Spectro-photometric calibrators and GALAH

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Abstract

Key words: stars: evolution — stars: supergiants — stars: massive

1 Introduction

Using the NGSL, XSL, UVES_POP, SPSS, CALSPEC, and STELIB, a sample of 1600 candidate spectro-photometric calibrators was assembled. Matches for 30 candidate calibrators were found in the GALAH catalog, as listed in Table 1.

The GALAH DR3 catalogs contains 588571 entries. The entire GALA DR3 catalog is available at the following address GALAH webpage. (go to the article here)Buder et al. (2021).

The maximum temperature listed in the catalog is 7993.15 K (from M-type to F-type). Hot stars are not present. There are four spectra for each star taken with the B,G,R, and I filters. The spectra are distributed as fits files, each including five extensions:

PRIMARY: Unnormalised spectrum with sky subtraction

input_sigma

no_sky_subspectrum

no_sky_sigma

normalised spectra.

The GALAH catalog delivers the stellar parameters (T_{eff}, logg, iron abundances) listed in Table 1.

The spectra can be downloaded directly in the local disk by calling them by source name:

$f = open(filemy,' r')$
$data = []$
$frames = ()$
$for\ line\ in\ f :$
$line = line.strip()$
$columns = line.split()$
$nameGALAH = columns[XX]$
$print(nameGALAH)$

$pallaB ='\ https :$
$//datacentral.org.au/vo/slink/links?ID =' +nameGALAH +'$
$\&DR = galah\_dr3\&FILT = B\&RESPONSEFORMAT = fits'$
$print(type(pallaB))$
$palla2B = namedr3 +' B.a.fits'$
$resB = wget.download(pallaB, palla2B)$

If the user want to only save the figures, without downloading the fits, a script is available. It is easy to make adapted scripts using the The GALAH python examples.

section**References**

Buder, S., Sharma, S., Kos, J., et al. 2021, MNRAS, 506, 150

$import\ wget$

$filemy =' myfile.txt'$

Table 1. Library stars observed by GALAH.

| Name	Gaia DR3 source_id	ra (J2000)	dec (J2000)	bestfit	simbad	library	primary	Teff	Teffe	logg	logge	Fe	Fe_e
HD011695	4942522955488925696	28.411421	-46.302668	0	SAT	UVES	0	4185.59	69.51	1.10	0.20	-1.17	0.04
HD033256	3212075924646082176	77.182078	-4.456208	0	OK	UVES	0	6266.04	69.34	3.99	0.29	-0.30	0.04
HD035072	4772547941122028672	79.842229	-50.605967	0	OK	UVES	0	6146.65	69.40	3.89	0.18	0.09	0.04
HD076932	5730371484020807808	134.683053	-16.132727	0	OK	UVES+NGSL	0	5787.65	91.45	4.11	0.18	-0.86	0.09
HD136352	5902750168276592256	230.450625	-48.317630	0	OK	UVES	0	5615.14	69.44	4.36	0.18	-0.34	0.04
HD140283	6268770373590148224	235.762905	-10.933499	0	ChP	UVES+XSL+XSL	0	5766.15	71.61	3.64	0.17	-2.38	0.07
HD160691	5945941905576552064	266.036263	-51.834053	0	CRO	UVES	0	5750.07	69.25	4.25	0.26	0.31	0.04
HD190248	6427464123776727168	302.181704	-66.182067	0	SAT	UVES	0	5590.81	71.23	4.33	0.28	0.35	0.04
X0351	6083695761740022144	201.488542	-47.673391	0	CRO	+XSL+XSL	0	4712.54	108.41	2.16	0.54	-0.77	0.09
X0480	4247355045211154560	301.434654	4.048004	0	ChP	+XSL+NGSL	0	6008.24	74.19	4.35	0.18	-1.50	0.07
X0504	4687246145432125824	17.622743	-72.826273	0	RSG	+XSL	0	4549.98	107.99	1.15	0.29	-0.23	0.08
X0506	4687250268600675712	17.324519	-72.761686	0	RSG	+XSL	0	4323.61	105.04	1.16	0.32	-0.29	0.09
X0558	3311148828615843328	65.884722	14.670478	0	OK	+XSL	0	5246.87	70.50	4.55	0.17	0.26	0.04
X0568	604911375882674560	132.822857	11.756308	0	planet	+XSL+XSL	0	4253.62	69.32	1.70	0.19	-0.25	0.04
X0602	3812733079585100032	171.704955	3.864345	0	OK	+XSL	0	5178.38	72.52	2.28	0.21	-1.80	0.05
X0630	3472600458906843392	182.474974	-31.419602	0	ChP	+XSL	0	5403.57	86.31	2.97	0.21	-2.56	0.15
X0794	64929391436043264	57.420514	23.341570	0	OK	+XSL	0	7756.31	69.15	4.22	0.17	-0.17	0.05
X0843	3085071164726715648	114.958800	-1.522327	0	OK	+XSL+XSL	0	4979.22	71.00	3.22	0.18	-0.83	0.04
HD018907	5071514326764428544	45.406793	-28.091494	0	OK	+NGSL	0	5029.89	71.39	3.53	0.30	-0.64	0.04
HD146233	4345775217221821312	243.905293	-8.369439	0	OK	+NGSL+CALSPEC	0	5762.00	69.45	4.49	0.29	0.04	0.04
HD157244	5922444483103229952	261.324951	-55.529885	0	SAT/RSG	+NGSL	0	4783.60	NaN	0.50	NaN	NaN	NaN
MMJ6476	604911135364519808	132.764646	11.750784	0	BSS	+NGSL	0	7399.30	69.43	3.60	0.23	-0.57	0.05
MMJ6490	604921202767814528	132.862547	11.864608	0	BSS	+NGSL	0	7386.96	NaN	3.91	NaN	NaN	NaN
345	4659680529922228096	89.889058	-67.020368	0	OK	+SPSS	1	6599.10	71.22	4.16	0.17	-0.03	0.05
346	4755812790042069888	89.994336	-66.102438	0	OK	+SPSS	1	5873.43	75.23	4.19	0.18	0.02	0.05
347	5476400477145058816	90.172277	-66.053705	0	OK	+SPSS	1	7649.09	71.80	4.09	0.18	0.23	0.05
348	5284204302730217984	90.547608	-66.583021	1	OK	+SPSS	1	5968.69	81.47	3.91	0.18	-0.07	0.07
HD268749	4655363946042099200	73.370833	-69.409444	0	BS	+STELIB	0	NaN	NaN	NaN	NaN	NaN	NaN
HD271163	4660612881443486720	79.716667	-65.689444	0	ESG	+STELIB	0	NaN	NaN	NaN	NaN	NaN	NaN
HD049933	3113219383954556416	102.707583	-0.540417	0	OK	+STELIB	0	6476.83	70.17	4.15	0.17	-0.45	0.05
HD060778	3086226785806303104	114.049125	-0.137472	0	OK	+STELIB	0	NaN	NaN	NaN	NaN	NaN	NaN
HD113226	3736865265441207424	195.544833	10.959111	0	SAT	+STELIB	0	5145.82	71.95	2.81	0.18	0.22	0.04
HD122563	3723554268436602240	210.633167	9.686278	0	ChP	+STELIB	0	4615.76	75.30	1.46	0.18	-2.51	0.05
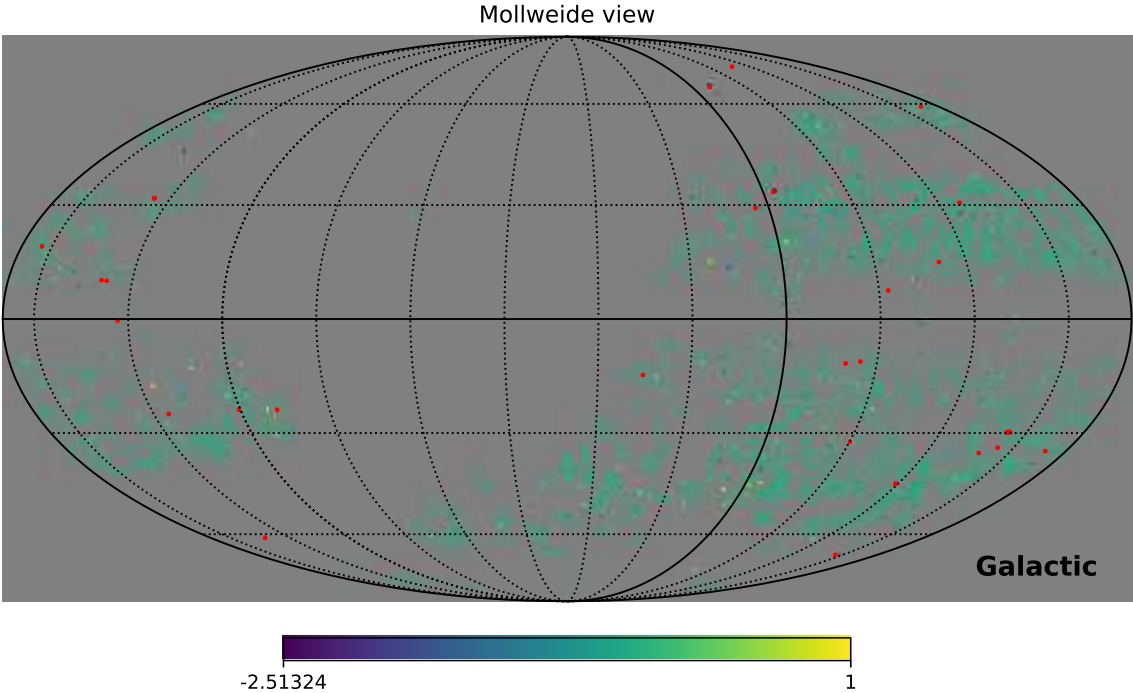
Mollweide view

Fig. 1. Mollweide projection of GALAH DR3 data-points (Galactic coordinates). The iron abundance is used for mapping. The library stars from table 1 are overlaid in red.
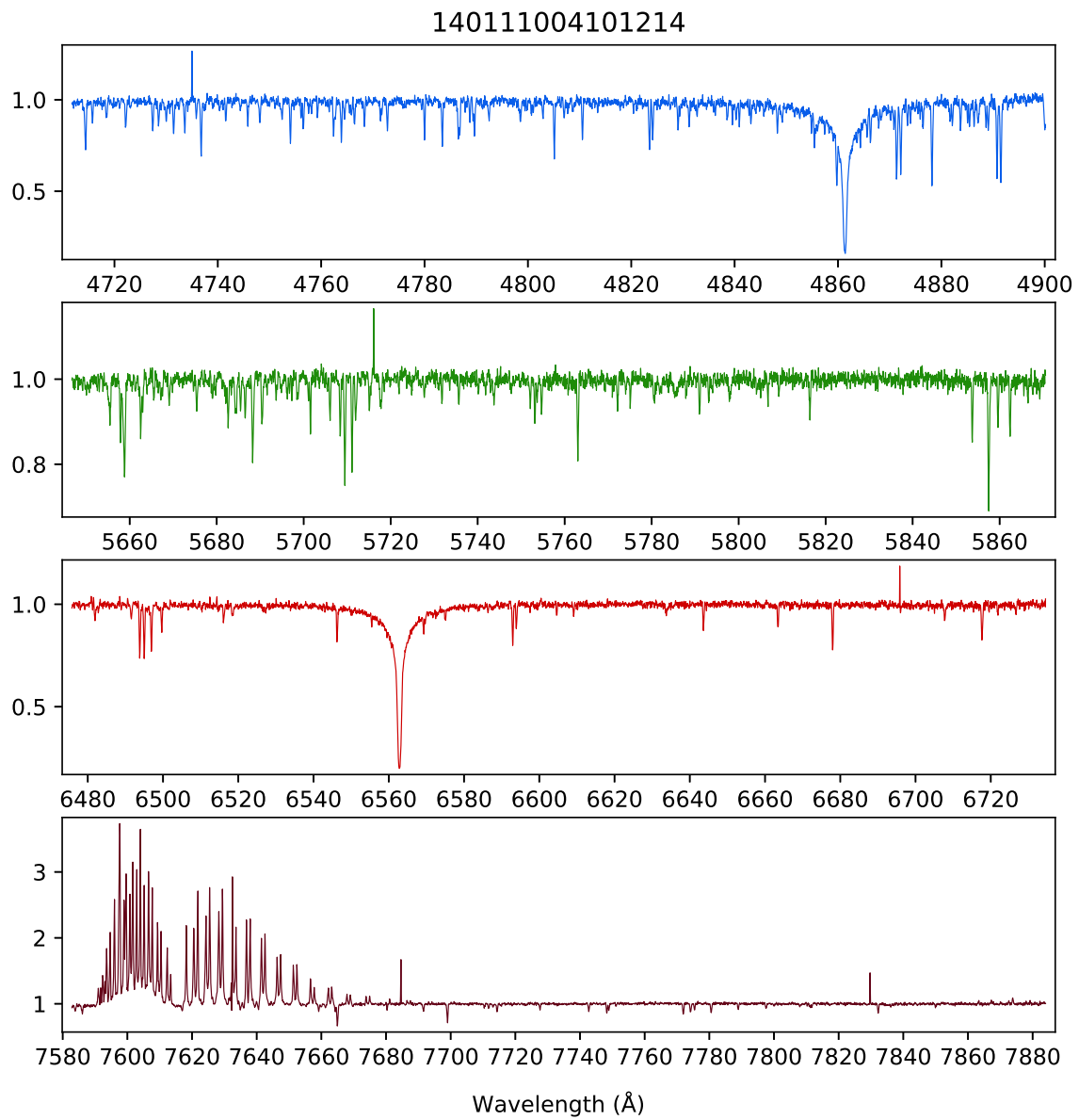
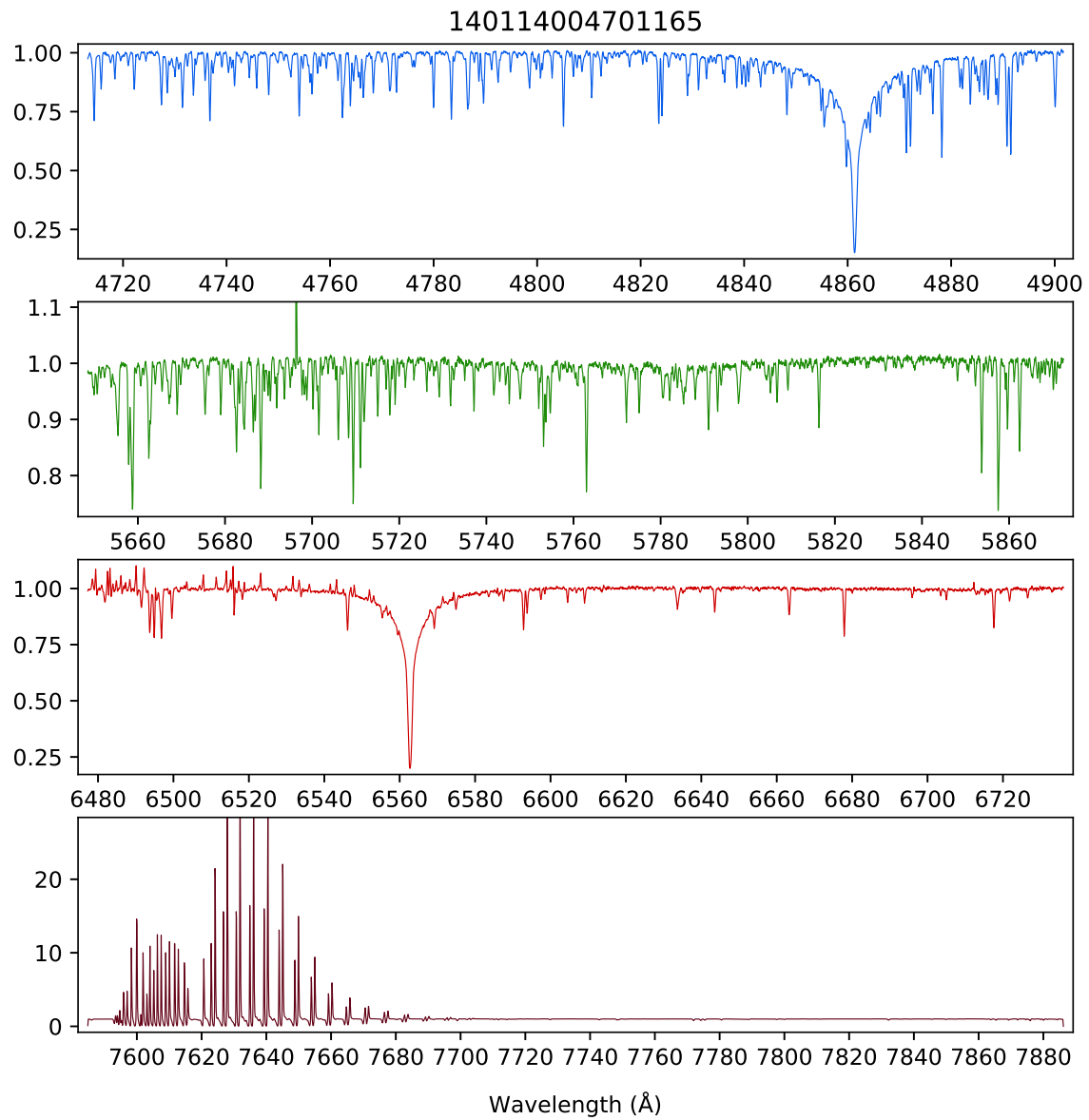**Fig. 2.** Normalized GALAH spectra.
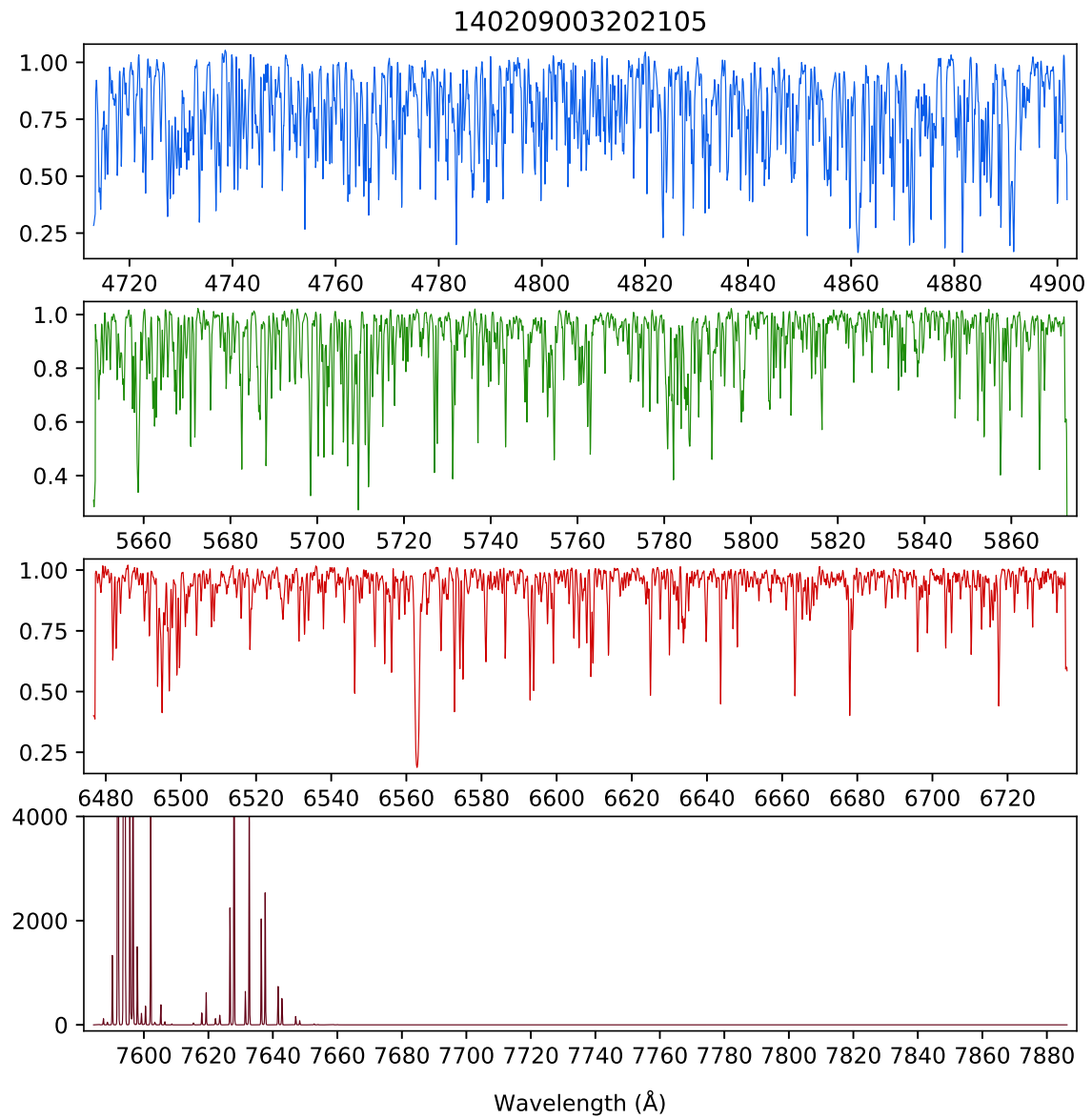
Fig. 3. Normalized GALAH spectra.

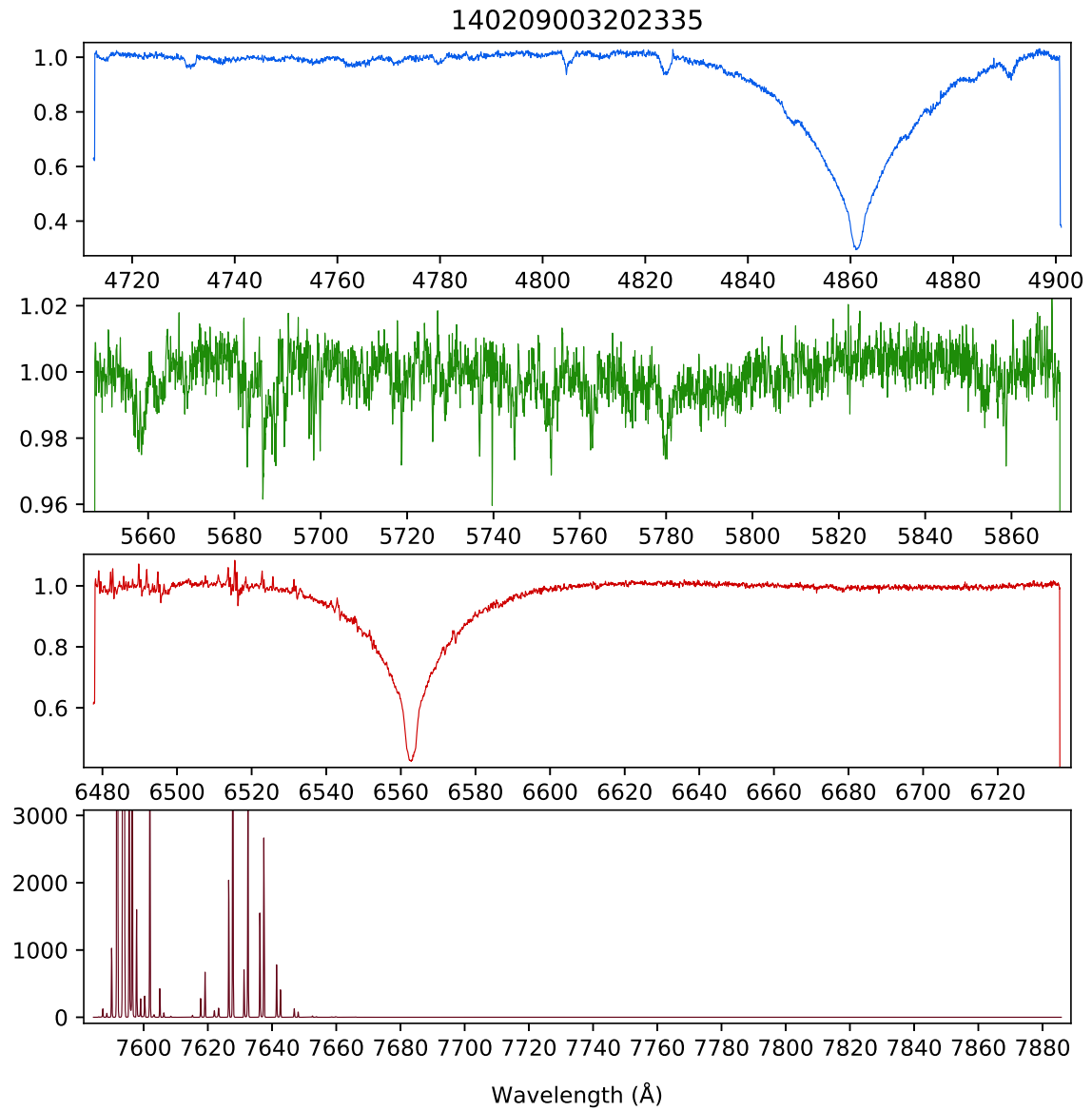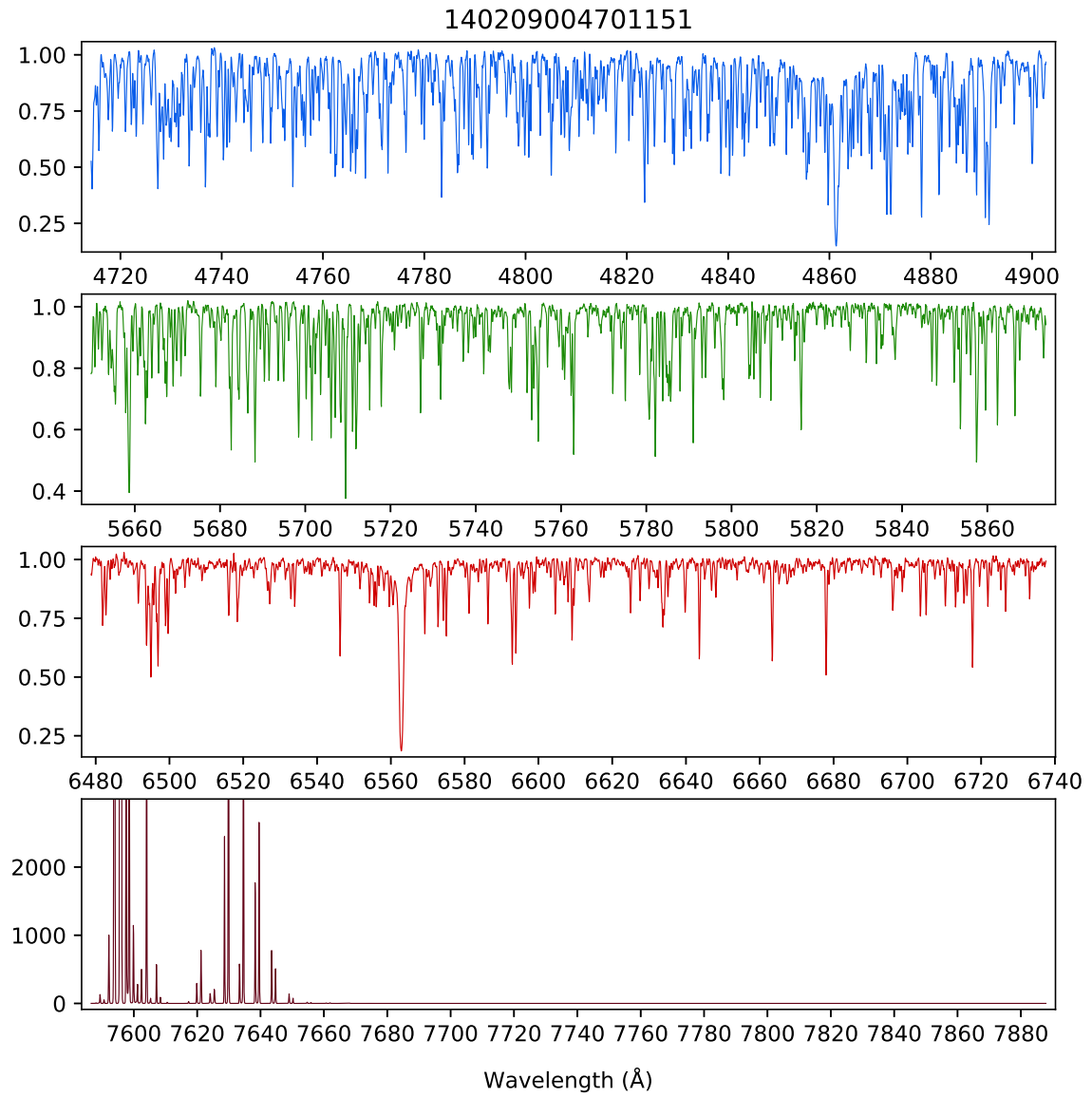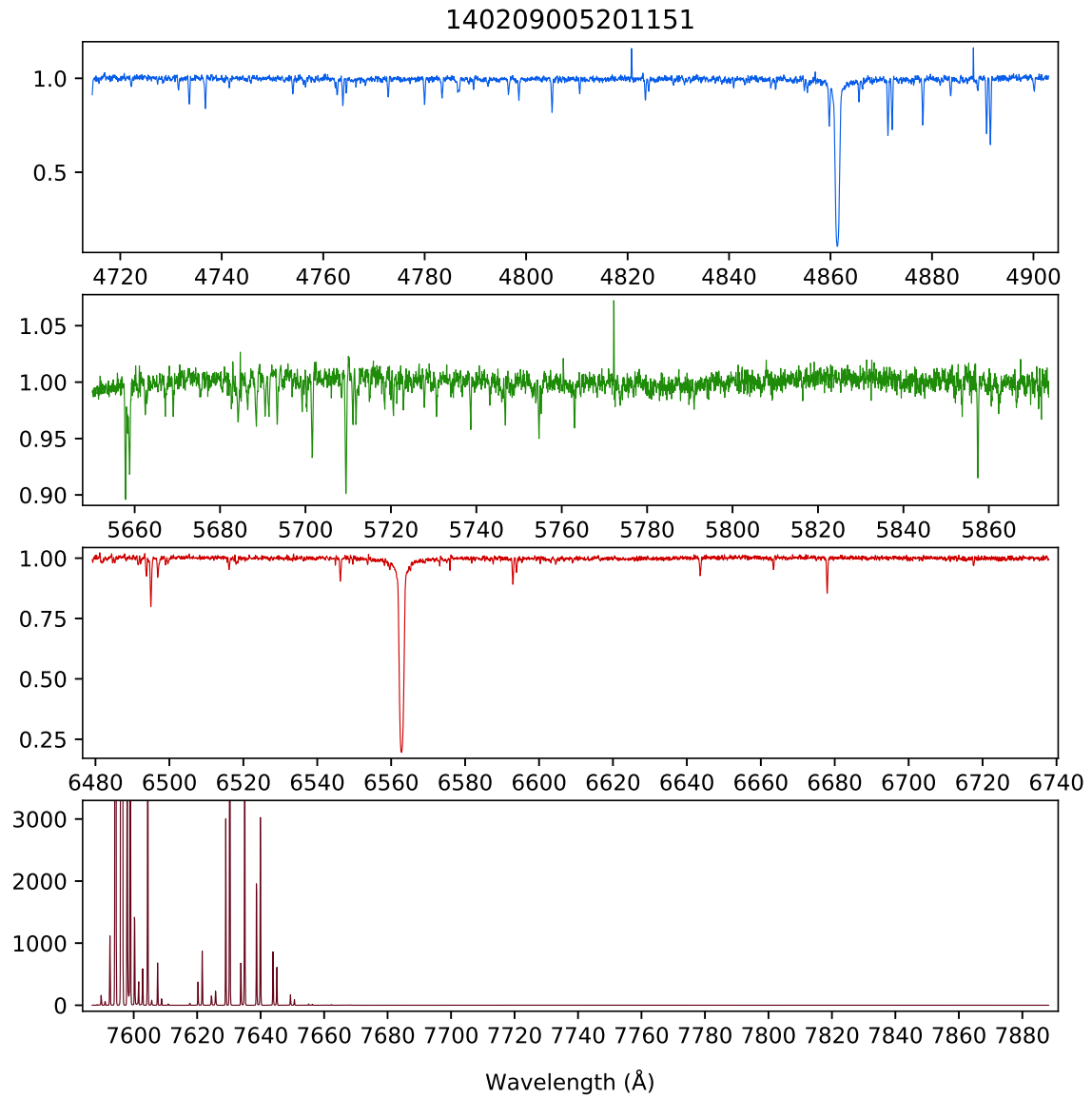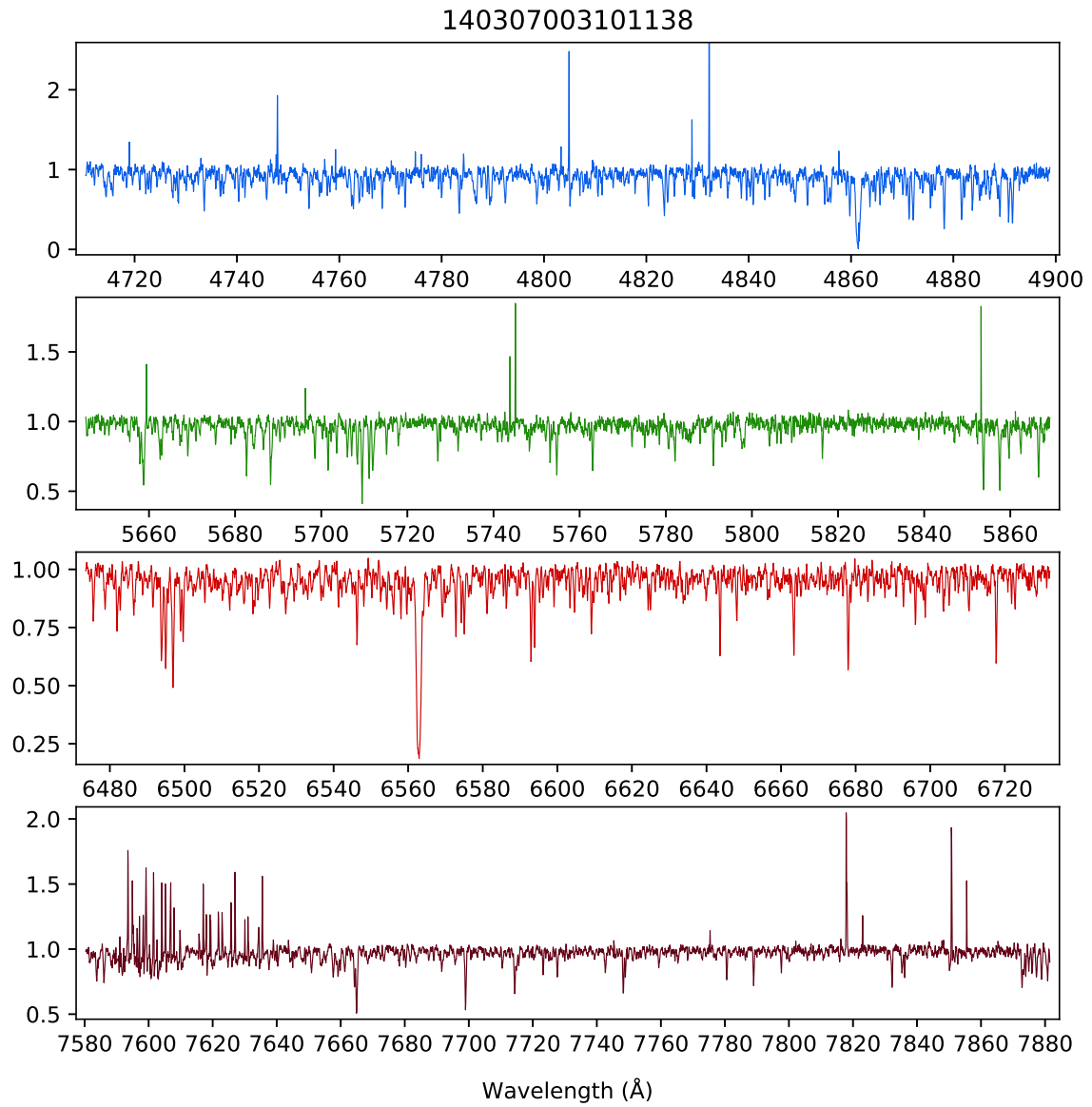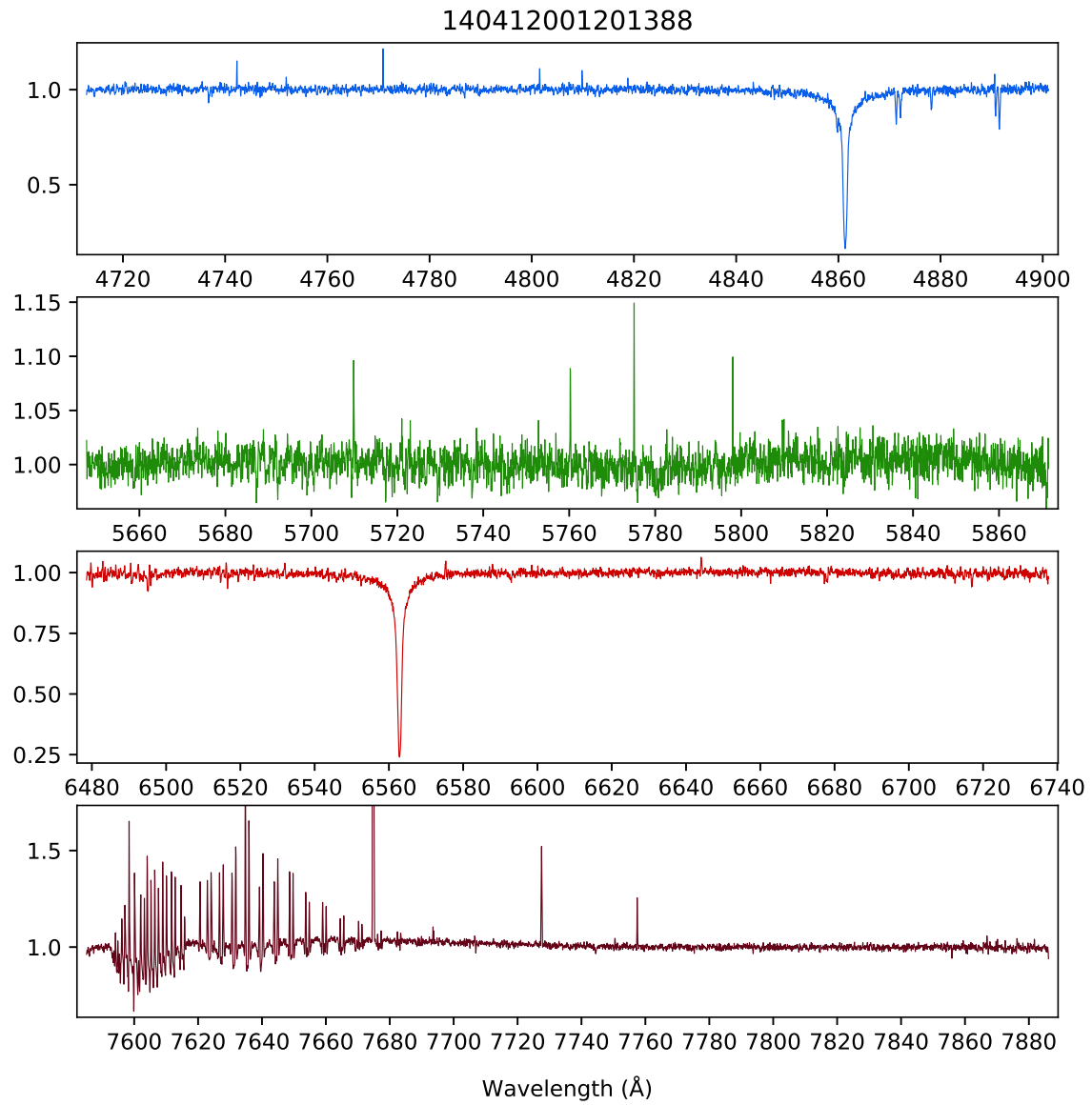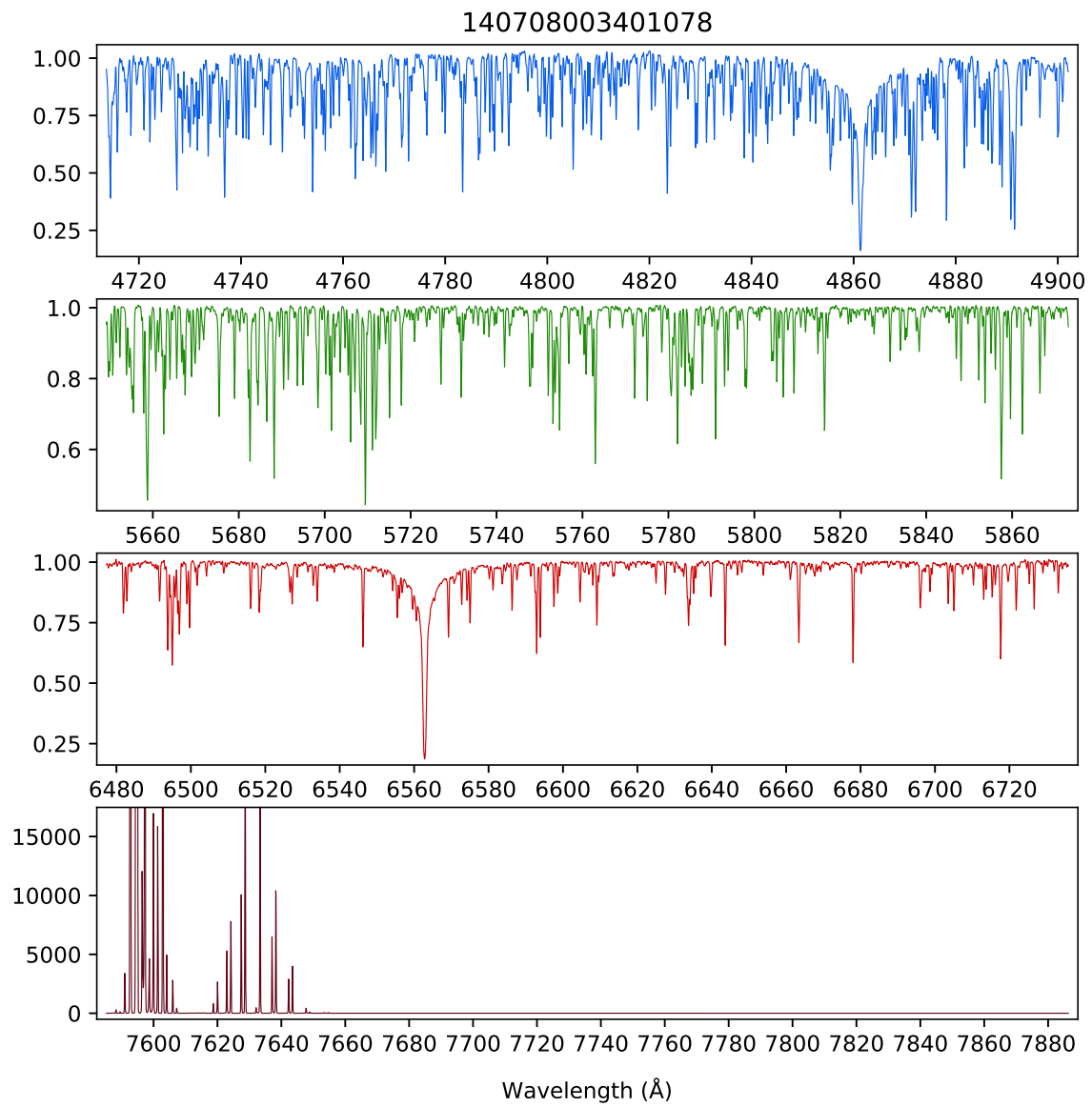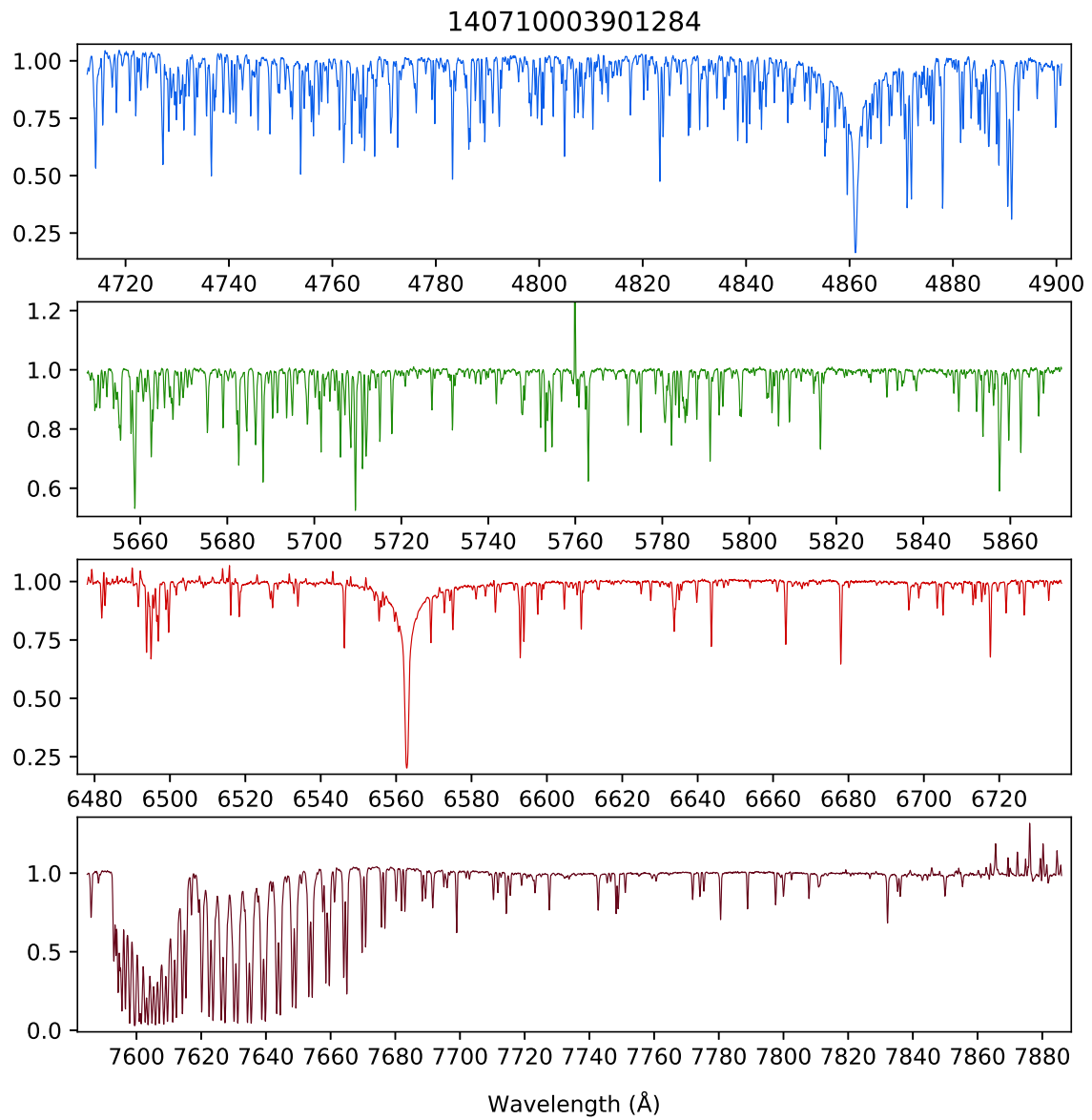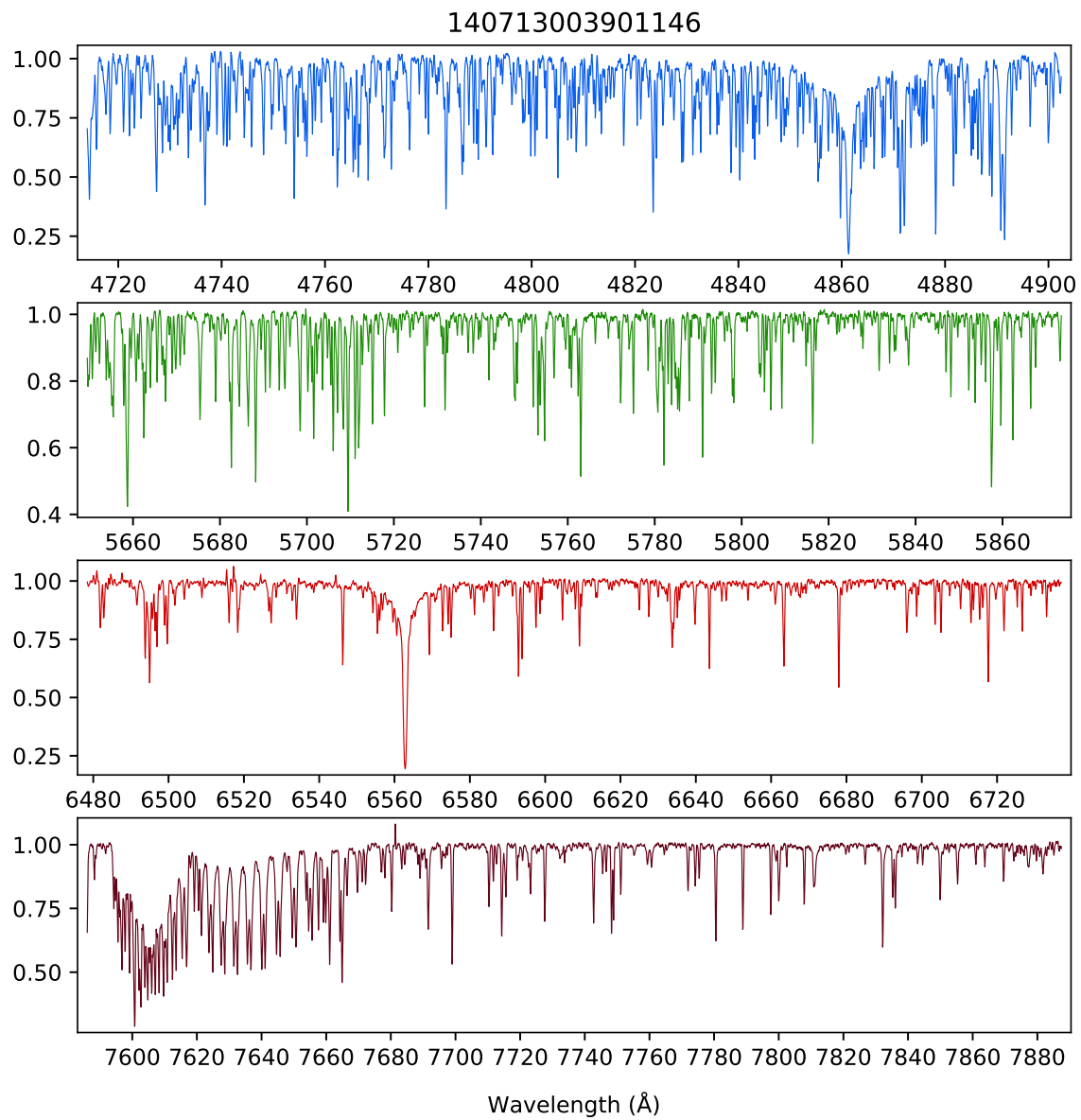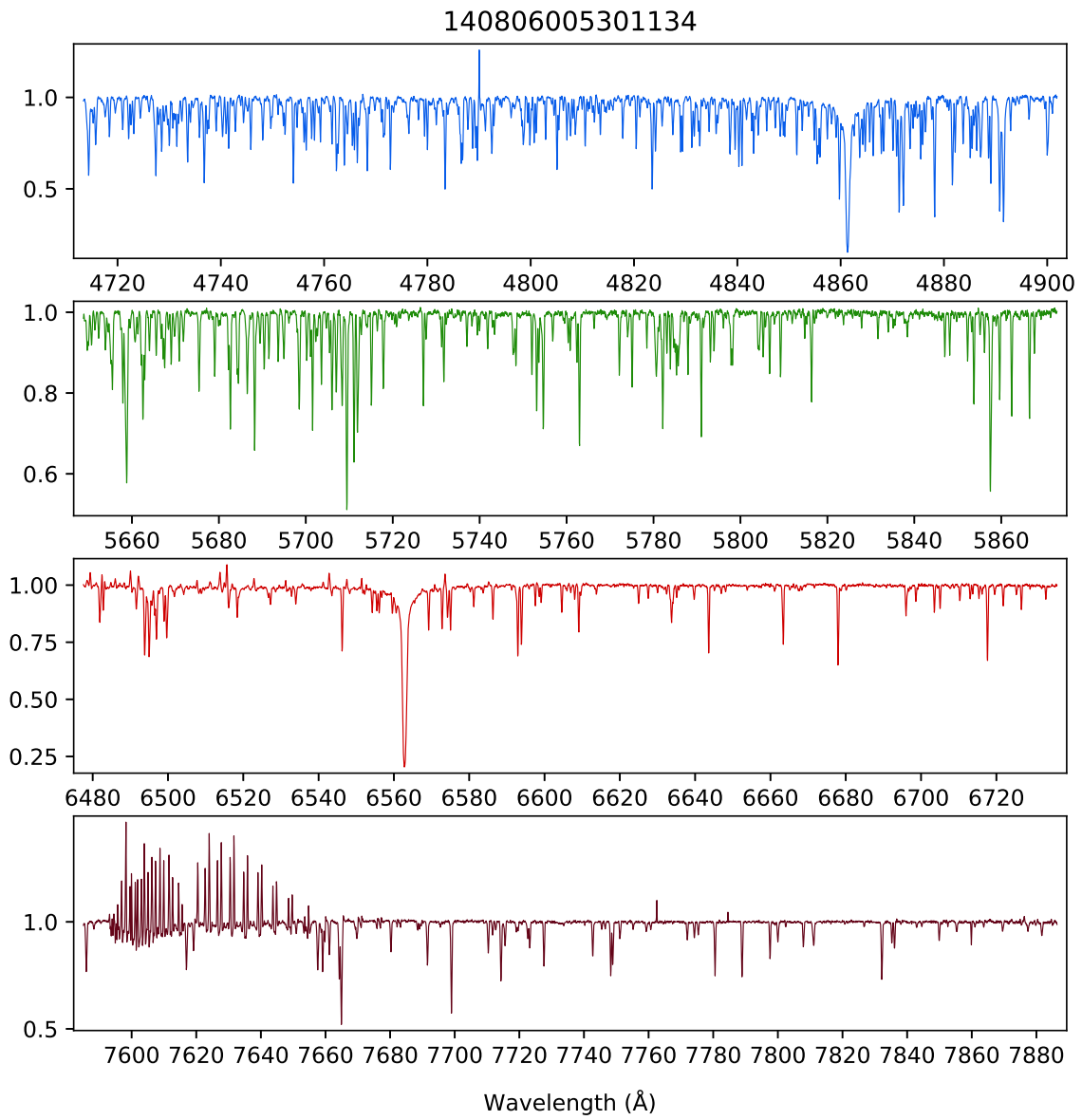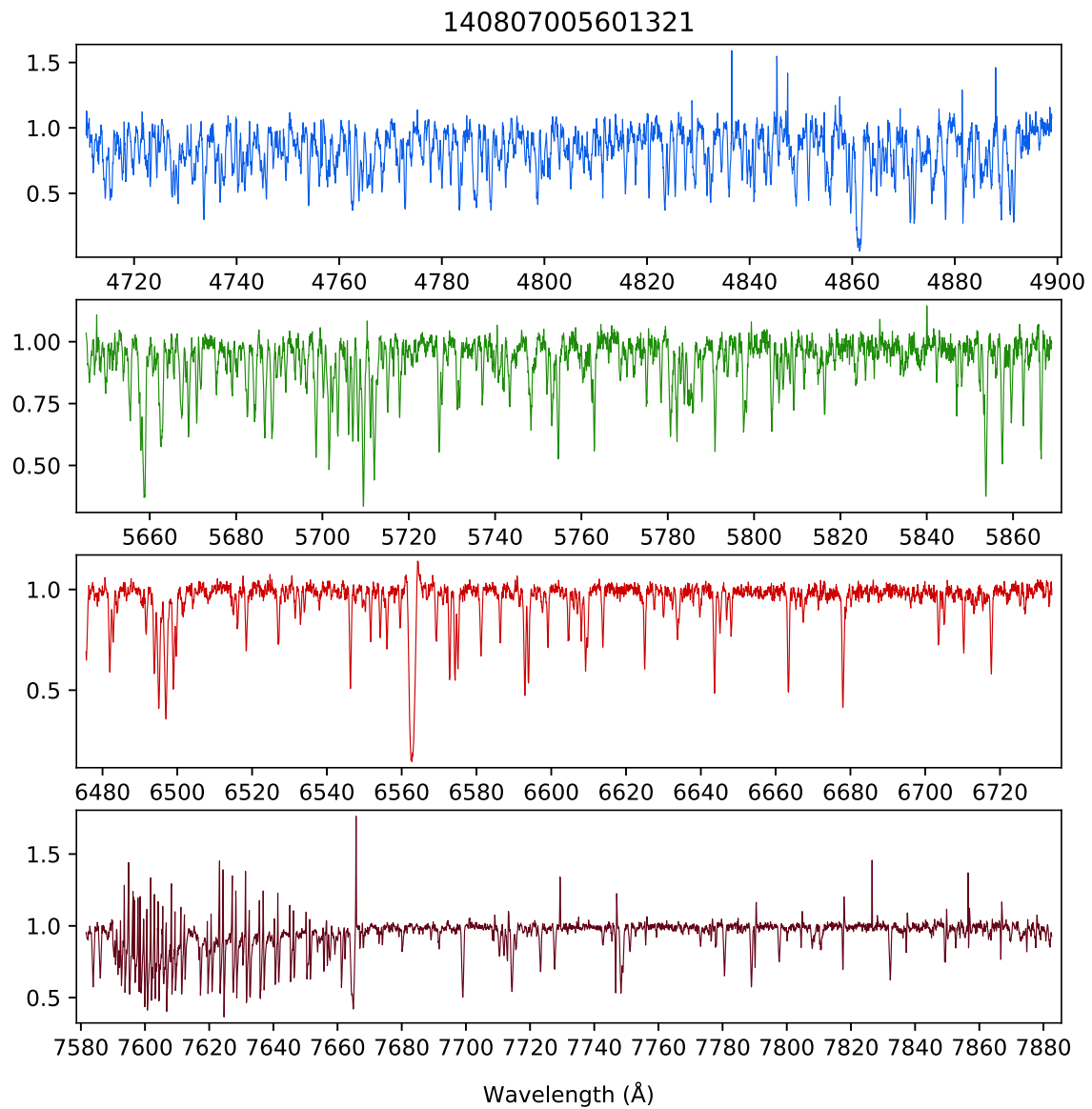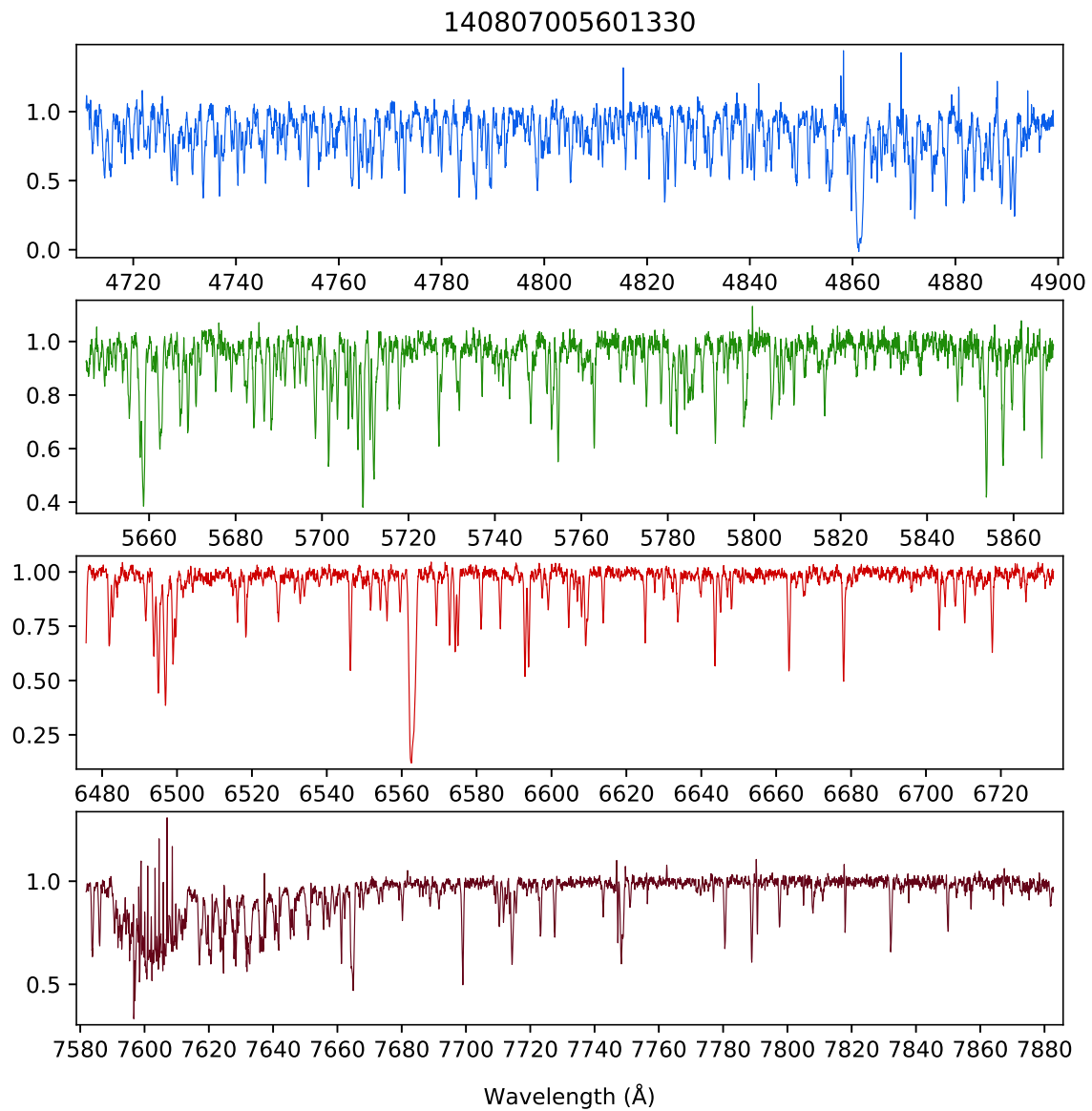**Fig. 4.** Normalized GALAH spectra.

Fig. 5. Normalized GALAH spectra.

Fig. 6. Normalized GALAH spectra.

Fig. 7. Normalized GALAH spectra.

Fig. 8. Normalized GALAH spectra.

Fig. 9. Normalized GALAH spectra.

Fig. 10. Normalized GALAH spectra.

Fig. 11. Normalized GALAH spectra.

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Fig. 12. Normalized GALAH spectra.

Fig. 13. Normalized GALAH spectra.

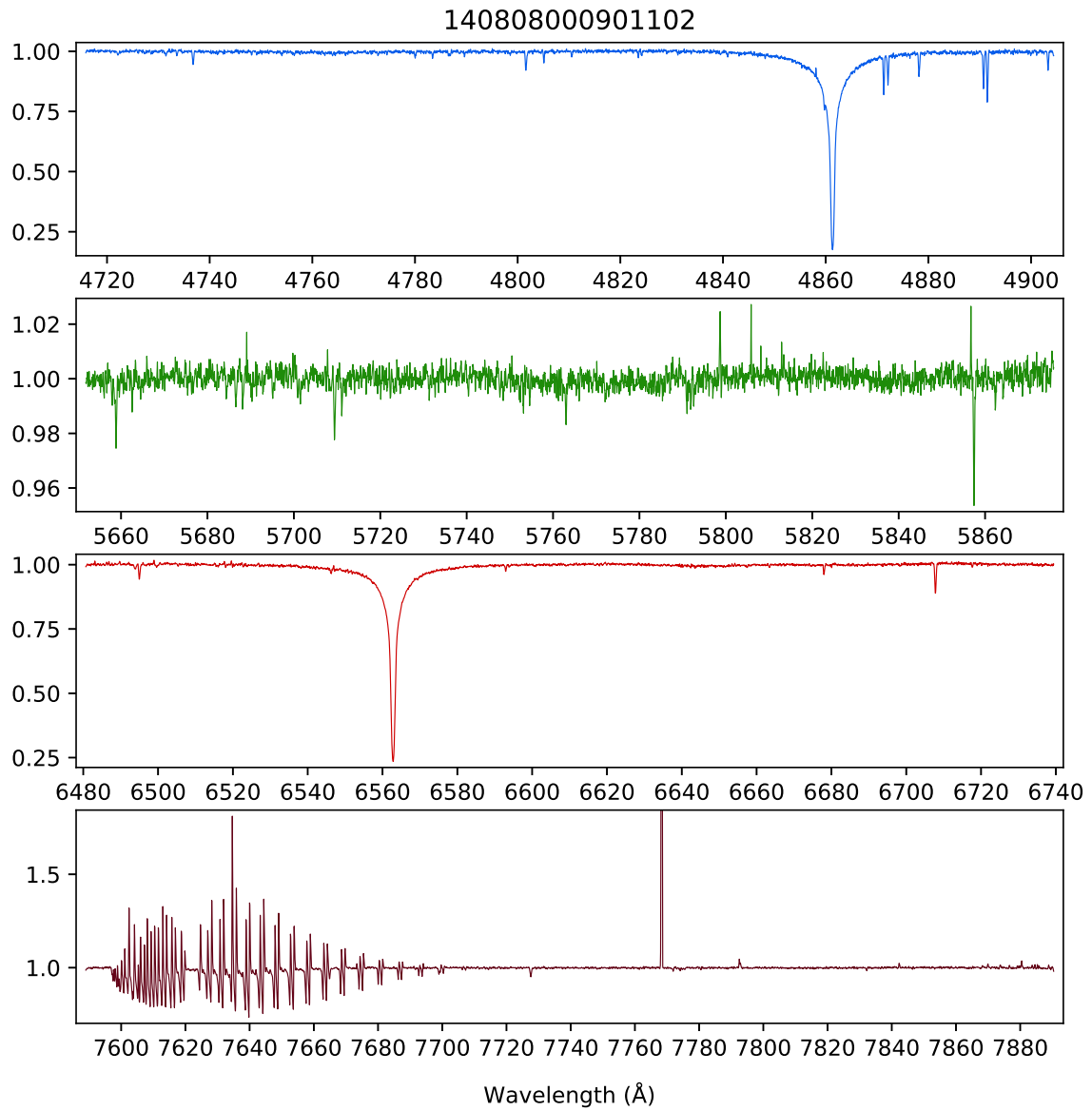**Fig. 14.** Normalized GALAH spectra.

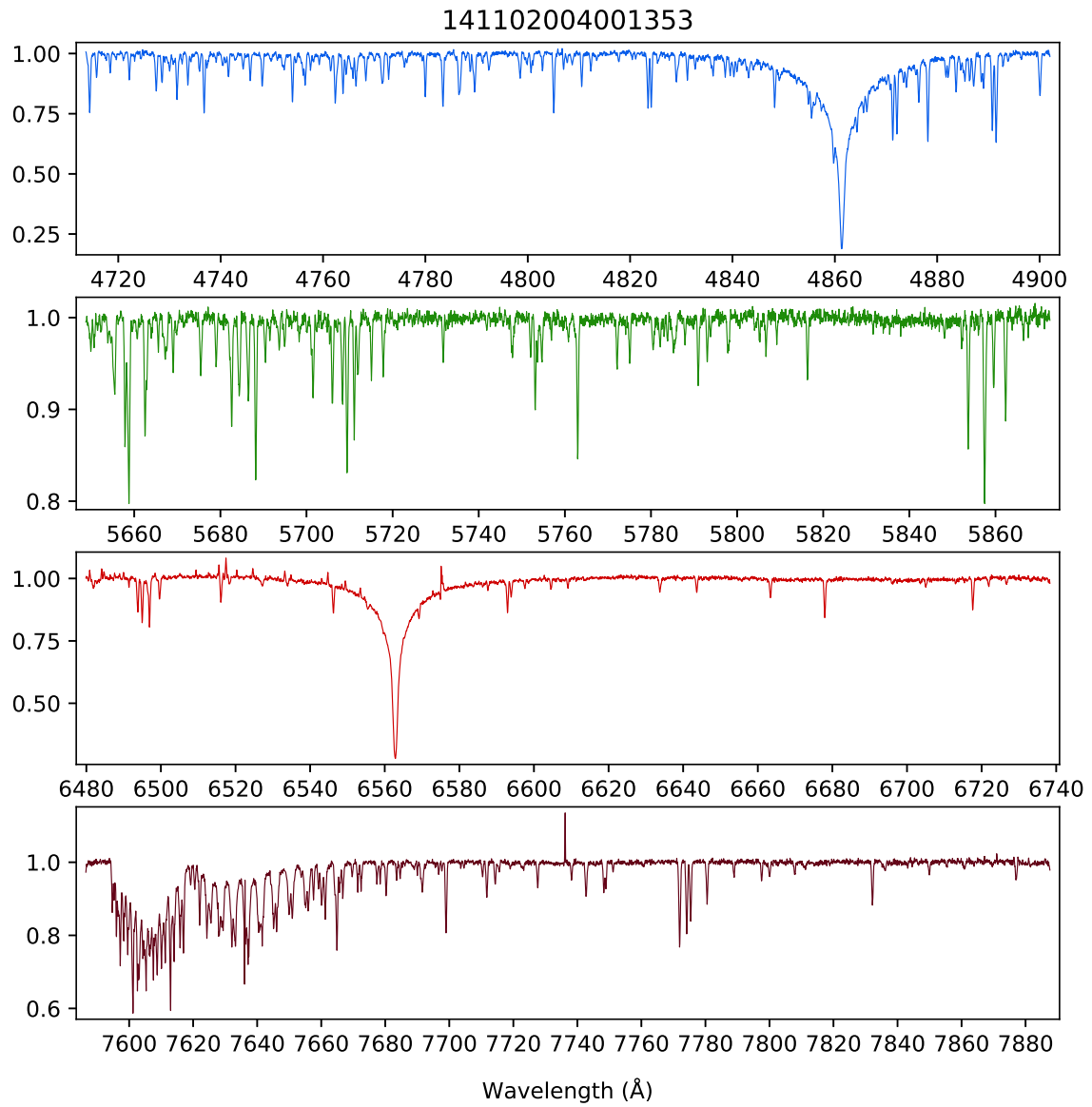**Fig. 15.** Normalized GALAH spectra.

Fig. 16. Normalized GALAH spectra.

Fig. 17. Normalized GALAH spectra.