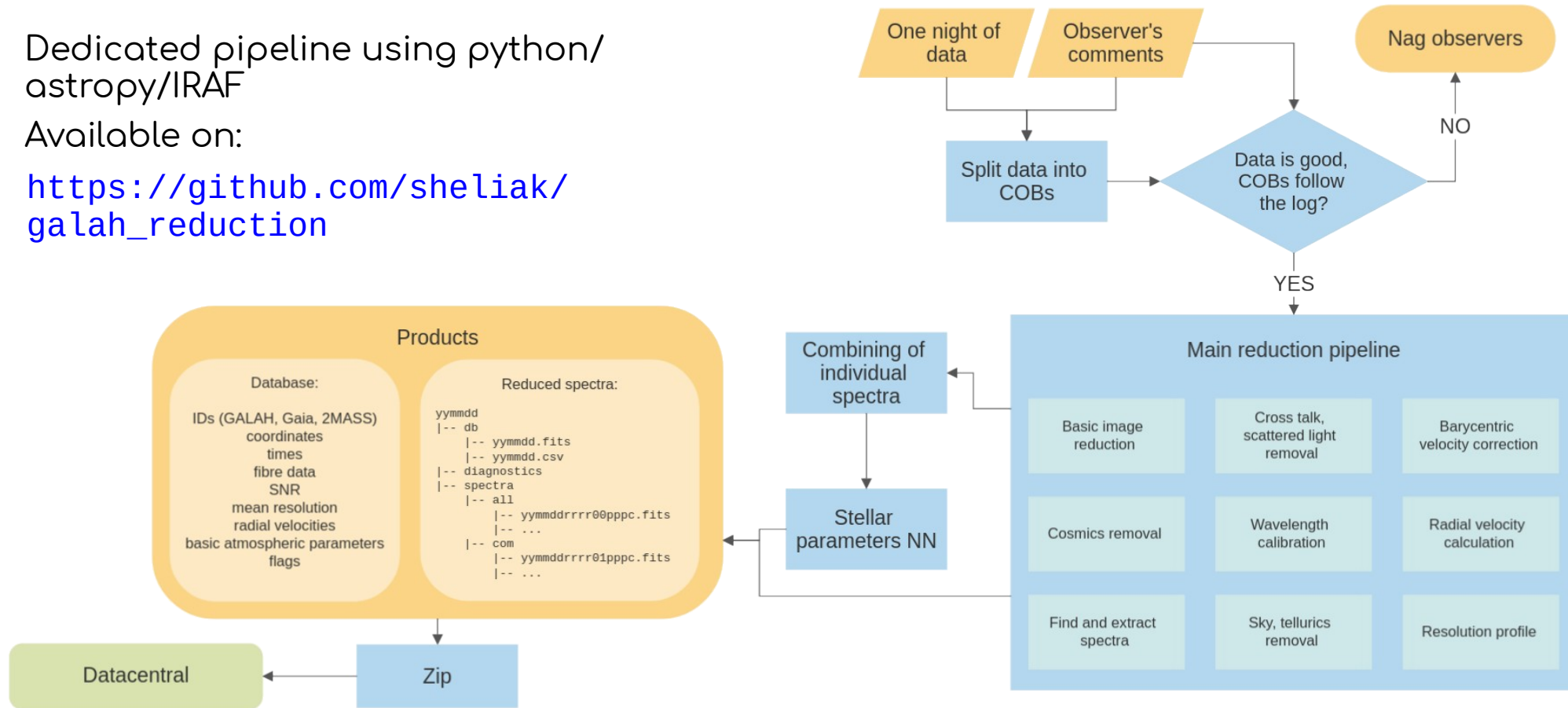


GALAH reduction pipeline

How it works

- Dedicated pipeline using python/astropy/IRAF
- Available on:

https://github.com/sheliak/galah_reduction



What is new

- master
10 branches
0

Go to file
Code

About

GALAH reduction code

Readme

GPL-3.0 license

1 star

4 watching

0 forks

Releases

No releases published

Packages

No packages published

Contributors

sheliax

kcotar

KevinBeeson

Languages

MAXScript 99.9%

Python 0.1%

sheliax
Create README

2020-11-10 15 days ago
132 commits

aux
Merge pull request #22 from sheliax/WhiteList-COBs
15 months ago

documentation
Create README
15 days ago

hivan_data
Added all files
2 years ago

parameters_model
Parameter names
2 years ago

rv_templates
added missing aux files
2 years ago

tools
removed useless print
2 years ago

utils
Merge pull request #21 from sheliax/hdfs-update
15 months ago

glignore
Updated model
2 years ago

LICENSE
Initial commit
2 years ago

README.md
Typos
15 months ago

cosmos.py
finished logging and added logger to extract. can now also change the...
2 years ago

extract_0.py
Support for different readout speeds, different resolution
12 months ago

hapi.py
Added all files
2 years ago

parameters_rn.py
Parameter names
2 years ago

run.py
Merge branch 'master' into onn-2
2 years ago

settings.py
Merge branch 'master' into onn-2
2 years ago

README.md

GALAH reduction pipeline

This is a package of programs and tools used to reduce spectra obtained by the HERMES instrument at the AAO. They are being developed to reduce data obtained by the GALAH survey and related programs. It is not guaranteed to produce trustworthy results or work at all for data outside the GALAH ecosystem.

Installation

GALAH reduction pipeline does not need to be installed. It depends on the following software that is needed to run the reduction pipeline.

Dependencies

 - Python 2.7
 - iraf
 - pyraf
 - scipy
 - numpy
 - astropy
 - matplotlib
 - pylab
 - imint
 - numdiffutils
 - ephem
 - json
 - joblib
 - h5py
 - galah_tools (included in this repository)

Using reduced GALAH data

Where to find it

- Datacentral

https://cloud.datacentral.org.au/apps/files?dir=/GALAH/obs/reductions/Iraf_6.0&fileid=15489397

Files | Data Central Cloud | Janez Kos (janez.kos@gmail.com)

All files > GALAH > obs > reductions > Iraf_6.0

Name	Size	Modified
220219	3.3 GB	4 months ago
220220	1.8 GB	4 months ago
220221	960.7 MB	2 months ago
220322	Pending	2 months ago
220324	Pending	2 months ago
documentation	17 KB	2 months ago
stats	39.4 MB	3 months ago
dr6.0.csv	886.8 MB	2 months ago
dr6.0.fits	608.9 MB	2 months ago
dr6.0.hdf5	608.9 MB	2 months ago
README	< 1 KB	5 months ago

548 folders and 4 files | 2.3 TB

Files | Data Central Cloud | Janez Kos (janez.kos@gmail.com)

All files > ... > Iraf_6.0 > documentation

Name	Size	Modified
changelog.txt	2 KB	2 months ago
db_description.txt	8 KB	a year ago
flags_description.txt	2 KB	2 months ago
folder_and_file_structure.txt	4 KB	a year ago
hdf5_combined_spectra_structure.txt	2 KB	a year ago

5 files | 17 KB

Files | Data Central Cloud | Janez Kos (janez.kos@gmail.com)

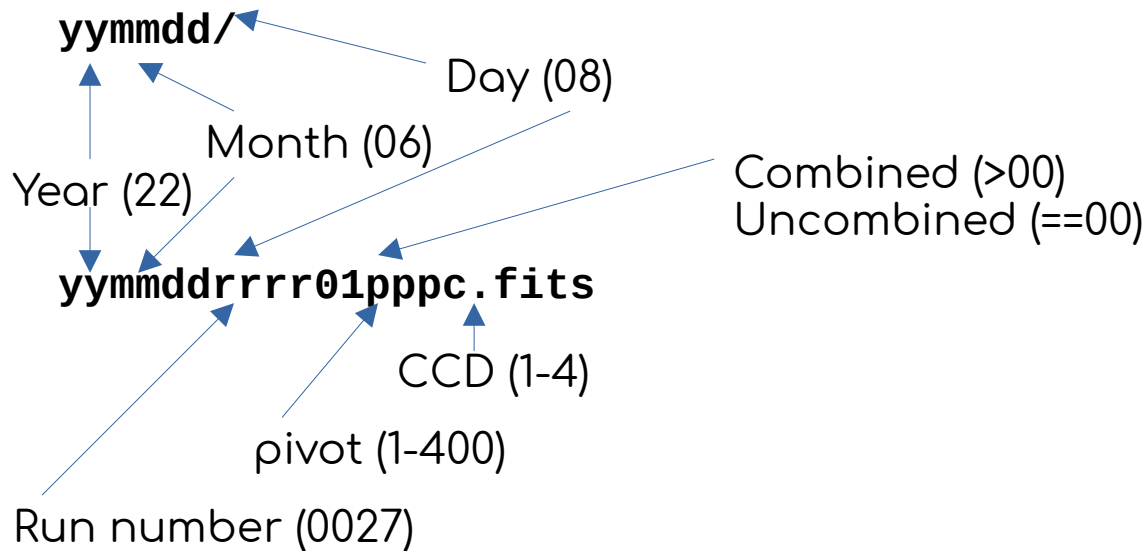
All files > ... > reductions > Iraf_6.0 > stats

Name	Size	Modified
allsky_equatorial.png	557 KB	3 months ago
allsky_galactic.png	547 KB	3 months ago
allsky_velocity.png	883 KB	3 months ago
alpha_fe.png	435 KB	3 months ago
cob_stats_0.pdf	25 KB	3 months ago
cob_stats_0.png	396 KB	3 months ago

Using reduced GALAH data

Folder structure

- spectra/com and spectra/all are zipped because Datacentral and Owncloud do not support millions of files.
- Naming conventions:



Name	Size	Type
210115	3 items	Folder
db	3 items	Folder
210115.fits	25.9 kB	Image
210115.hdf5	8.9 kB	Document
210115.txt	7.1 kB	Text
diagnostics	0 items	Folder
spectra	2 items	Folder
all	0 items	Folder
com	20 items	Folder
2101150001010021.fits	403.2 kB	Image
2101150001010022.fits	403.2 kB	Image
2101150001010023.fits	403.2 kB	Image
2101150001010024.fits	403.2 kB	Image
2101150001010031.fits	403.2 kB	Image
2101150001010032.fits	403.2 kB	Image
2101150001010033.fits	403.2 kB	Image
2101150001010034.fits	403.2 kB	Image
2101150001010041.fits	403.2 kB	Image
2101150001010042.fits	403.2 kB	Image
2101150001010043.fits	403.2 kB	Image
2101150001010044.fits	403.2 kB	Image
2101150001010051.fits	403.2 kB	Image
2101150001010052.fits	403.2 kB	Image
2101150001010053.fits	403.2 kB	Image
2101150001010054.fits	403.2 kB	Image
2101150022012391.fits	299.5 kB	Image
2101150022012392.fits	299.5 kB	Image
2101150022012393.fits	299.5 kB	Image
2101150022012394.fits	299.5 kB	Image
documentation	5 items	Folder
changelog.txt	2.5 kB	Text
db_description.txt	8.0 kB	Text
flags_description.txt	1.6 kB	Text
folder_and_file_structure.txt	4.0 kB	Text
hdf5_combined_spectra_structure.txt	1.8 kB	Text
stats	7 items	Folder
allsky_equatorial.png	570.3 kB	Image
allsky_galactic.png	560.4 kB	Image
README	2.8 kB	Text
repeats.png	1.3 MB	Image
resolution_fibres.png	1.6 MB	Image
snr.png	95.6 kB	Image
snr_per_element.png	98.9 kB	Image
210115.fits	256.3 kB	Image
dr6.0.fits	25.9 kB	Image
dr6.0.hdf5	8.9 kB	Document
dr6.0.txt	7.1 kB	Text
README	520 bytes	Text



Using reduced GALAH data

Database structure

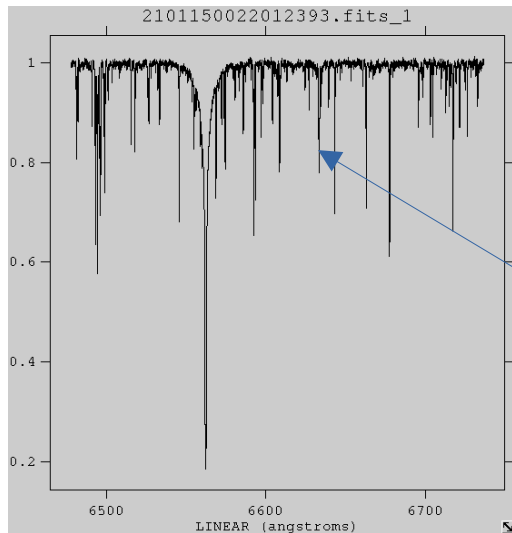
- Fits, csv, and hdf5 formats
- See `db_description.txt` in the documentation folder
- Entries can be arrays (array of four v_r in one column instead of four velocities in four columns)









	obj_name	galah_id	zmass	gaia_id	snr					
	gaiadr2_3335074476514836608	None	05505952+2759226	3335074476514836608	(22.1591, 43.2137, 58.58233, 69.493256)					
	gaiadr2_3335031144588572416	None	05492441+0800522	3335031144588572416	(24.49571, 47.767635, 70.07752, 76.79426)					
	gaiadr2_333504221377143687936	None	05481002+0805158	333504221377143687936	(27.617647, 41.06321, 40.64838, 47.30115)					
	gaiadr2_3335042281439724032	None	05481101+0804348	3335042281439724032	(17.927574, 25.585434, 31.410936, 28.5520...					
	gaiadr2_3335061866491047040	None	05510181+0755193	3335061866491047040	(16.26517, 29.6932, 39.34468, 44.152897)					
	gaiadr2_33350391847672737248	None	05480332+0759422	33350391847672737248	(19.744057, 31.98743, 42.36305, 42.803127)					
	gaiadr2_3335040082416484608	None	05474933+0800392	3335040082416484608	(24.311218, 35.413586, 42.2184, 40.678406)					
	gaiadr2_333504062235985408	None	05475376+0802148	333504062235985408	(20.966766, 30.76269, 41.157455, 36.7178...					
	gaiadr2_3335023860324040704	None	05491860+0754111	3335023860324040704	(24.349243, 38.31095, 48.748142, 47.14402...					
	gaiadr2_333496366358726144	None	05510880+0748577	333496366358726144	(27.028599, 44.824184, 60.87149, 61.35661)					
	gaiadr2_3334978441046247040	None	05500435+0752122	3334978441046247040	(16.27863, 27.331093, 33.79147, 38.49702)					
	gaiadr2_3334977616412276224	None	05500884+0751031	3334977616412276224	(19.527021, 35.74639, 49.356853, 53.8976...					
	gaiadr2_3335023207489011456	None	05484292+0755099	3335023207489011456	(15.8017845, 33.094986, 49.05827, 56.932...					
	gaiadr2_3335024513159069312	None	05485980+0755189	3335024513159069312	(20.21906, 25.93475, 42.89588, 43.24447)					
	gaiadr2_3334975417389045760	None	05492595+0751087	3334975417389045760	(42.79215, 61.87645, 75.0881, 72.14314)					
	gaiadr2_333496452532203648	None	05503856+0746121	333496452532203648	(10.293749, 18.748781, 26.16957, 31.64015...					
	gaiadr2_3334965139531175424	None	05502429+0746291	3334965139531175424	(15.03748, 30.953445, 46.87235, 53.336273)					
	gaiadr2_3334964319193779840	None	05503043+0745203	3334964319193779840	(11.172056, 20.073051, 29.050026, 31.0807)					
	gaiadr2_3334970740168530560	None	05495358+0744576	3334970740168530560	(25.310698, 50.56815, 75.68982, 85.681404)					
	gaiadr2_3335021803035855488	None	05490319+0751094	3335021803035855488	(36.948368, 56.103943, 72.558754, 86.0876...					
	gaiadr2_3334971809616520320	None	05494050+0746574	3334971809616520320	(21.59127, 32.02736, 41.819687, 40.304443)					
	gaiadr2_33322949916980673408	None	05505719+0738270	33322949916980673408	(16.052788, 34.989002, 56.634804, 60.7238...					
	gaiadr2_3334958924714627840	None	05500006+0744024	3334958924714627840	(14.3349, 24.238453, 34.35803, 33.90839)					
	gaiadr2_3334957997001927244	None	05502587+0741515	3334957997001927244	(20.63208, 35.009697, 49.1565, 47.572227)					
	gaiadr2_3335021906115082624	None	05484989+0750394	3335021906115082624	(28.1891, 41.6916, 54.4486, 50.04661)					
	gaiadr2_3334957683467953792	None	05500557+0740488	3334957683467953792	(44.92377, 65.202324, 82.589656, 75.41166)					
	gaiadr2_3334969232636158464	None	05493299+0742482	3334969232636158464	(46.600452, 98.9716, 159.38489, 173.39314)					
	gaiadr2_3335001187192677888	None	05474391+0750260	3335001187192677888	(25.223001, 35.141724, 43.115704, 40.7312...					
	gaiadr2_3334974936352715136	None	05492860+0748054	3334974936352715136	(10.673324, 20.927328, 37.231934, 30.691...					
	gaiadr2_3335002767704063184	None	05474694+0752049	3335002767704063184	(16.26325, 25.494099, 39.89688, 31.780731)					
	gaiadr2_3334969125680828672	None	05493437+0742010	3334969125680828672	(27.166864, 41.874405, 57.56152, 52.6976...					
	gaiadr2_3335025754405887968	None	05481739+0753144	3335025754405887968	(48.19157, 102.272125, 167.62067, 186.043...					
	gaiadr2_3334968780310645544	None	05482940+0740076	3334968780310645544	(15.07415, 26.27623, 26.53707, 38.0075...					
S184	2021-01-15 12:17:03.355	2021_03976	1	10	1 -18440	4092, 47	0.15687	0	(34.52282, 33.59067, 22.083, 7.596154)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	20	11	20 -39207	4092, 47	0.156483	0	(50.204167, 193.0491, 91.3122, 178.3522)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	12	19	12 -27307	4092, 47	0.205303	0	(0.1958891, 185.1442, 183.0970, 170.0175)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	18	13	18 -31792	4092, 47	0.20885	0	(187.54831, 176.8169, 174.8352, 161.6874)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	12	17	12 -11724	4092, 47	0.27098	0	(179.12168, 57.6574, 166.8565, 153.324)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	16	15	16 -16322	4092, 47	0.259792	0	(171.1121, 160.0482, 158.4732, 145.1003)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	15	15	15 -32100	4092, 47	0.225648	0	(162.82814, 152.0455, 150.1638, 136.774)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	14	17	14 -40593	4092, 47	0.269974	0	(154.61813, 143.8646, 142.0207, 128.5542)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	13	13	13 -49574	4092, 47	0.261283	0	(146.3476, 135.9899, 133.7916, 120.1247)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	11	12	11 -54019	4092, 47	0.24019	0	(138.0191, 127.2692, 125.1111, 109.691)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	11	20	11 -55962	4092, 47	0.23018	0	(129.8894, 119.1043, 117.393, 103.6821)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	30	21	30 -32462	4092, 47	0.331603	0	(299.5032, 288.8869, 286.736, 274.1927)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	29	23	29 -48327	4092, 47	0.340947	0	(291.1199, 280.4191, 278.411, 265.731)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	28	22	28 -81381	4092, 47	0.328772	0	(282.8669, 272.1612, 270.7195, 257.4034)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	27	21	27 -56957	4092, 47	0.2982	0	(274.2418, 263.6655, 261.8488, 248.8774)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	26	25	26 -67927	4092, 47	0.448679	0	(266.0833, 255.383, 253.4619, 240.5405)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	25	26	25 -34655	4092, 47	0.408503	0	(257.665, 246.964, 245.0635, 232.0986)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	24	27	24 -72269	4092, 47	0.406687	0	(249.2254, 238.5229, 236.6067, 223.6278)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	23	28	23 -64724	4092, 47	0.403176	0	(240.0176, 230.1892, 228.355, 215.2637)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	22	29	22 -36737	4092, 47	0.348474	0	(232.479, 221.8021, 219.9245, 206.8222)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	21	30	21 -44405	4092, 47	0.560785	0	(224.0921, 213.3823, 211.564, 198.9393)	86.845
S184	2021-01-15 12:17:03.355	2021_03976	39	32	39 -30275	4092, 47	0.438346	0	(389.9877, 379.4101, 377.2635, 365.2936)	86.845

Using reduced GALAH data

Fits files structure

- Always 8 extensions
- The same wavelength solution in all extensions
- Linear wavelength solution
- Info, parameters from the database are also in the headers
- Which spectra were combined is given in the headers only!



File Edit Tools Help							
Index		Extension	Type	Dimension	View		
	0	Primary	Image	4096	Header	Plot	Table
	1	normalized	Image	4096	Header	Plot	Table
	2	relative_error	Image	4096	Header	Plot	Table
	3	sky	Image	4096	Header	Plot	Table
	4	teluric	Image	4096	Header	Plot	Table
	5	scattered	Image	4096	Header	Plot	Table
	6	cross_talk	Image	4096	Header	Plot	Table
	7	resolution_profile	Image	4096	Header	Plot	Table

```

RA_ICRS = 0.0 / RA of object in degrees in ICRS
DEC_ICRS = 0.0 / dec of object in degrees in ICRS
APERTURE = 228 / Aperture number (1-392, in image)
PIVOT = 239 / Pivot number (1-400, in 2dF)
FIBRE = 232 / Fibre number (1-400, in image)
X = 12.0 / x position of fibre on plate in um
Y = -14.0 / y position of fibre on plate in um
THETA = 3.739465 / Bend of fibre in degrees
AP_POS = 2389.846 / Position of aperture in image at x=2000
TRACE_OK = 1 / Is aperture trace OK? 1=yes, 0=no
MAG = 0.0 / Magnitude from the .fld file
E_B-V = '0.0376' / Terminal color excess queried from Planck maps
PIPE_VER = '6.0' / IRAF reduction pipeline version
RV = -21.49044078305031 / Radial velocity (this CCD) in km/s
E_RV = 0.1631037303616132 / Radial velocity uncertainty (this CCD) in km/s
RV_OK = 1 / Did RV pipeline converge? 1=yes, 0=no
RVCOM = -21.37987205911892 / Combined radial velocity in km/s
E_RVCOM = 0.1235532859193668 / Radial velocity uncertainty in km/s
RVCOM_OK = 1 / Did RV pipeline converge? 1=yes, 0=no
TEFF_R = 5655.0517578125 / T eff in K
LOGG_R = 4.306982040405273 / log g in log cm/s^2
FE_H_R = 0.02175363898277283 / Iron abundance in dex ([Fe/H])
A_F_E_R = -0.00565761327743530 / Alpha abundance in dex ([alpha/Fel])
VMIC_R = 1.109674334526062 / Microturbulence in km/s
VBROAD_R = 5.11270809173584 / Broadening velocity in km/s
PAR_OK = 1 / Are parameters trustworthy? 1=yes, 0=no
UTMJD_S = 59229.6589920426 / UTMJD at the start of exposure
UTDATE_S = '2021-01-15 15:48:56.912' / UT date of start of first exposure in ISO
EPOCH_S = 2021.040161622034 / Epoch, decimal years C.E. at start of exposure
UTMJD_E = 59229.71209566834 / UTMJD at the end of exposure
UTDATE_E = '2021-01-15 17:05:25.066' / UT date of end of last exposure in ISO for
EPOCH_E = 2021.04030711142 / Epoch, decimal years C.E. at end of exposure
MEAN_ZD = 47.89135403476246 / Mean zenith distance
AIRMASS = 1.491338508995666 / Mean airmass
MEAN_HA = -24.35240388282963 / Mean hour angle
WAV_RMS = 0.0186 / RMS of the wavelength solution in Angstroms
WAVLINES = '43/45' / Number of arc lines (used/Found)
WAV_OK = 1 / Is wav. solution OK? 1=yes, 0=no
FIB_THR = 0.8101217150688171 / Fibre throughput relative to best fibre in fld
CROSS_OK = 1 / Is cross-talk calculated reliably? 1=yes, 0=no
LSF = 'exp(-0.693147|2x/fwhm|'B') / Line spread function
LSF_FULL = 'exp(-0.693147|2x/fwhm|^2.371)' / Line spread function
B = 2.371 / Boxiness parameter for LSF
BUNIT = 'counts'
COMMENT Explanation of the LSF function: function is centred at 0. fwhm is full
COMMENT width at half maximum in angstroms and is given in extension 7, it is wa
COMMENT vavelength dependent and varies from fibre to fibre as well. It is advis
COMMENT to use the whole resolution profile from extension 7 rather than averag
COMMENT e resolution in RES keyword. B is a boxiness parameter. It is given in k
COMMENT eyword B in the header. LSF_FULL includes B in the function.
WAT1_001 = 'wtype=linear label=Wavelength units=Angstroms'
NCOMBINE = 7
COMB0 = '210115002800239' / Combined spectra
COMB1 = '210115002200239' / Combined spectra
COMB2 = '210115002600239' / Combined spectra
COMB3 = '210115002400239' / Combined spectra
COMB4 = '210115002700239' / Combined spectra
COMB5 = '210115002500239' / Combined spectra
COMB6 = '210115002300239' / Combined spectra
END
    
```

