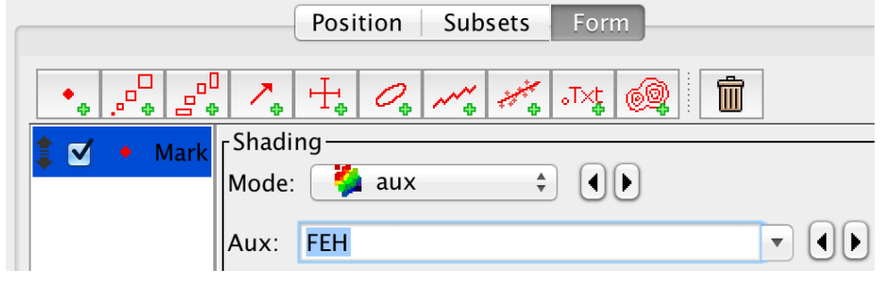
Select the Data Format FITS FILE option before submitting query, then on the results page just select “Launch file in Topcat” [if you have “Java Web Start” try it - it may work!], else, if you have a manual TOPCAT install, select “Download Results File” and open that file in TOPCAT:

Select “Plane Plot” in TOPCAT and Shift-Click to drag a selection to reduce plot range



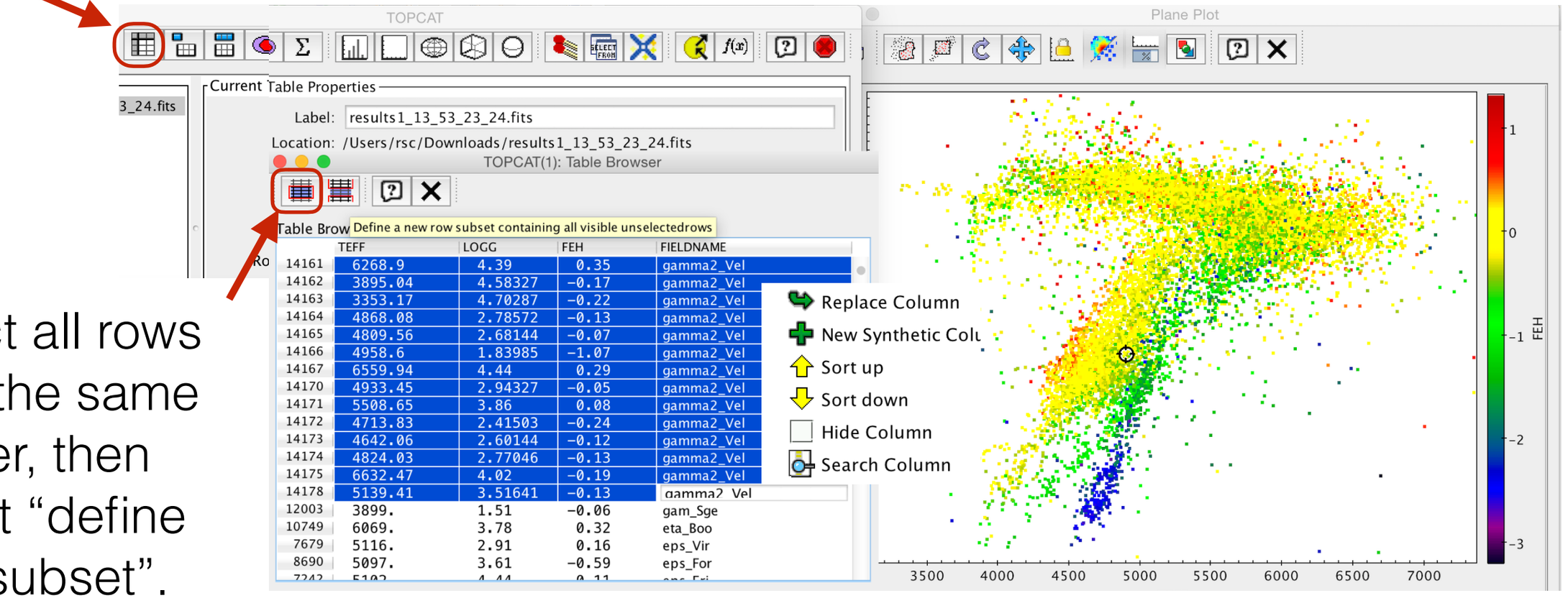
TOPCAT Plotting (HR Diagram example):

Including FeH as a colour gradient on the HR diagram:

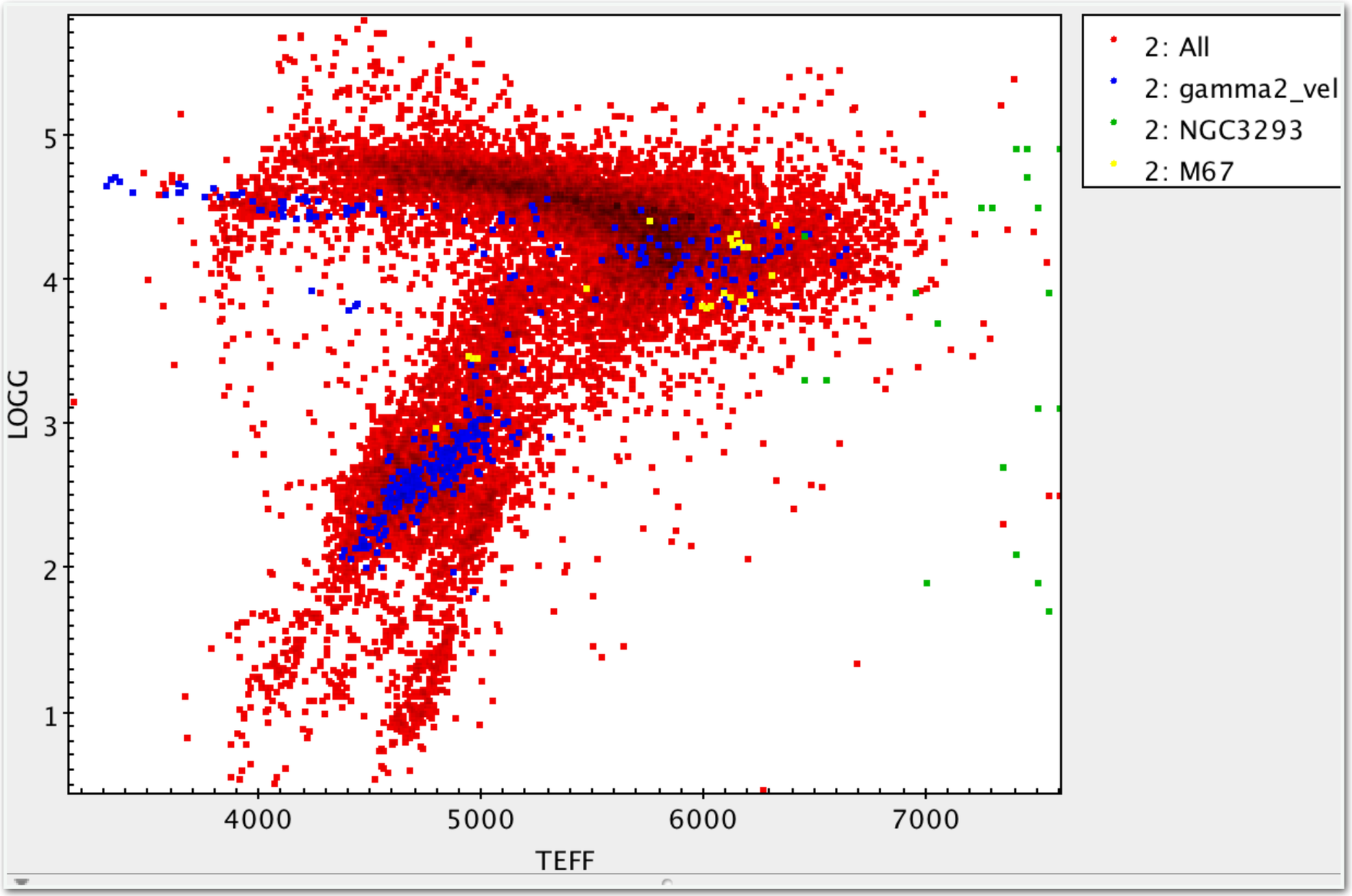


Select Table Browser, Right-Click FILENAME column to sort it.

Select all rows from the same cluster, then select “define new subset”.



TOPCAT Plotting (HR Diagram example):



Workshop

Support e-mail address, please send *any* queries here:

ges-support@roe.ac.uk

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- Crib sheet:
  - http://ges.roe.ac.uk/docs/ges2015_workshop_cribsheet.txt

- This presentation:
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