Eruptive stars spectroscopy

Cataclysmics, Symbiotics, Nova Supernovae

ARAS Eruptive Stars
Information Letter n° 27 #2016-06 01-09-2016
Observations of July-August 2016

News

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Nova Sco 2016
SS Cygni outburst

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Cataclysmics

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A new publication using ARAS Spectra :
Active phases and flickering of a symbiotic recurrent nova T CrB

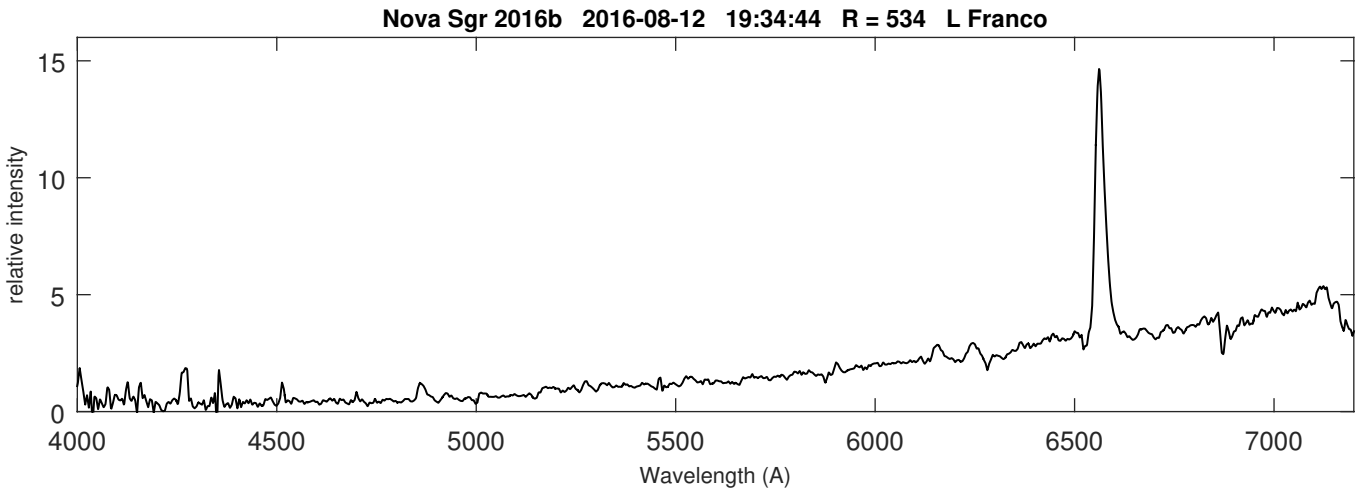
Authors : F. Teyssier, S. Shore, P. Somogyi, D. Boyd, P. Berardi, T. Lester, U Sollecchia, T. Bohlsen, J. Montier, F. Campos, K. Graham, O. Garde, P. Cazzato, L. Franco, V. Bouttard, O. Thizy, G. Martineau, Y. Buchet, C. Kreider, A. Wilson, C. Boussin, F. Boubault, M. Verdelin, J.P. Masviel, M. Rodriguez, P. Le Du, S. Charbonnel

"We acknowledge with thanks the variable star observations from the AAVSO International Database contributed by observers worldwide and used in this letter."
Kafka, S., 2015, Observations from the AAVSO International Database, http://www.aavso.org

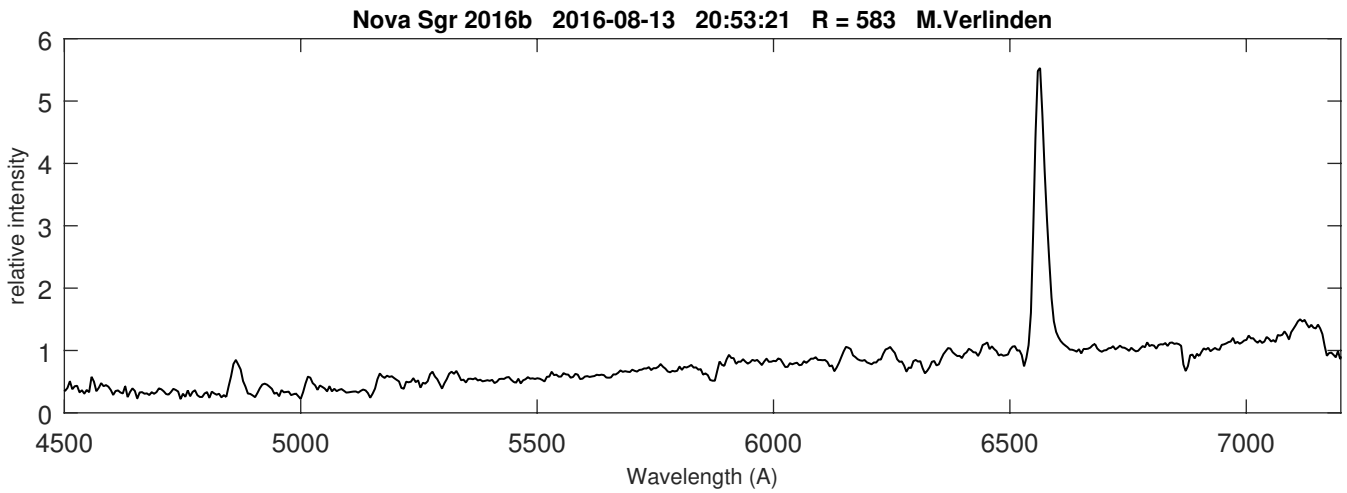
Nova Sgr 2016 b = ASASSN-16ig

Coordinates (2000.0)	
R.A.	18 01 07.75
Dec	-26 31 44.8
Mag Max	

Discovered by: Koichi Nishiyama (Kurume, Japan) & Fujio Kabashima (Miyaki, Japan) (CBET 4295) andAll Sky Automated Survey for SuperNovae (ASAS-SN) (K. Z. Stanek et al., ATel #9343) at mag 10.7 (Nishiyama and Kabashima)- ASAS-SN - V~13.3

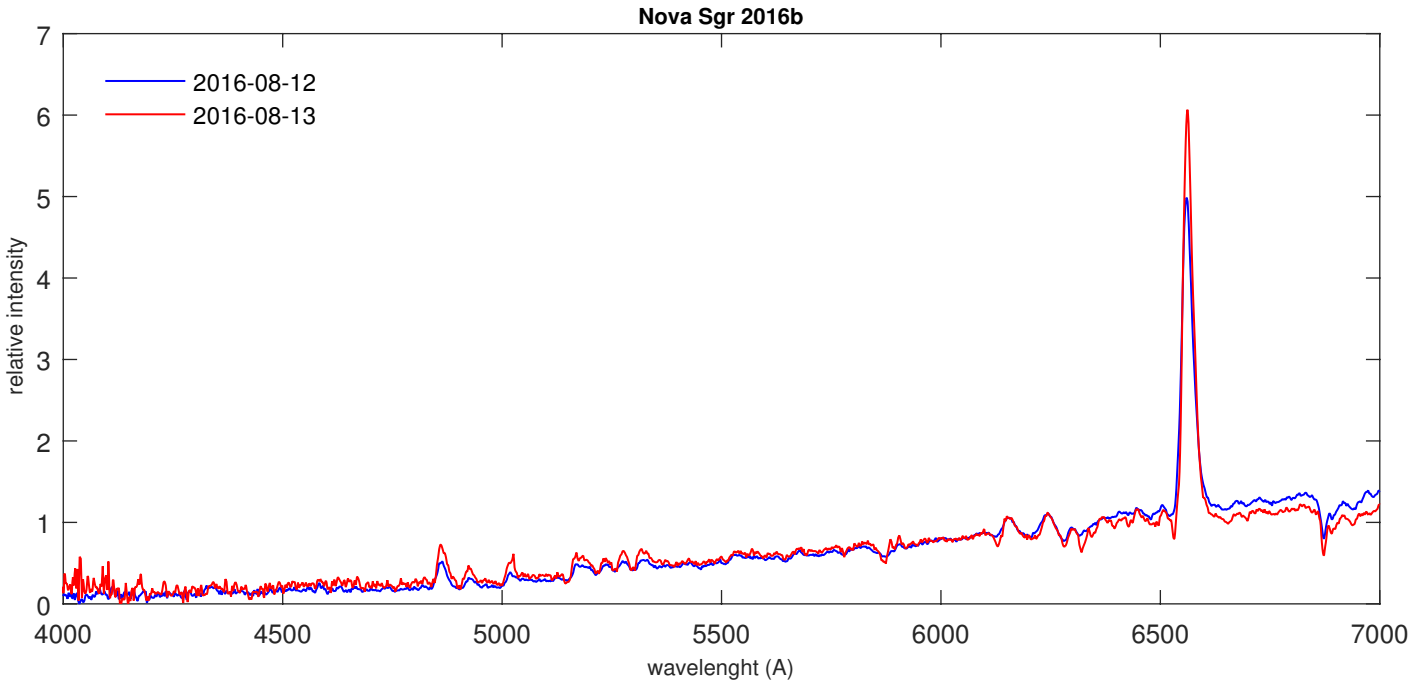


First spectrum in Aras database, obtained by Lorenzo Franco with a SC8" and Alpy600 spectrograph



Spectrum obtained by Michel Verlinden with a SC8" and Alpy600 spectrograph (12x600 sec)

Nova Sgr 2016 b = ASASSN-16ig



Spectra obtained by Olivier Garde, Stephane Charbonnel, Pascal Le Du with a SC14" and a LISA during OHP spectro party

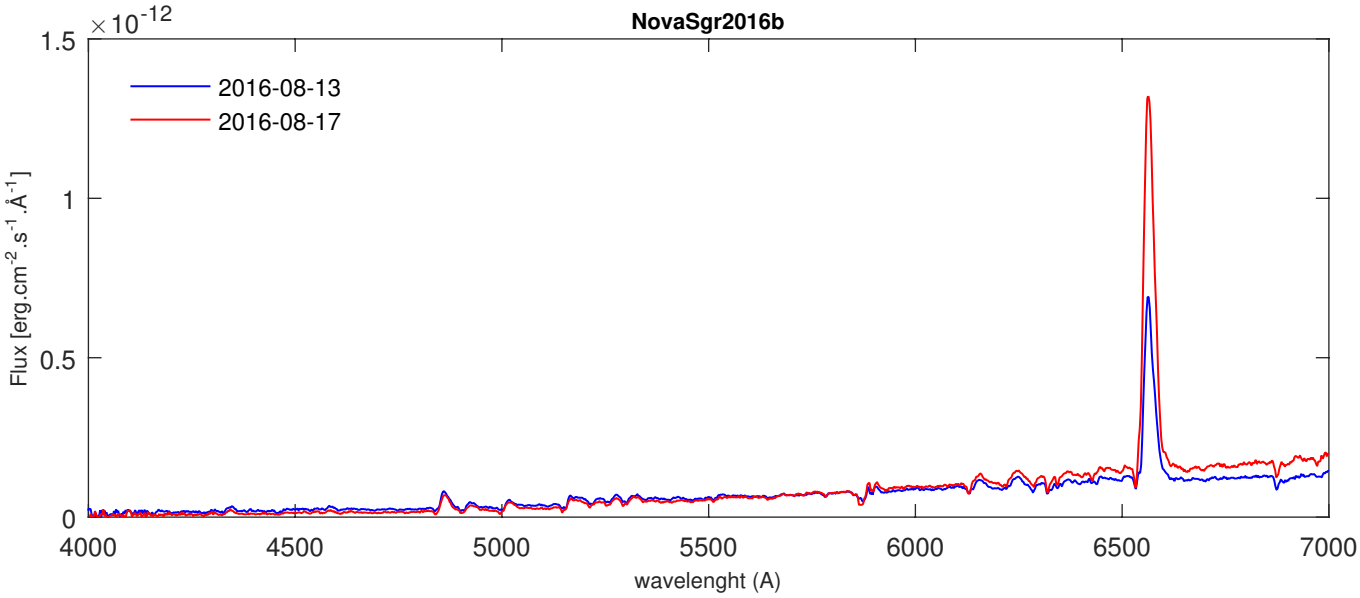
ARAS Optical Spectroscopy of Classical Nova ASASSN-16ig (Nova Sgr 2016 no. 2)

ATel #9377; Olivier Garde, Stephane Charbonnel, Pascal Le Du (ARAS Group)
on 16 Aug 2016; 02:58 UT
Credential Certification: S. N. Shore (shore@df.unipi.it)

We obtained a series of optical of the classical nova ASASSN-16ig in Sagittarius (N Sgr 2016 no. 2) (see ATels #9375, #9343, #9352, #9359, CBET 4295, 4299) with a LISA spectrograph plus ATIK414EX CCD using a C14 at Obs. Hautes Provence on Aug. 13.83 UT and 14.49 UT with total exposures of about 6000 sec each at a resolution of around 700 covering the interval 4000 - 7550 A with sufficient S/N ratio (> 10). The spectra on both days are show the early optically thick "Fe curtain" stage of the ejecta expansion with the usual low ionization spectrum. The nova has displayed significant changes in only 24 hours. Relatively weak (at this resolution) Halpha absorption on Aug. 13 appeared broad, extending to about -2000 km/s. The second spectrum displayed weak blueshifted absorption with v_rad(abs) = -1500+/-50 km/s; Hbeta was asymmetric but showed no absorption at this resolution. The Halpha absorption on Aug. 13 was not associated with blueshifted emission, the profile on Aug. 14 had become narrower within a broader emission wing that indicated a continuing decrease in the ejecta density and line optical depth. There was no change in the red wing (vrad(max) = +2500 km/s for Halpha). No He I emission was present. The Fe II 5169 A developed absorption at vrad = -1300 km/s; Fe II 4924, 5018 A were asymmetric with no obvious absorption. None displayed such profiles one day before. In the red, C I blend at 7113 A (noted in V339 Del 2013) was present on both days, as was Fe II 7462 A (with a similar profile to Fe II 5169 A). The equivalent width ratios of the Balmer emission lines (in A) were Halpha:Hbeta:Hgamma = 103:41:14 on Aug. 13 and 140:39:(<20, wk) on Aug. 14; Hgamma was clearly detected in the first spectrum. No strong P Cyg was seen on Hbeta but its asymmetric profile on both days (with vrad(max,red) = +2200 km/s and vrad(max,blue)=-1500 km/s) suggests absorption. As noted in the cited ATels, the extinction is quite high (perhaps E(B-V) >= 1). Observations will continue and the spectra will be publicly available through the Astronomical Ring for Access to Spectroscopy (ARAS) Database.

A.R.A.S Spectral Data Base NSgr 2016

Nova Sgr 2016 b = ASASSN-16ig



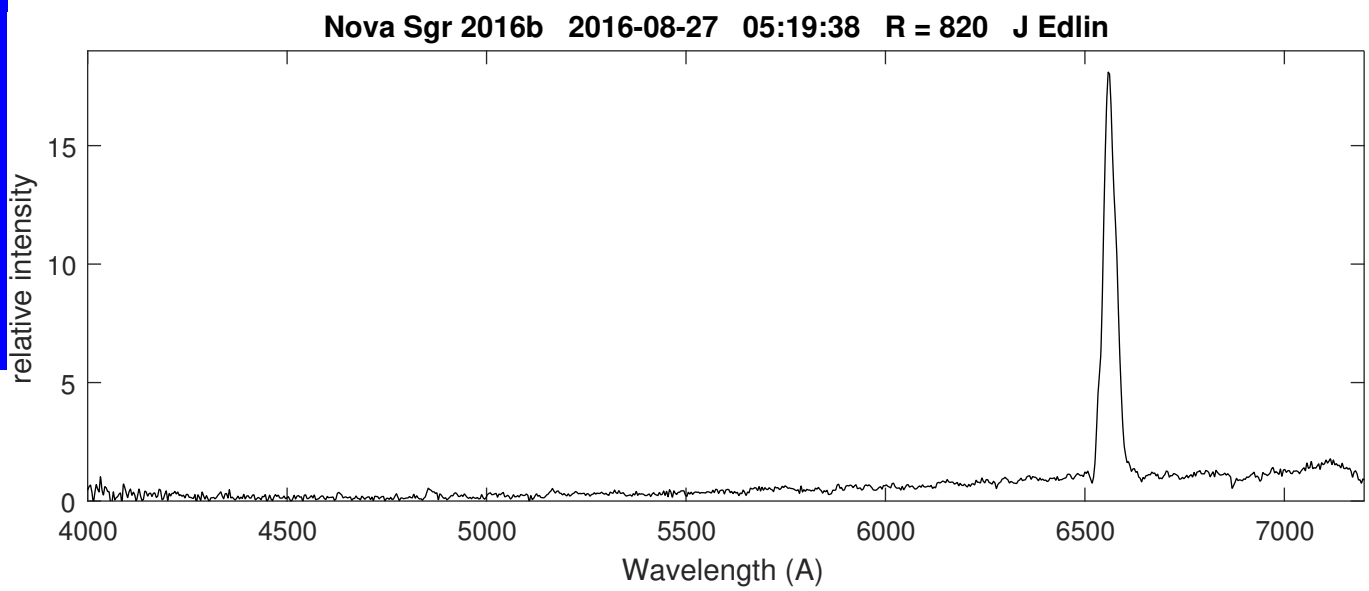
Flux calibrated spectra obtained by Terry Bohlsen with a SC11" and LISA spectrograph

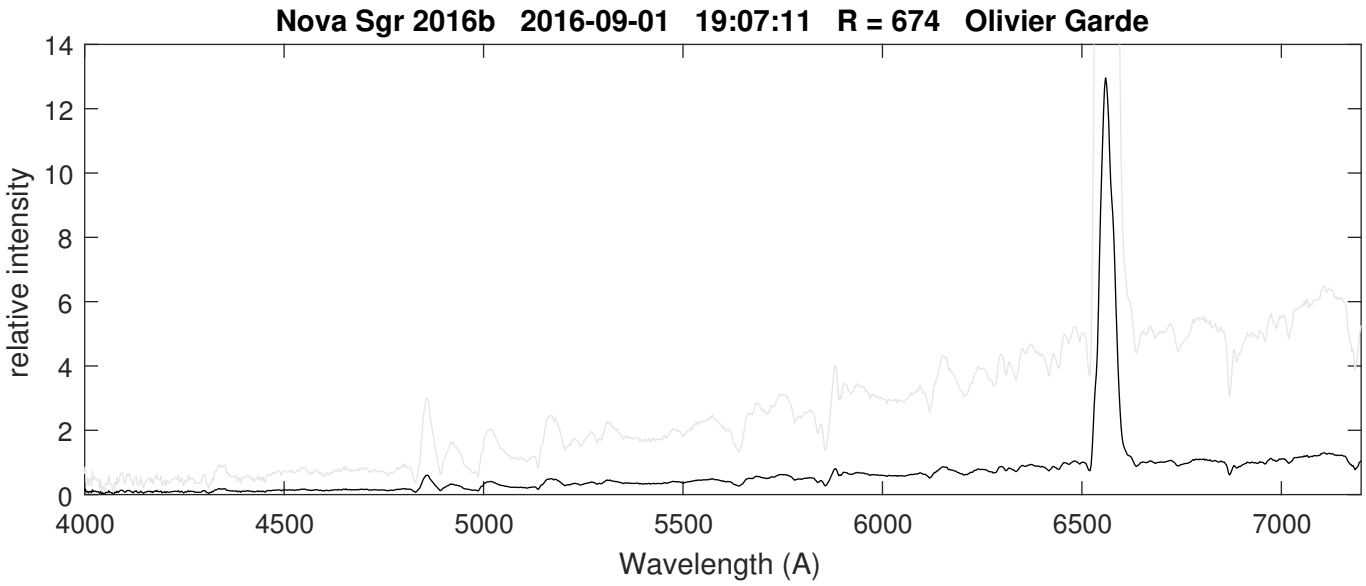
ARAS Group Additional Optical Spectroscopy of Classical Nova ASASSN-16ig (Sgr 2016 no. 2)

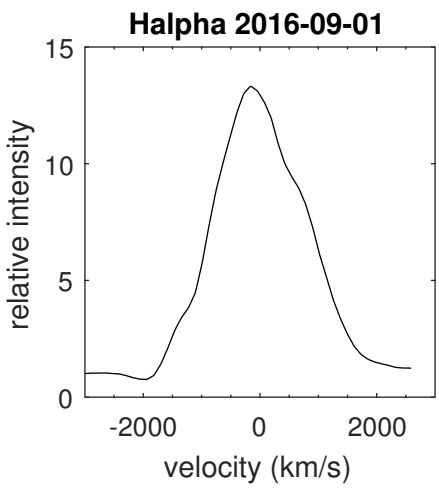
ATel #9379; Lorenzo Franco, Terry Bohlsen (ARAS)
on 16 Aug 2016; 15:21 UT
Credential Certification: S. N. Shore (shore@df.unipi.it)

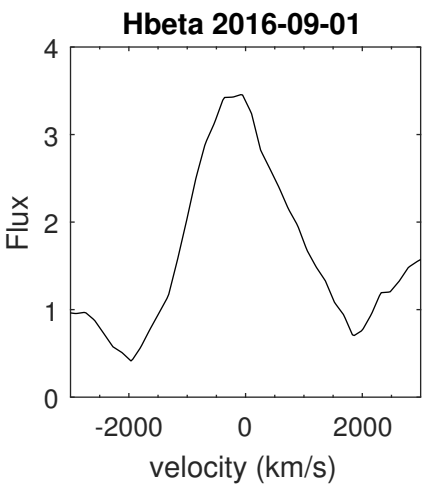
We supplement ATel #9377 with results for ASASSN-16ig (N Sgr no. 2) from ARAS observers covering the period just before that report and after the Liverpool Telescope observation reported in ATel #9375. Spectra were obtained on Aug. 12.82 (Balzaretto IT, Alpy60, R=560, total exposure time of 4200 sec, 3840-7234A), and Aug. 13.53 (Mirranook Armidale AU, LISA, R=1500, total exposure time 1769 sec, absolute flux calibrated, 3800-7249A). The Aug. 12.8 spectrum was notable in showing strong C II 4267A emission (equiv. width = 100 A) that was not seen in the later spectra. As in earlier reports, strong P Cyg profiles were present on the Balmer (Halpha-Hgamma) lines with vrad(max,blue) = -2000 km/s. Fe II 4924, 5018, and 5169A all displayed broad emission peaks and blueshifted absorption trough at about -1400 km/s; the spectrum was a strong Fe-curtain stage aside from the 4267A line; Na I D may have been detected with a possible P Cyg profile at lower velocity on Aug. 12.8. The Aug. 13.5 spectrum confirmed Na I D with vrad=-1300 and -850 km/s components in absorption (possibly affected by the doublet structure, but agreeing very well with double absorption components on Fe II 4924, 5018, and 5169A and with the Balmer lines). The Halpha/Hbeta/Hgamma ratio (erg/s/cm^2) was 1.6E-11: 1.9E-12: 2.3E-13. The integrated flux (3840-7310A) was 2.4E-10 erg/s/cm^2 (if, e.g., E(B-V)=1.0, 3.6E-9). The C II 7113A was present on both spectra (that along with the C II line point to a CO nova, but this will require monitoring of later stages). Observations are continuing and the spectra are publicly available through the ARAS Database.

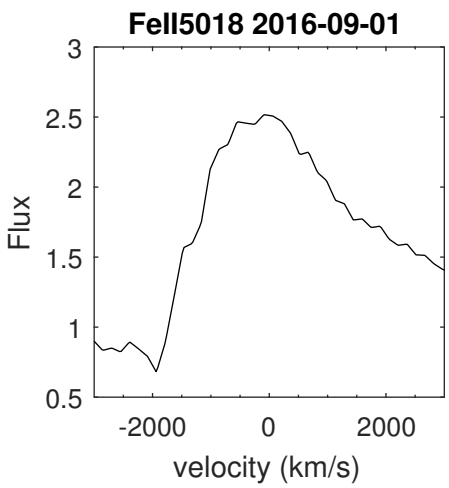
Nova Sgr 2016 b = ASASSN-16ig



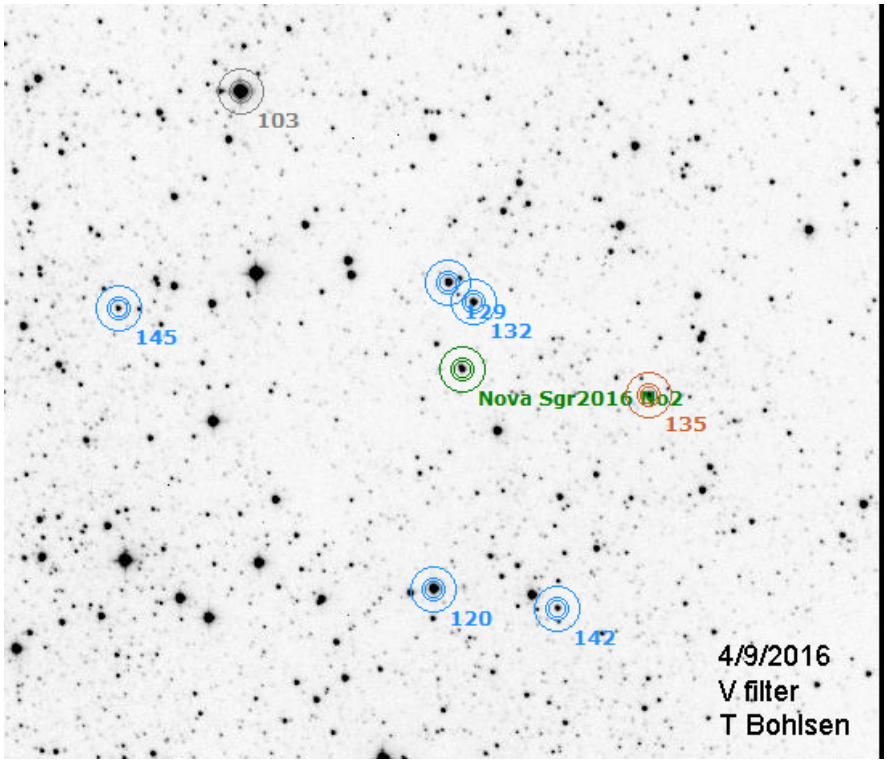








Nova Sgr 2016 b Note on Photometry (T. Bohlsen)

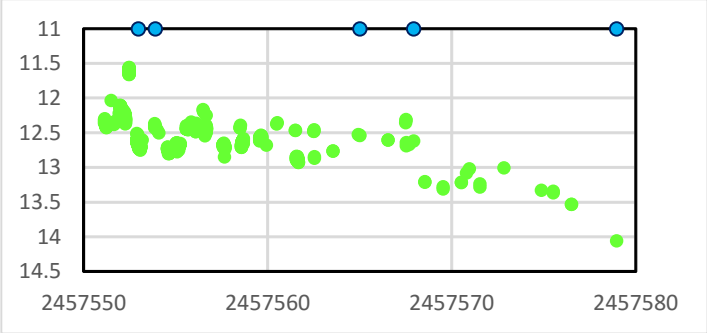


The nova clearly has a dim companion star that is being included in the spectra and the photometry. I think it is a mag<15 red star. You can see slight elongation of the nova compared to the other stars on the attached image. All I can see in the spectrum is an effect in the IR region. I can not separate the star in the slit as it is too dim.

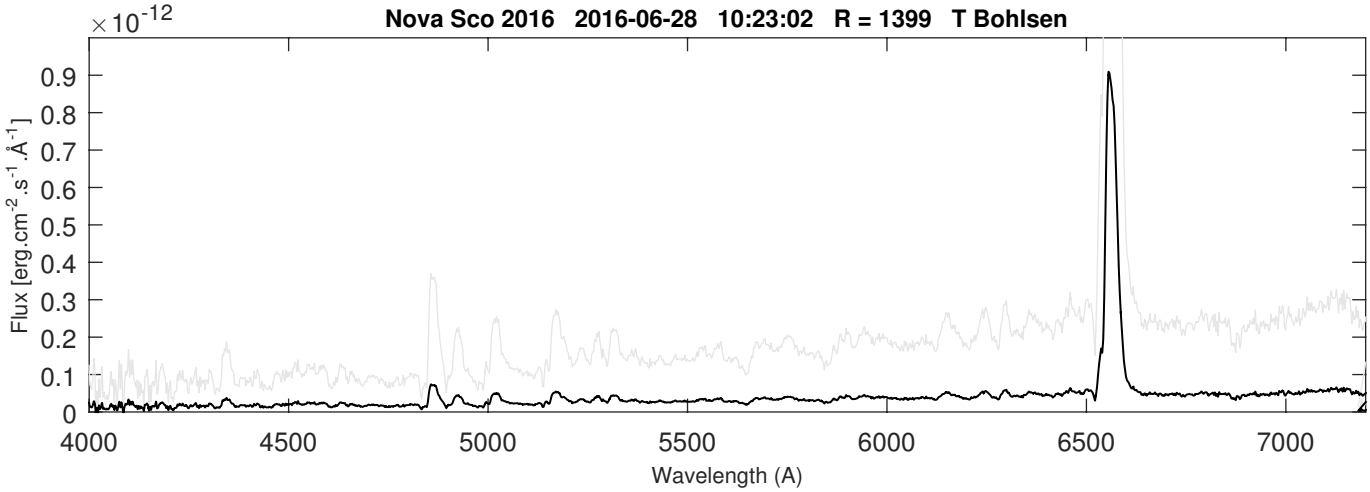
NOVAE

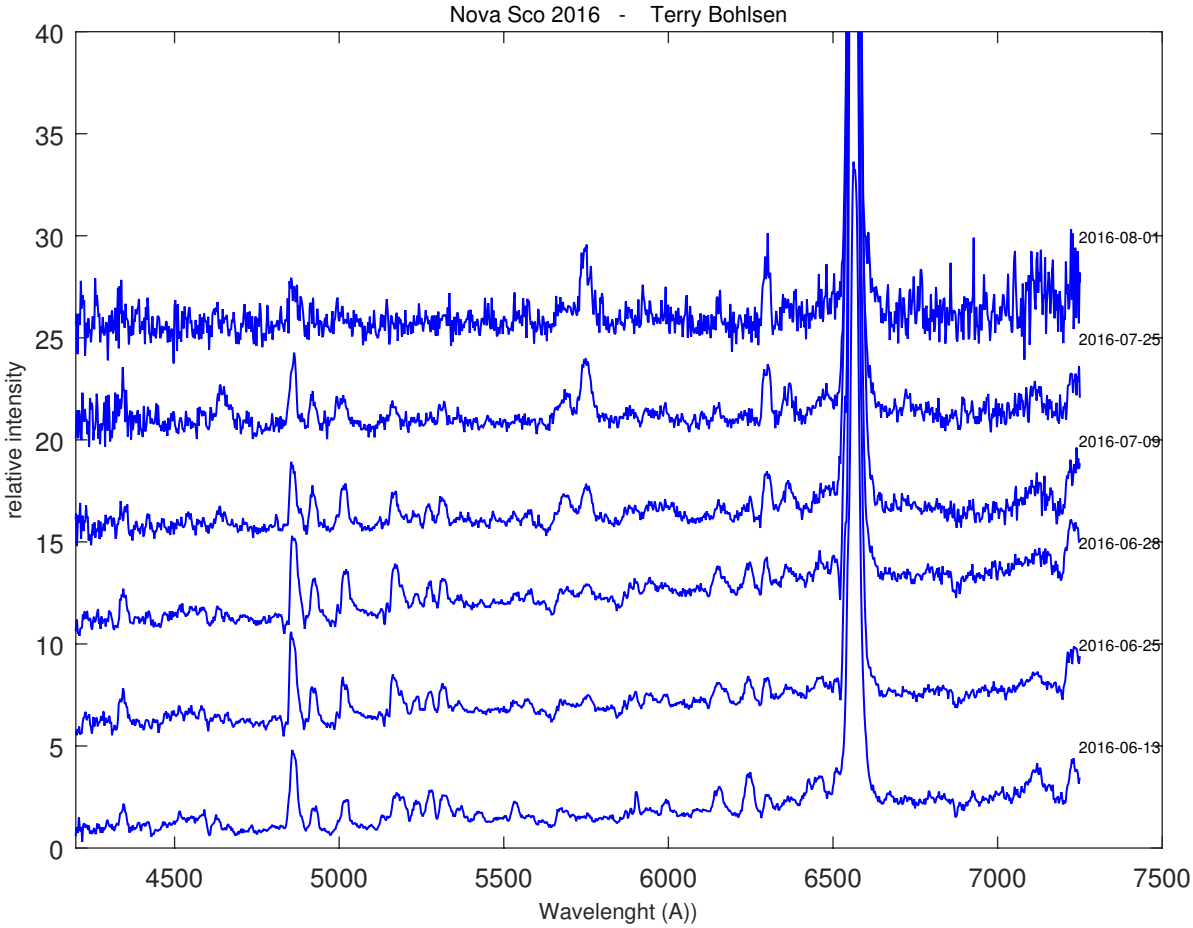
Nova Sco 2016 = PNV J17381927-3725077

Monotoring of Nova Sco 2016 by Terry Bohlsen with a LISA and photometry (Flux calibrated spectra)



AAVSO light curve (V) and Terry's spectra





Symbiotics in July-August

CH Cygni : ongoing campaign upon the request of Augustin Skopal and Margarita Karovska
T CrB : superactive phase
BF Cygni : signature of jets

Observing : main targets

Name	AD (2000)	DE (2000)
AG Dra	16 1 40.5	+66 48 9.5
AG Peg	21 51 1.9	+12 37 29.4
AX Per	01 36 22.7	+54 15 2.5
BF Cyg	19 23 53.4	+29 40 25.1
BX Mon	07 25 24	-03 36 00
CH Cyg	19 24 33	+50 14 29.1
CI Cyg	19 50 11.8	+35 41 03.2
EG And	00 44 37.1	+40 40 45.7
R Aqr	23 43 49.4	-15 17 04.2
RS Oph	17 50 13.2	-06 42 28.4
T CrB	15 59 30.1	+25 55 12.6
V443 Her	18 22 8.4	+23 27 20
V694 Mon	07 25 51.2	-07 44 08
Z And	23 33 39.5	+48 49 5.4

Symbiotics in ARAS Data Base Update : 10-07-2016

#	Name	AD (2000)	DE (2000)	Nb. of spectra	First spectrum	Last spectrum	Days Since Last
1	EG And	0 44 37.1	40 40 45.7	49	12/08/2010	09/09/2016	8
2	AX Per	1 36 22.7	54 15 2.5	106	04/10/2011	09/09/2016	8
3	V471 Per	1 58 49.7	52 53 48.4	4	06/08/2013	04/02/2016	226
4	Omi Cet	2 19 20.7	-2 58 39.5	6	28/11/2015	20/02/2016	210
5	BD Cam	3 42 9.3	63 13 0.5	15	08/11/2011	06/03/2016	195
6	UV Aur	5 21 48.8	32 30 43.1	38	24/02/2011	07/03/2016	194
7	V1261 Ori	5 22 18.6	-8 39 58	6	22/10/2011	20/02/2016	210
8	StHA 55	5 46 42	6 43 48	2	17/01/2016	25/01/2016	236
9	ZZ CMi	7 24 13.9	8 53 51.7	32	29/09/2011	05/04/2016	165
10	BX Mon	7 25 24	-3 36 0	36	04/04/2011	12/03/2016	189
11	V694 Mon	7 25 51.2	-7 44 8	166	03/03/2011	21/04/2016	149
12	NQ Gem	7 31 54.5	24 30 12.5	41	01/04/2013	17/04/2016	153
13	GH Gem	7 4 4.9	12 2 12	3	10/03/2016	29/03/2016	172
14	CQ Dra	12 30 06	69 12 04	8	11/06/2015	09/07/2016	70
15	TX CVn	12 44 42	36 45 50.6	32	10/04/2011	02/07/2016	77
16	IV Vir	14 16 34.3	-21 45 50	3	28/02/2015	20/06/2016	89
17	T CrB	15 59 30.1	25 55 12.6	143	01/04/2012	07/09/2016	10
18	AG Dra	16 1 40.5	66 48 9.5	158	03/04/2013	07/09/2016	10
19	V503 Her	17 36 46	23 18 18	3	05/06/2013	13/08/2016	35
20	RS Oph	17 50 13.2	-6 42 28.4	33	23/03/2011	01/09/2016	16
21	V934 Her	17 6 34.5	23 58 18.5	19	09/08/2013	14/08/2016	34
22	AS 270	18 05 33.7	-20 20 38	2	01/08/2013	02/08/2013	1142
23	YY Her	18 14 34.3	20 59 20	19	25/05/2011	15/07/2016	64
24	FG Ser	18 15 6.2	0 18 57.6	3	26/06/2012	24/07/2014	786
25	StHa 149	18 18 55.9	27 26 12	3	05/08/2013	14/10/2015	339
26	V443 Her	18 22 8.4	23 27 20	34	18/05/2011	08/09/2016	9
27	FN Sgr	18 53 52.9	-18 59 42	4	10/08/2013	02/07/2014	808
28	BF Cyg	19 23 53.4	29 40 25.1	96	01/05/2011	08/09/2016	9
29	CH Cyg	19 24 33	50 14 29.1	390	21/04/2011	15/09/2016	2
30	V919 Sgr	19 3 46	-16 59 53.9	2	10/08/2013	10/08/2013	1134
31	V1413 Aql	19 3 51.6	16 28 31.7	5	10/08/2013	26/09/2015	357
32	V335 Vul	19 23 14	+24 27 39.7	5	14/08/2016	25/08/2016	23
33	HM Sge	19 41 57.1	16 44 39.9	9	20/07/2013	26/08/2016	22
34	QW Sge	19 45 49.6	18 36 50	5	14/08/2016	25/08/2016	23
35	CI Cyg	19 50 11.8	35 41 3.2	122	25/08/2010	07/09/2016	10
36	StHA 169	19 51 28.9	46 23 6	2	12/05/2016	14/05/2016	126
37	V1016 Cyg	19 57 4.9	39 49 33.9	10	15/04/2015	14/07/2016	65
38	PU Vul	20 21 12	21 34 41.9	11	20/07/2013	03/09/2016	14
39	LT Del	20 35 57.3	20 11 34	1	28/11/2015	28/11/2015	294
40	ER Del	20 42 46.4	8 40 56.4	4	02/09/2011	31/08/2016	17
41	V1329 Cyg	20 51 1.1	35 34 51.2	6	08/08/2015	27/08/2016	21
42	V407 Cyg	21 2 13	45 46 30				
43	StHa 190	21 41 44.8	2 43 54.4	16	31/08/2011	24/07/2016	55
44	AG Peg	21 51 1.9	12 37 29.4	181	06/12/2009	09/09/2016	8
45	V627 Cas	22 57 41.2	58 49 14.9	14	06/08/2013	30/08/2016	18
46	Z And	23 33 39.5	48 49 5.4	61	30/10/2010	03/09/2016	14
47	R Aqr	23 43 49.4	-15 17 4.2	28	25/09/2010	03/09/2016	14
48	SU Lyn	06 42 55.1	+55 28 27.2	2	02/05/2016	04/05/2016	136

ARAS Data Base Symbiotics : http://www.astrosurf.com/aras/Aras_DataBase/Symbiotics.htm

SYMBIOTICS

Symbiotics luminosity from AAVSO Data Update : 12-07-2016

AAVSO V magnitude of Symbiotic (or suspected) stars — Updated 13/09/2016

#	Name	AD (2000)	DE (2000)	V	JD	Date	OBS	Days Last
1	EG And	0 44 37.1	40 40 45.7	7.74	2457638.928	2016 Sep. 07.42812	DKS	6
2	AX Per	1 36 22.7	54 15 2.5	11.1	2457640.551	2016 Sep. 09.05100	MEV	4
3	V471 Per	1 58 49.7	52 53 48.4	13.03	2457638.923	2016 Sep. 07.42294	DKS	6
4	o Cet	2 19 20.7	-2 58 39.5	8.36	2457633.877	2016 Sep. 02.37709	SAH	11
5	BD Cam	3 42 9.3	63 13 0.5	5.16	2455566.614	2011 Jan. 05.11354	PSEB	2078
6	UV Aur	5 21 48.8	32 30 43.1	7.99	2457640.587	2016 Sep. 09.08700	MEV	4
7	V1261 Ori	5 22 18.6	-8 39 58	6.97	2457376.631	2015 Dec. 20.13088	SBL	268
8	StHa 55	5 46 42	6 43 48					
9	ZZ CMi	7 24 13.9	8 53 51.7	10.18	2456713.286	2014 Feb. 24.78604	HPIA	931
10	BX Mon	7 25 24	-3 36 0	9.96	2457484.265	2016 Apr. 05.76528	TIA	160
11	V694 Mon	7 25 51.2	-7 44 8	9.19	2457548.496	2016 Jun. 08.99586	HMB	96
12	NQ Gem	7 31 54.5	24 30 12.5	7.94	2457479.431	2016 Mar. 31.93113	BDG	165
13	GH Gem	7 4 4.9	12 2 12	13	2457639.638	2016 Sep. 08.13800	MEV	5
14	CQ Dra	12 30 06	69 12 04					
15	TX CVn	12 44 42	36 45 50.6	10.01	2457624.323	2016 Aug. 23.82300	MEV	20
16	IV Vir	14 16 34.3	-21 45 50					
17	T CrB	15 59 30.1	25 55 12.6	10.03	2457642.366	2016 Sep. 10.86595	HKEB	2
18	AG Dra	16 1 40.5	66 48 9.5	9.72	2457641.382	2016 Sep. 09.88200	MEV	3
19	V503 Her	17 36 46	23 18 18	12.55	2457561.706	2016 Jun. 22.20556	DKS	83
20	RS Oph	17 50 13.2	-6 42 28.4	11.41	2457582.398	2016 Jul. 12.89774	RZD	62
21	V934 Her	17 6 34.5	23 58 18.5	8.65	2454102.417	2007 Jan. 01.91700	GMZ	3542
22	AS 270	18 05 33.7	-20 20 38	13.58	2457639.35	2016 Sep. 07.85040	HKEB	5
23	AS 289	18 12 22	-11 40 13	13.17	2456355.011	2013 Mar. 03.51100	OCN	1289
24	YY Her	18 14 34.3	20 59 20	12.94	2457641.35	2016 Sep. 09.85000	MEV	3
25	FG Ser	18 15 6.2	0 18 57.6	12.01	2456783.432	2014 May. 05.93194	TIA	861
26	StHa 149	18 18 55.9	27 26 12	12.15	2456844.496	2014 Jul. 05.99603	GCO	800
27	V443 Her	18 22 8.4	23 27 20	11.67	2457329.311	2015 Nov. 02.81110	BCP	315
28	FN Sgr	18 53 52.9	-18 59 42	12.98	2457543.944	2016 Jun. 04.44380	OCN	101
29	V335 Vul	19 23 14.2	24 27 40.2	13.03	2456861.606	2014 Jul. 23.10600	OCN	783
30	BF Cyg	19 23 53.4	29 40 25.1	10.46	2457641.381	2016 Sep. 09.88100	MEV	3
31	CH Cyg	19 24 33	50 14 29.1	7.59	2457643.585	2016 Sep. 12.08532	GKA	1
32	V919 Sgr	19 3 46	-16 59 53.9	13.20	2457575.832	2016 Jul. 06.33163	DKS	69
33	V1413 Aql	19 3 51.6	16 28 31.7	11.75	2457538.957	2016 May. 30.45700	PYG	106
34	HM Sge	19 41 57.1	16 44 39.9	12.42	2457628.292	2016 Aug. 27.79236	TIA	16
35	QW Sge	19 45 49.6	18 36 50	12.67	2457641.371	2016 Sep. 09.87100	MEV	3
36	CI Cyg	19 50 11.8	35 41 3.2	10.88	2457643.516	2016 Sep. 12.01632	DKS	1
37	StHA 169	19 51 28.9	46 23 6	13.03	2457543.955	2016 Jun. 04.45470	OCN	101
38	V1016 Cyg	19 57 4.9	39 49 33.9	11.74	2457561.842	2016 Jun. 22.34182	MZK	83
39	PU Vul	20 21 12	21 34 41.9	12.95	2457627.29	2016 Aug. 26.79028	TIA	17
40	LT Del	20 35 57.3	20 11 34	13.06	2457641.411	2016 Sep. 09.91100	MEV	3
41	ER Del	20 42 46.4	8 40 56.4	10.25	2457210.509	2015 Jul. 07.00854	LCLA	434
42	V1329 Cyg	20 51 1.1	35 34 51.2	13.38	2457615.459	2016 Aug. 14.95858	BDG	29
43	V407 Cyg	21 2 13	45 46 30	14.96	2457633.007	2016 Sep. 01.50660	OCN	11
44	StHA 190	21 41 44.8	2 43 54.4	10.59	2455855.553	2011 Oct. 21.05296	DKS	1789
45	AG Peg	21 51 1.9	12 37 29.4	8.66	2457631.46	2016 Aug. 30.96000	BDG	13
46	V627 Cas	22 57 41.2	58 49 14.9	12.93	2457631.467	2016 Aug. 30.96741	BDG	13
47	Z And	23 33 39.5	48 49 5.4	9.97	2457639.923	2016 Sep. 08.42273	DKS	5
48	R Aqr	23 43 49.4	-15 17 4.2	10.10	2457640.624	2016 Sep. 09.12390	HKEB	4
49	SU Lyn	06 42 55.1	+55 28 27.2	8.62	2457511.473	2016 May. 02.97260	BDG	133

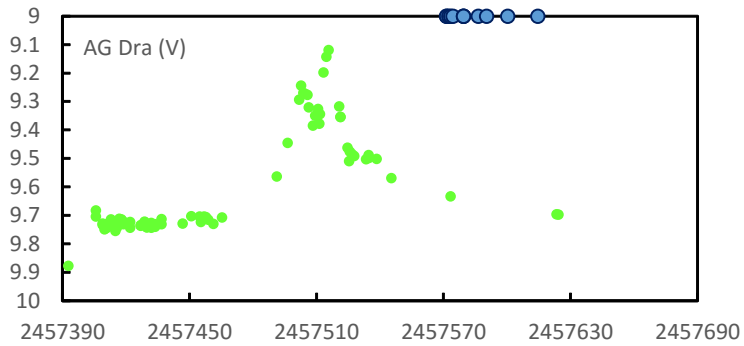
Update on :

http://www.astronomie-amateur.fr/Actualite/AAVSO.htm

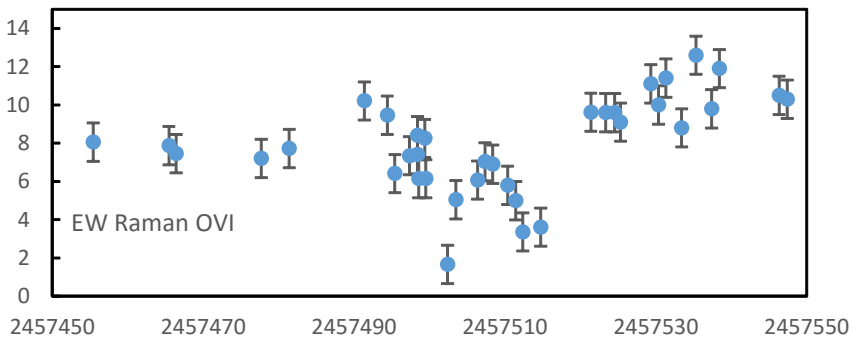
AG Dra

Coordinates (2000.0)	
R.A.	16 01 41.0
Dec	+66 48 10.1

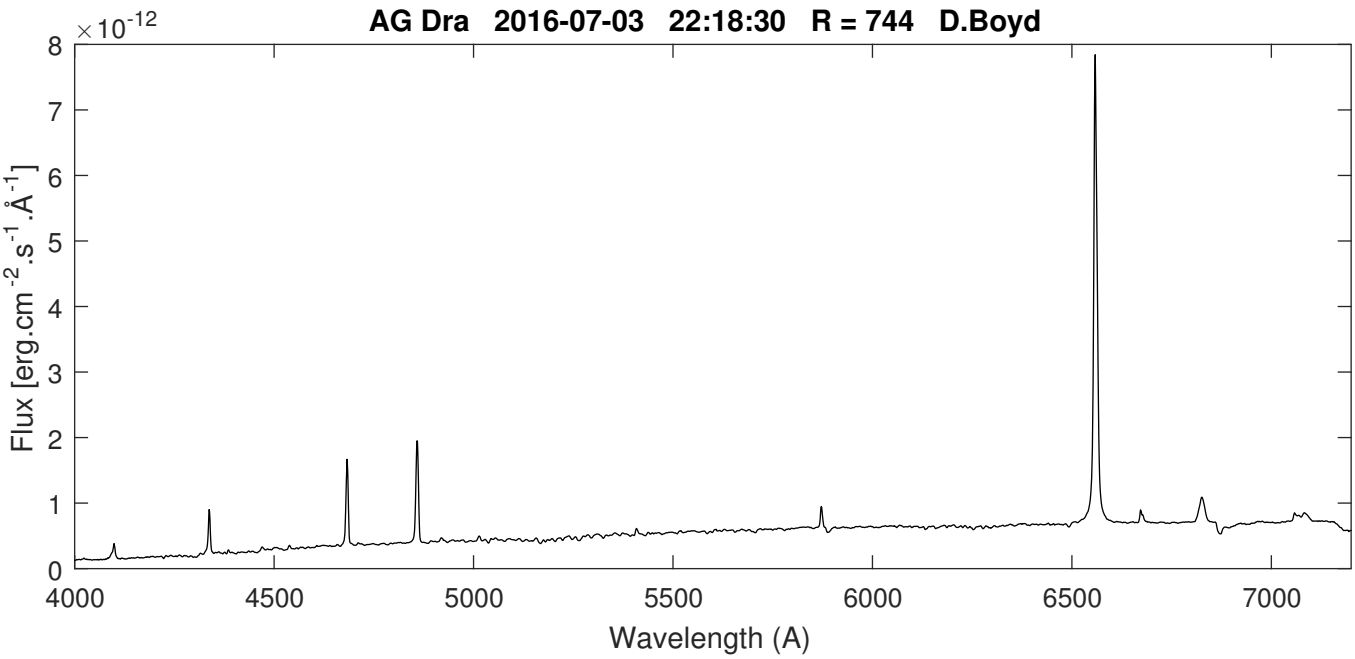
AG Dra is returning to quiescent state after its double-peaked outburst during Spring
Raman OVI lines have recovered



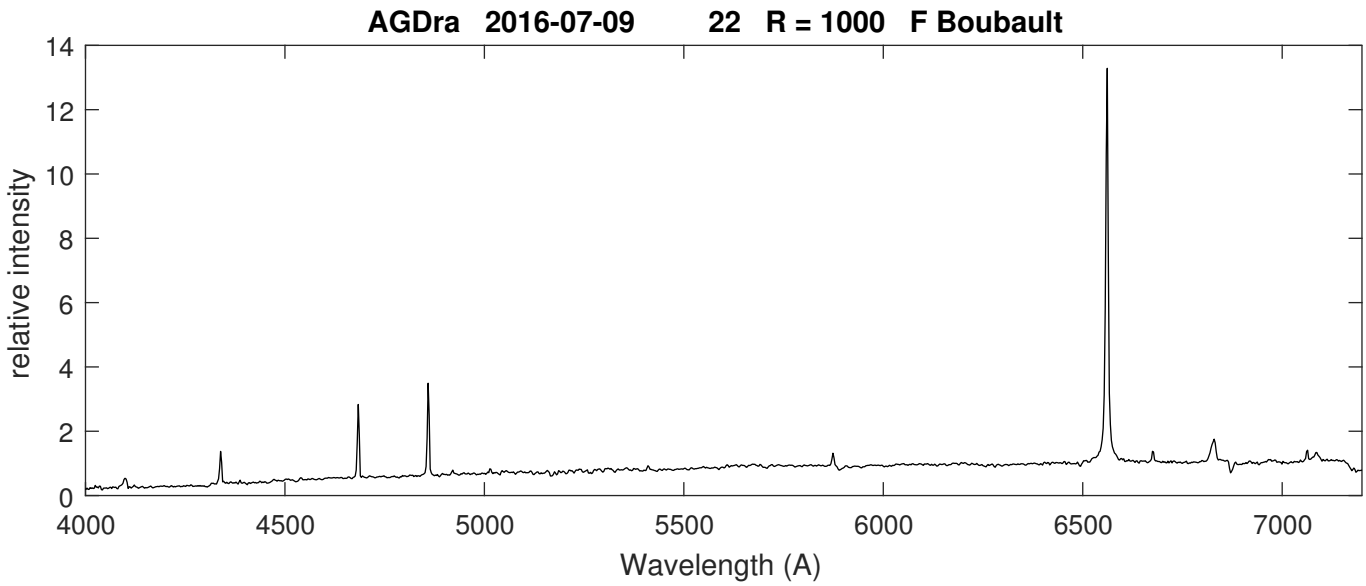
AAVSO Green Lightcurve
ARAS Spectra in July-August 2016 : blue dots

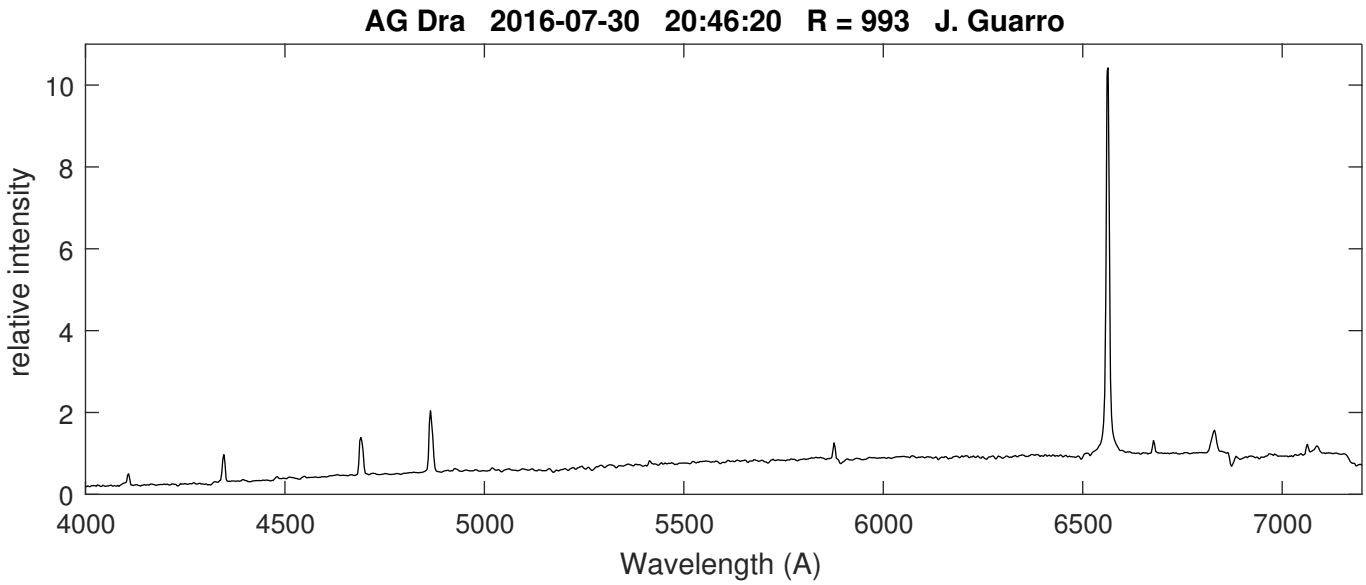


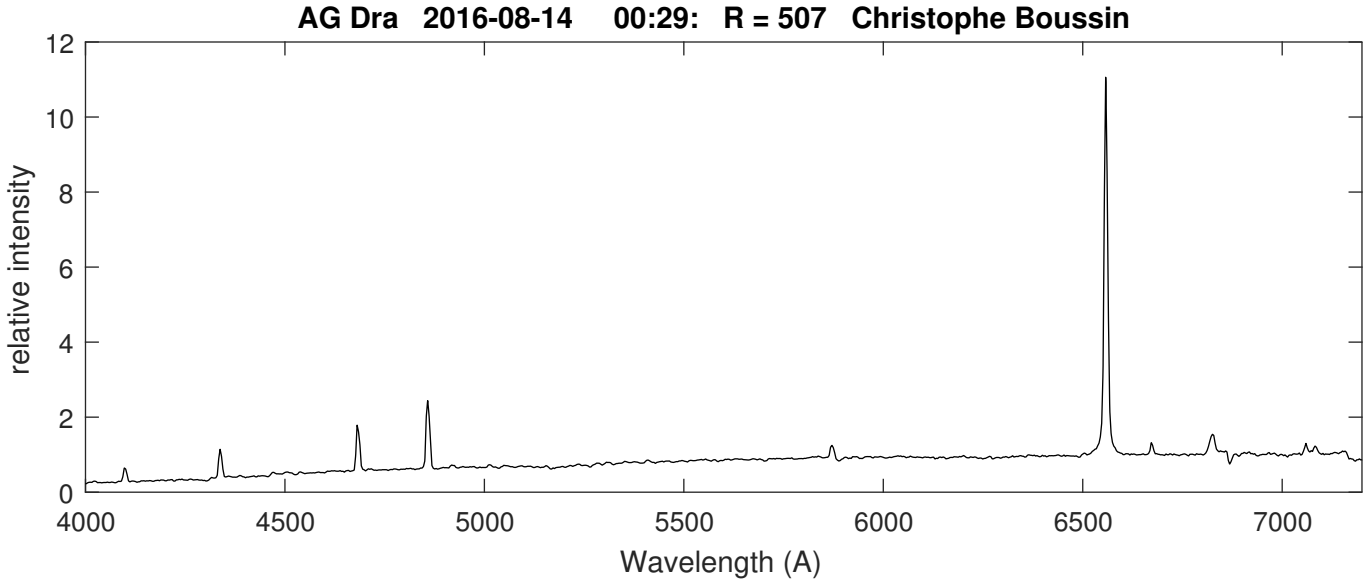
Update of Raman OVI equivalent width during the outburst



AG Dra in July throw low res spectra

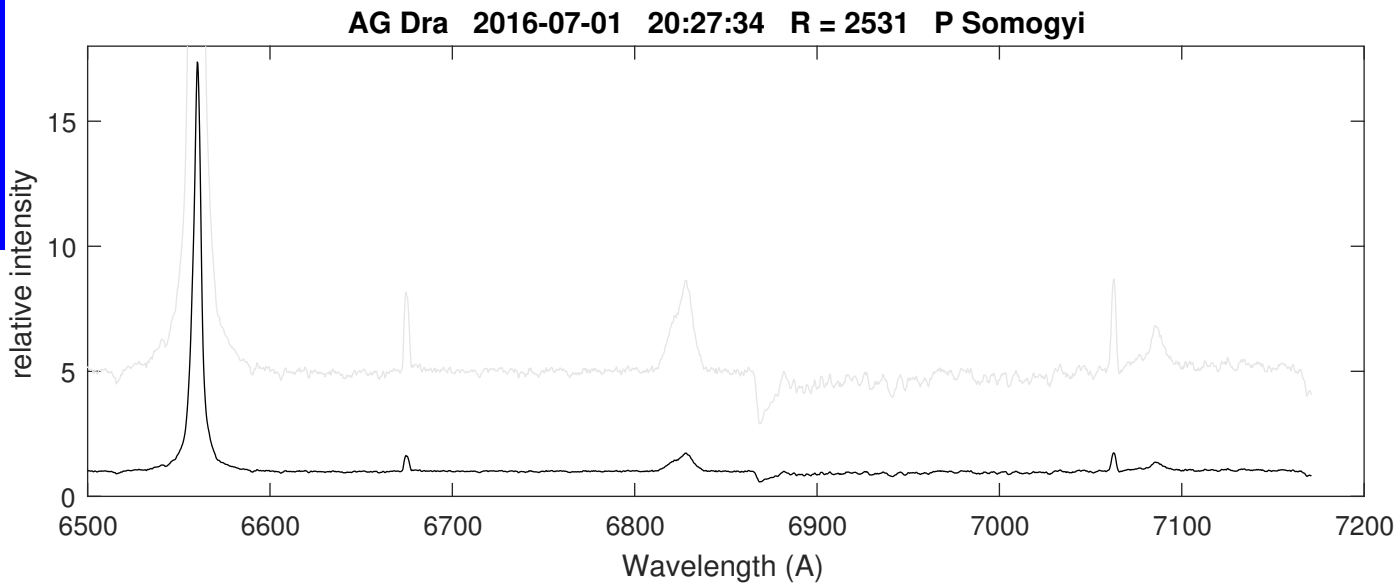


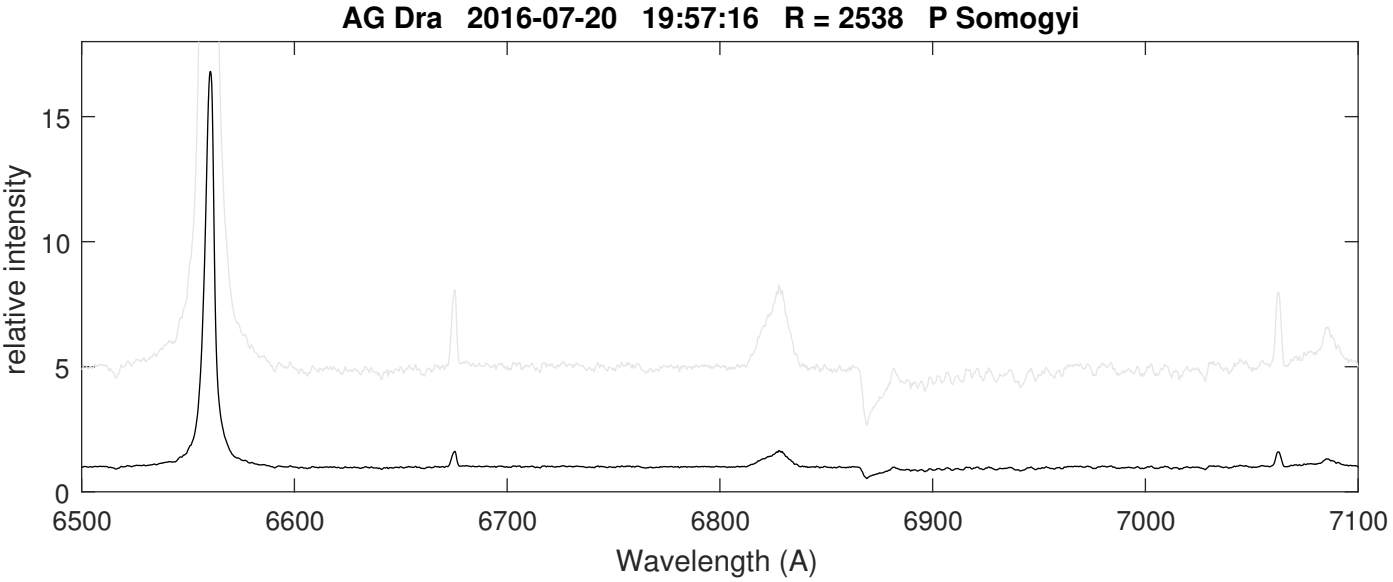


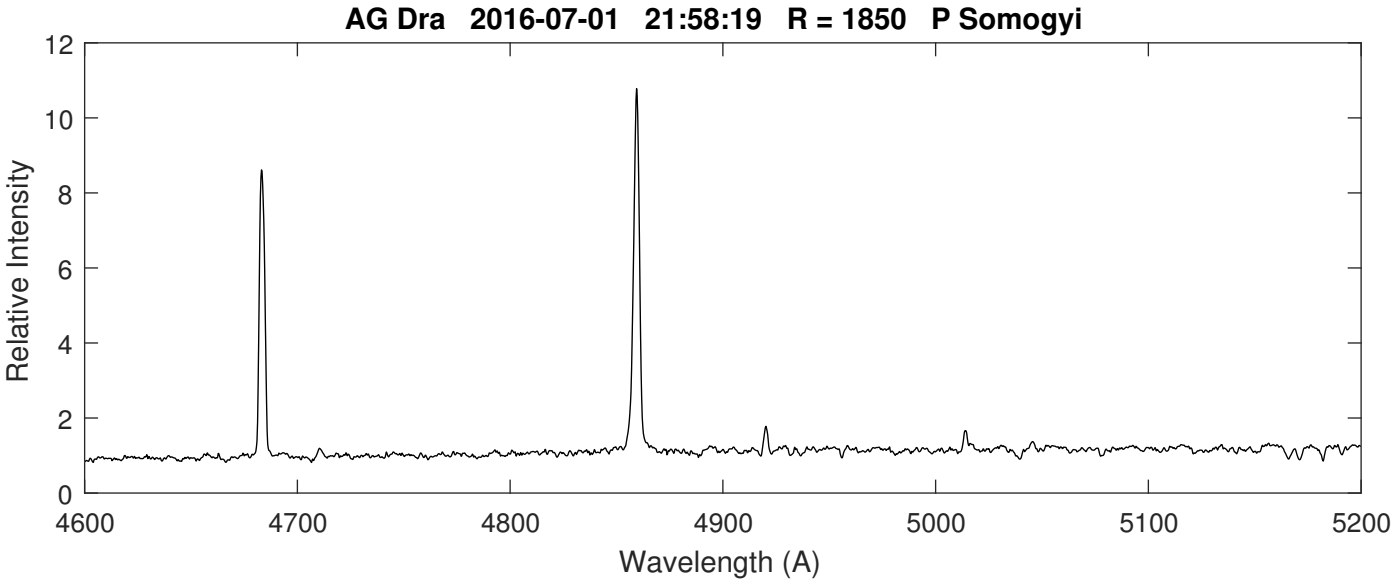


AG Dra Hβ and Hα regions by P. Somogyi

Hα and Hβ region obtained by P. Somogyi with a Lhires III (600 ln/mm, R = 2500)

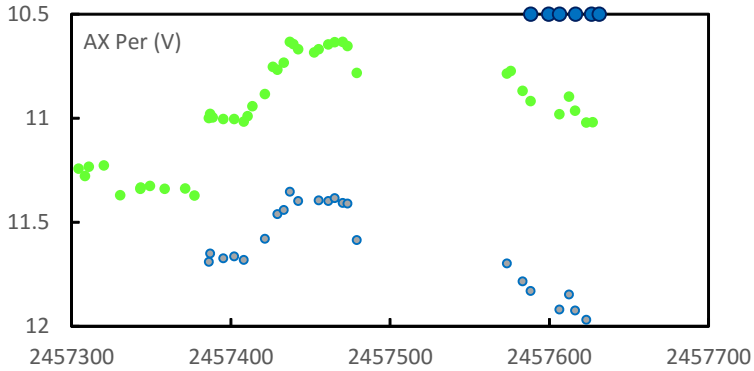




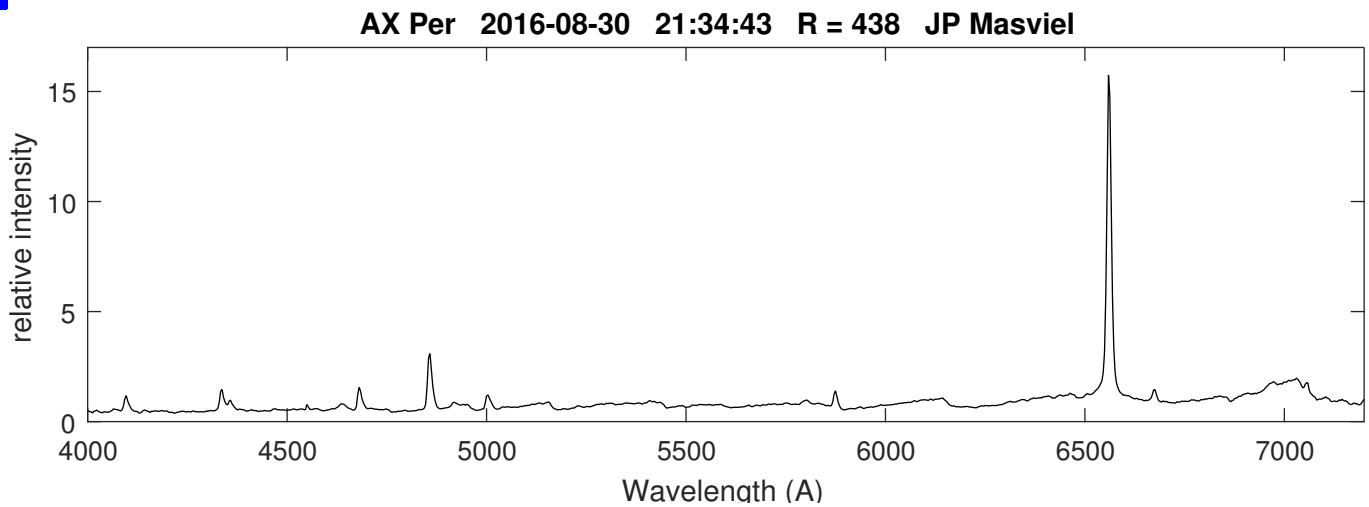


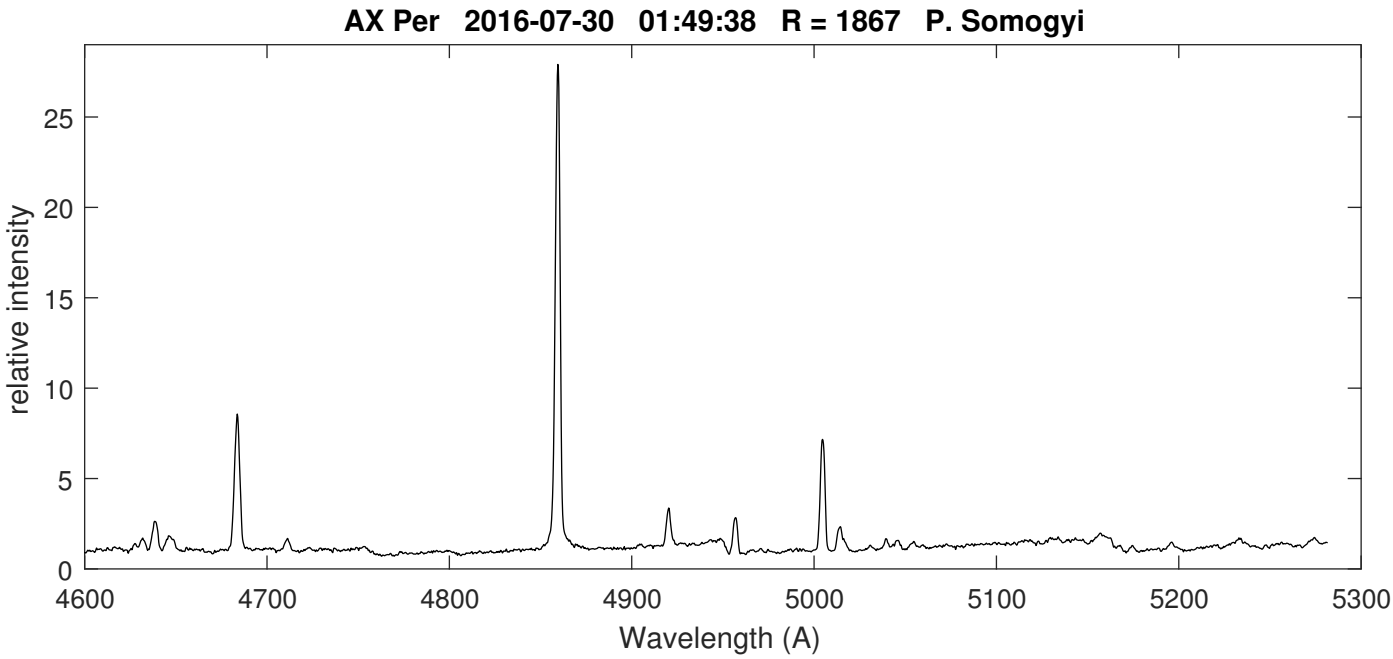
AX Per

Coordinates (2000.0)	
R.A.	01 36 22.7
Dec	+54 15 02.4



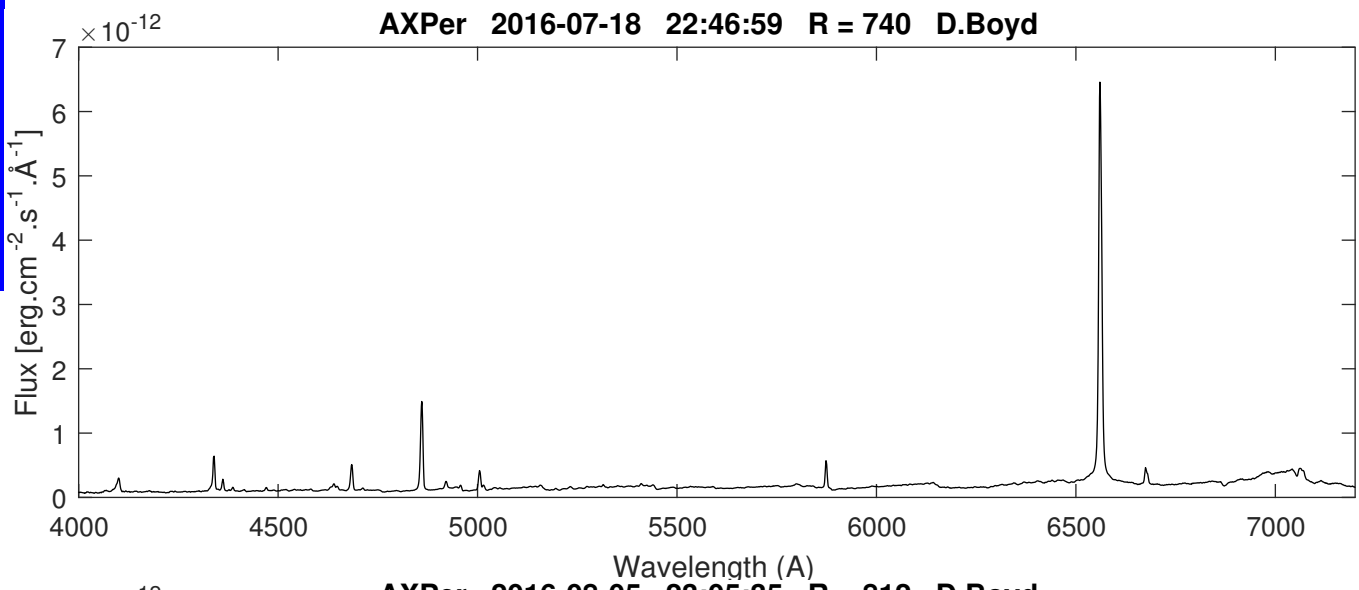
AAVSO Blue and Green Lightcurve
ARAS Spectra in July-August 2016 : blue dots

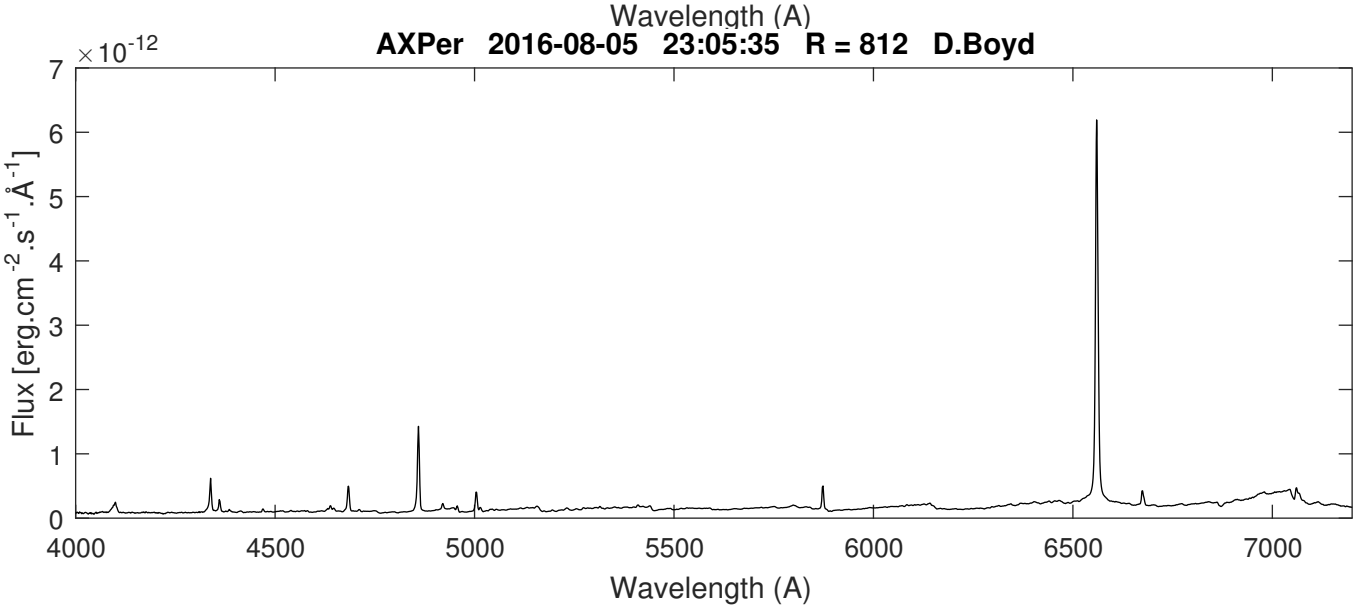


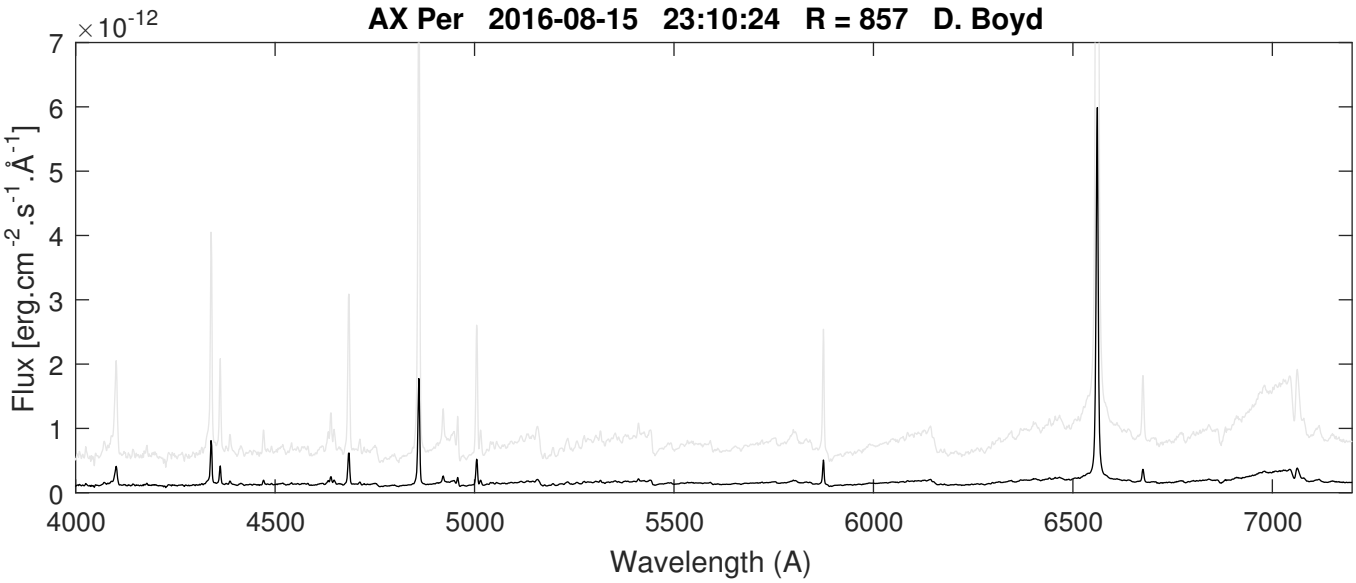


H beta region by Peter Somogyi (Lhires III - 600 ln/mm)

AX Per Flux calibrated spectra by David Boyd



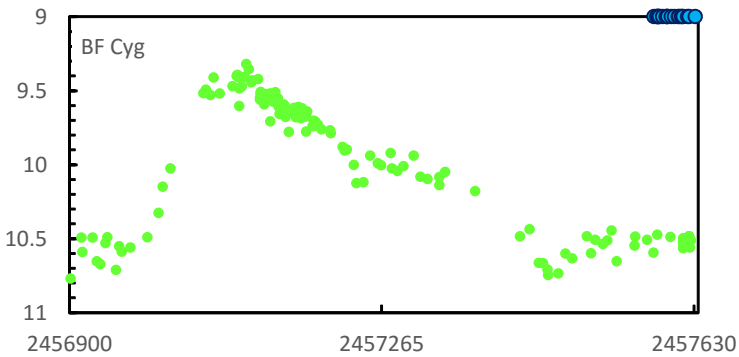


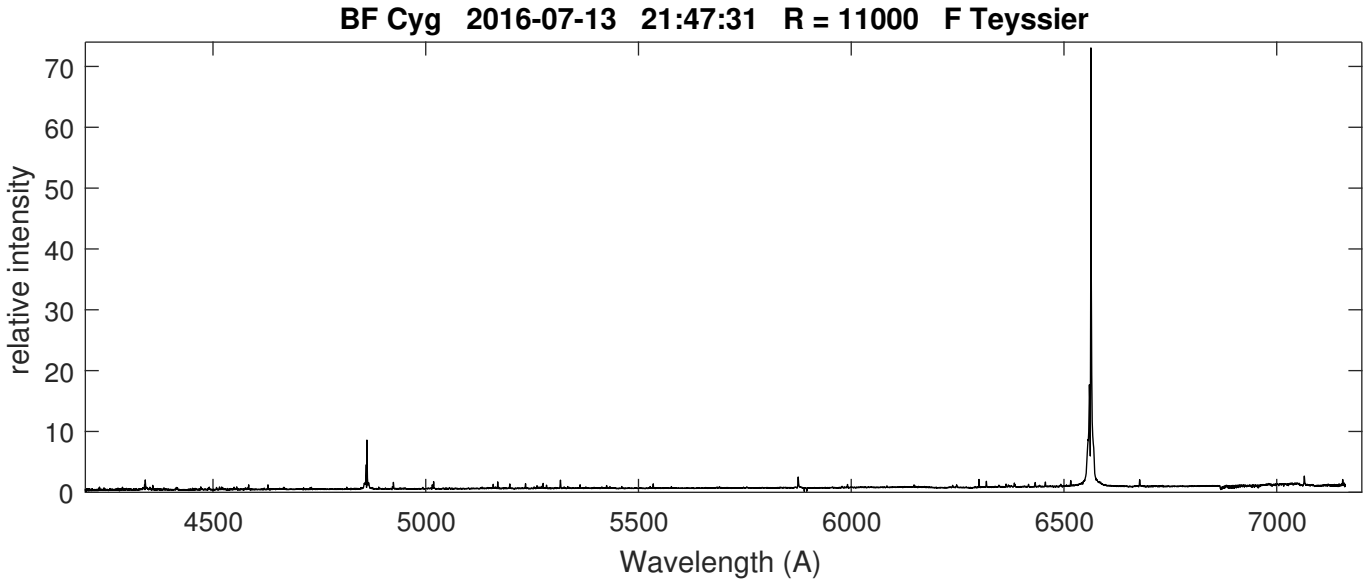


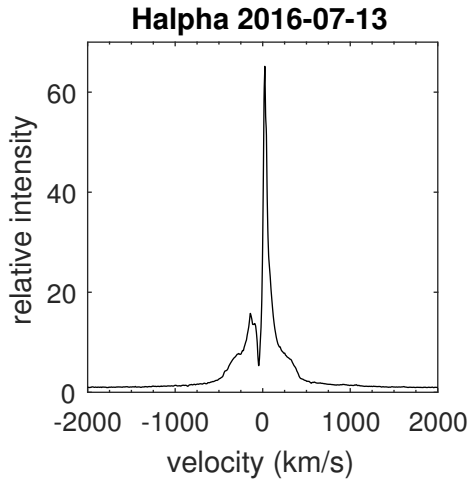
BF Cyg

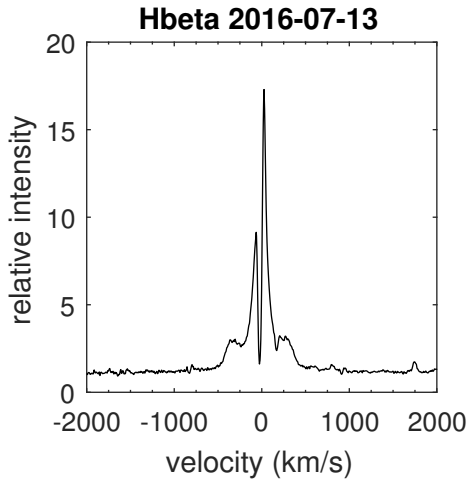
Coordinates (2000.0)	
R.A.	19 23 53.5
Dec	+29 40 29.2
Mag	9.2-10.8

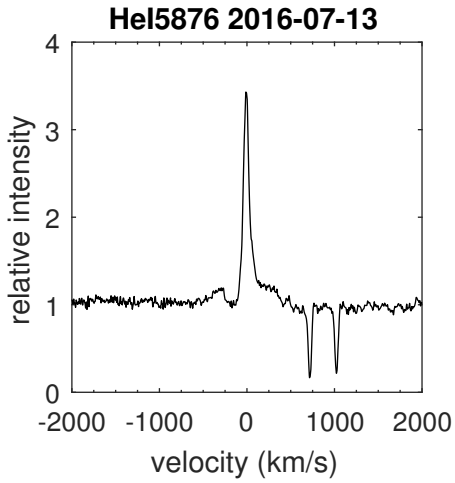
In quiescent state after a long outburst (Nov. 2014 to Feb. 2016) with a peak at mag V ~9.4 (Feb.- Apr. 2015)





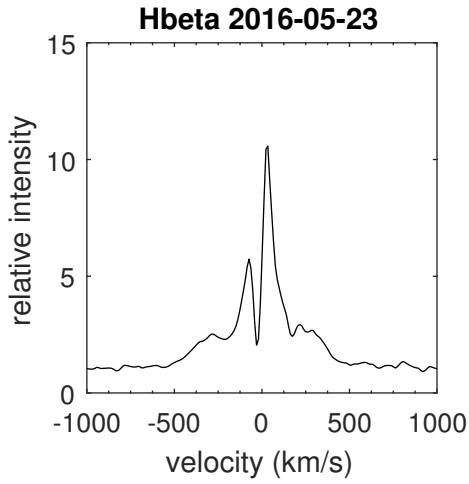






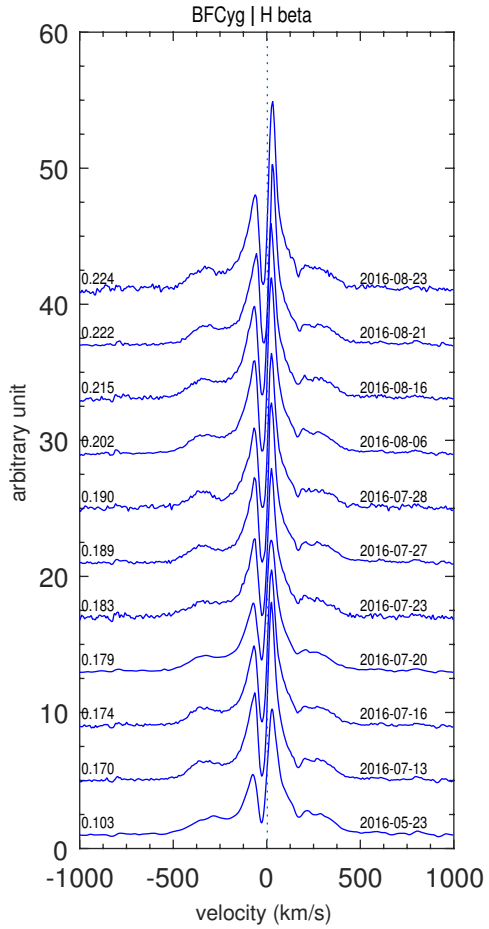
In the spectrum obtained with an eshel at R = 11000 the 13th of July, 2016, strong satellite lines are observed in Balmer lines at +250 and -330 km.s^{-1}
The satellite components was already present in Tim Lester spectrum obtained in May (5)

Note the absorption in the blue edge of He I line (max velocity is about -270 km.s^{-1}

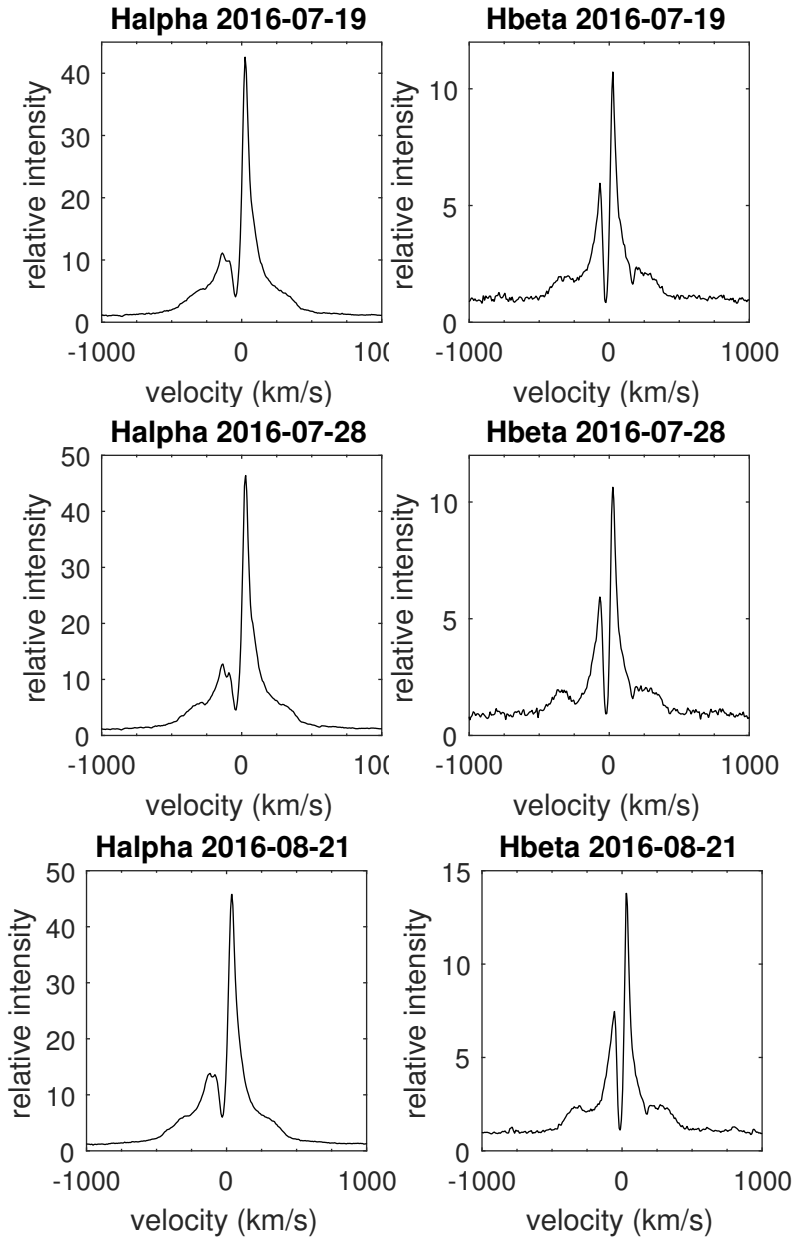


Tim Lester (R = 9000)
23-05-2016

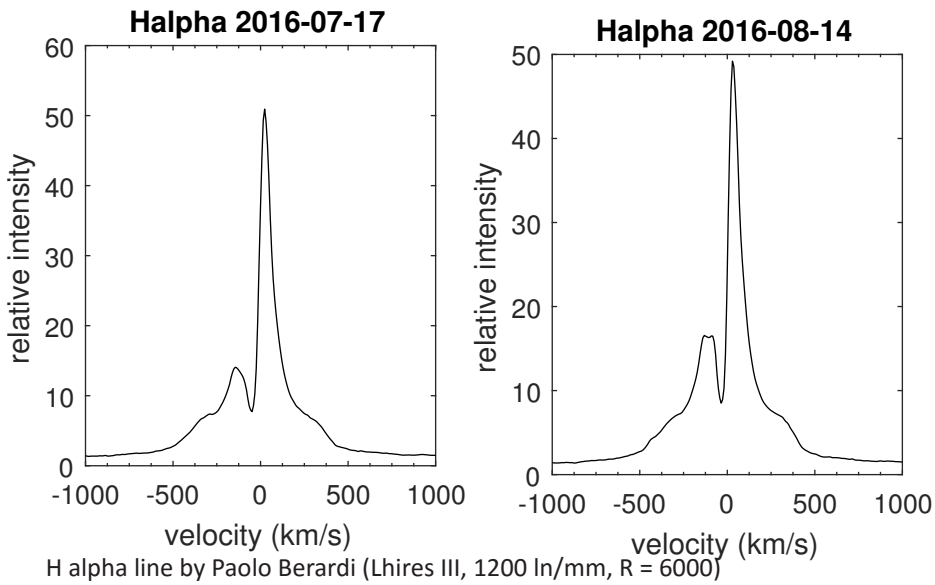
BF Cyg



H beta line in 2016
Spectra obtained by T. Lester and F. Teyssier

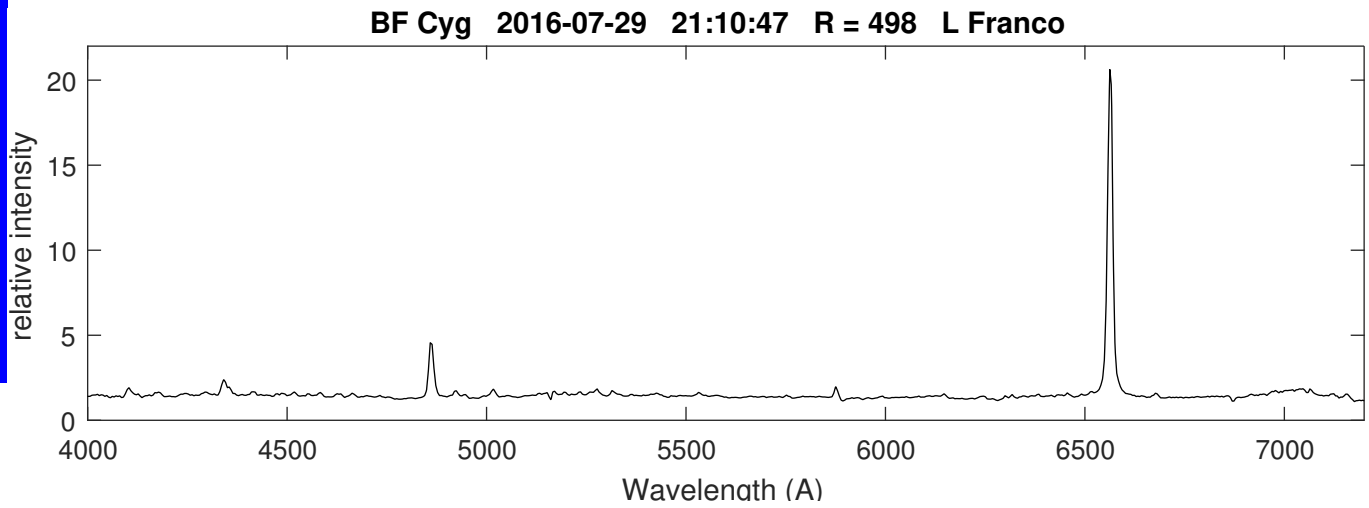


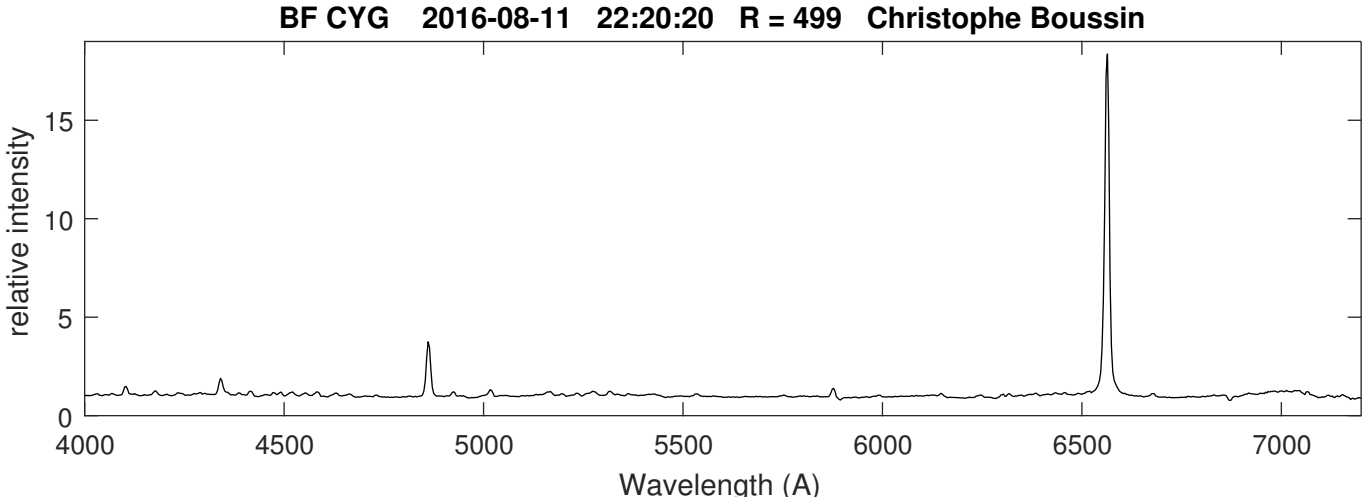
H alpha and H beta lines by POlivier Thizy (19-09 & 21-08) and O. Garde (28-08) with an eshel at R = 11000

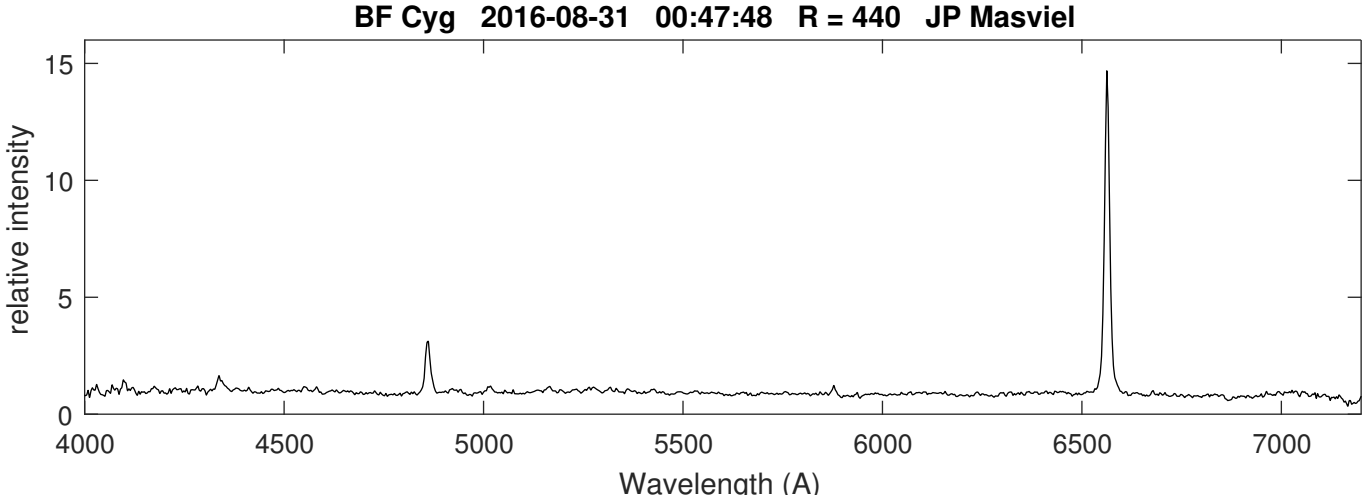


H alpha line by Paolo Berardi (Lhires III, 1200 ln/mm, R = 6000)
Note the absorption in the blue part of the line in the spectrum obtained the 14th of August

BF Cyg Low res spectra in August, 2016



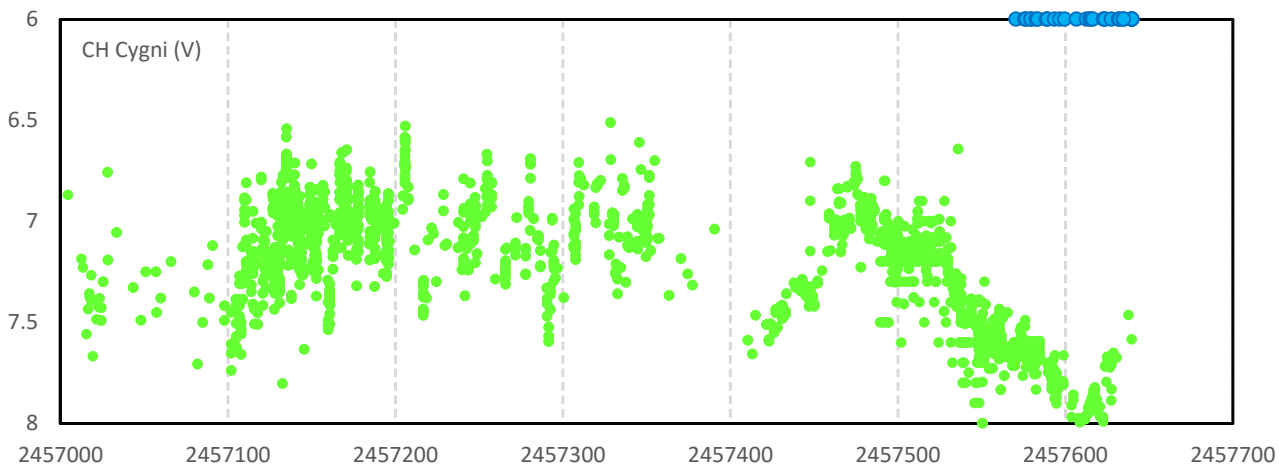




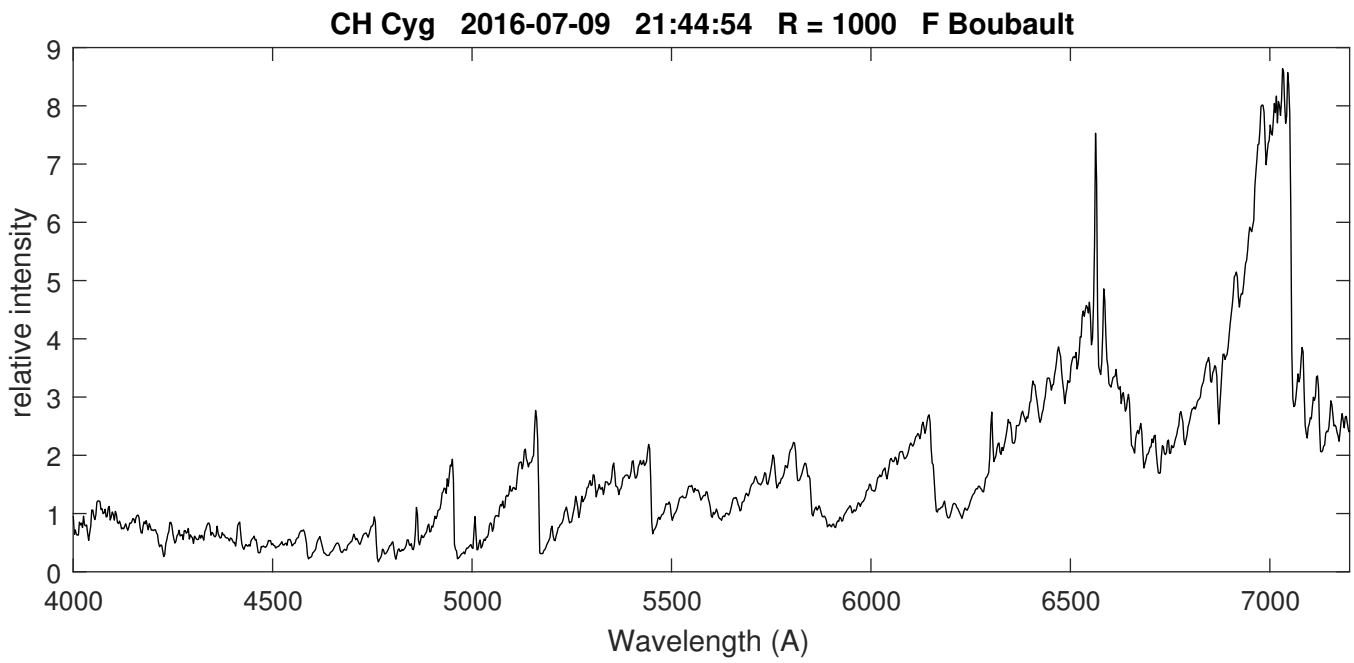
CH Cyg

Coordinates (2000.0)	
R.A.	19 24 33.1
Dec	+50 14 29.1
Mag	

Ongoing campaign upon the request of Augustin Skopal
At least one spectrum a month (high resolution and low resolution, with a correct atmospheric response)



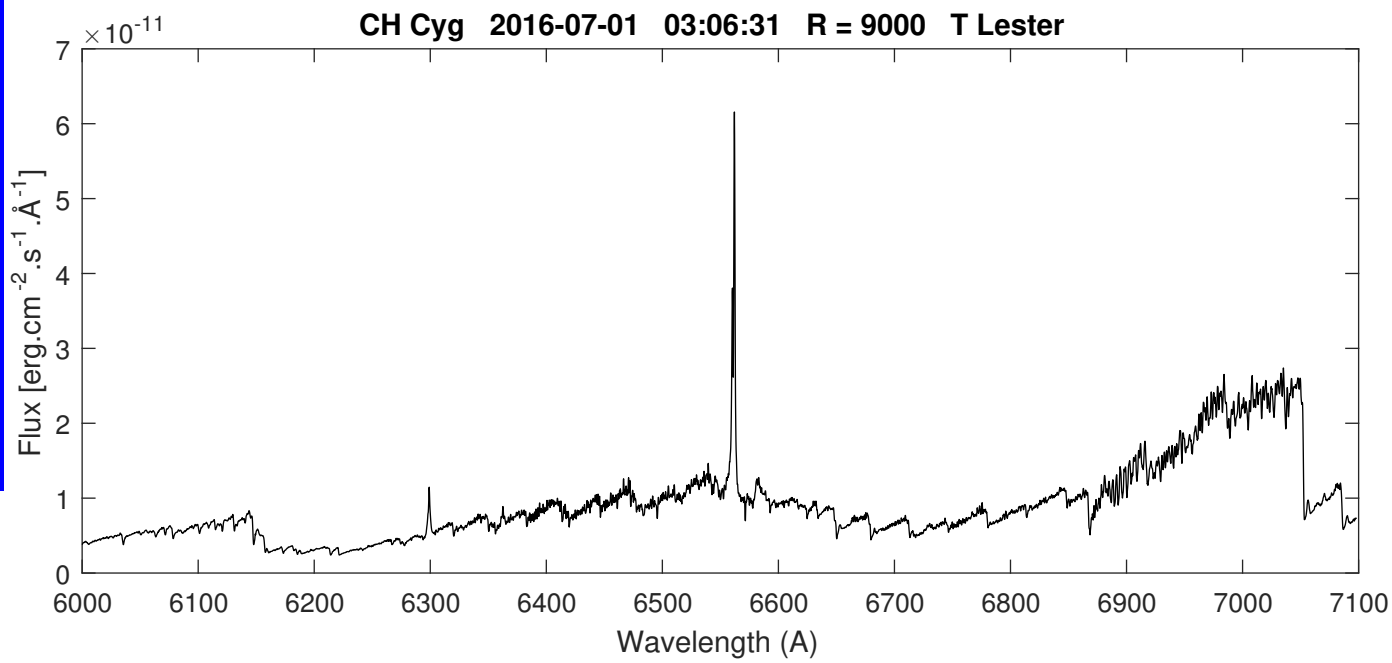
AAVSO V lightcurve in 2015-2016 and ARAS spectra (blue dots)
After a continuous decline to Mag V = 8.0 (10th of August) , CH Cygni is currently rising (V ~ 7.5 08-09-

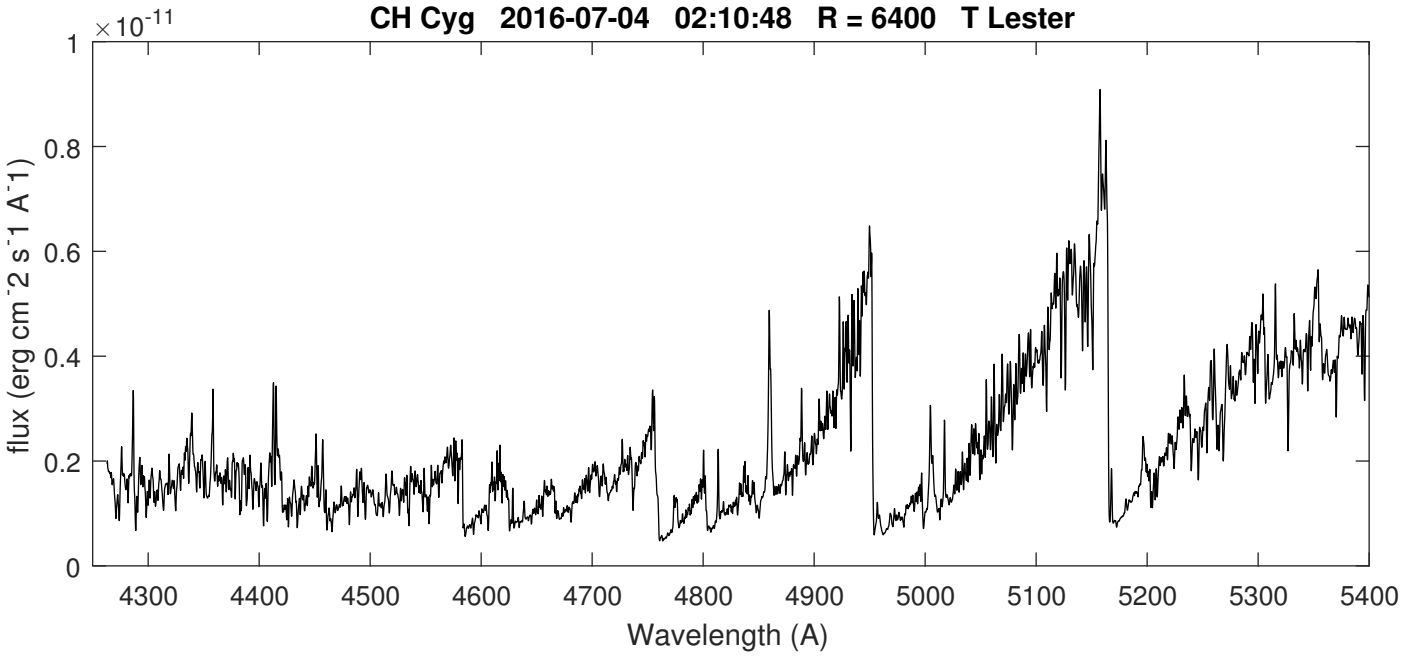


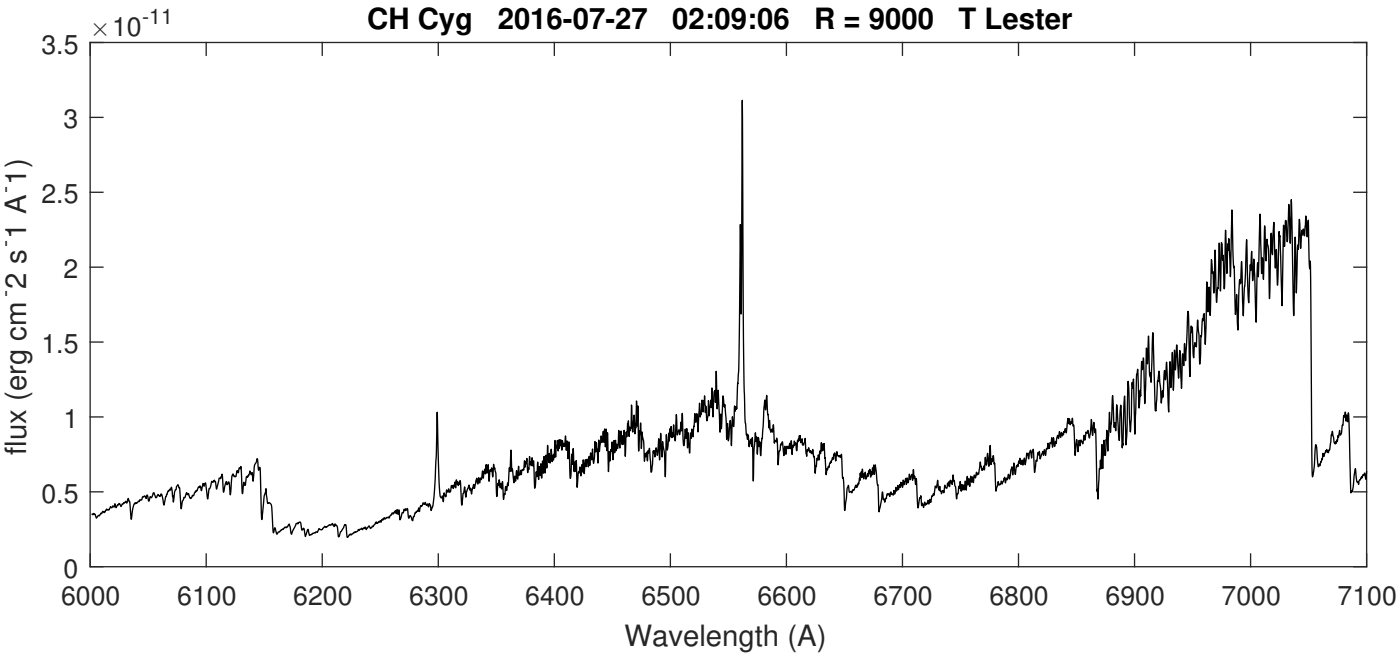
Franch Boubault with a Lisa (R = 1000)

CH Cyg

Flux calibrated spectra obtained by Tim Lester with its home-made spectrpgraph at R = 9000



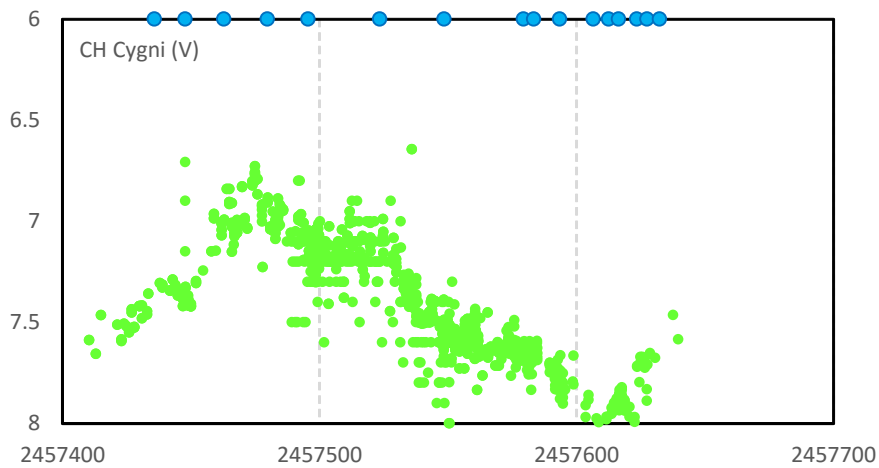


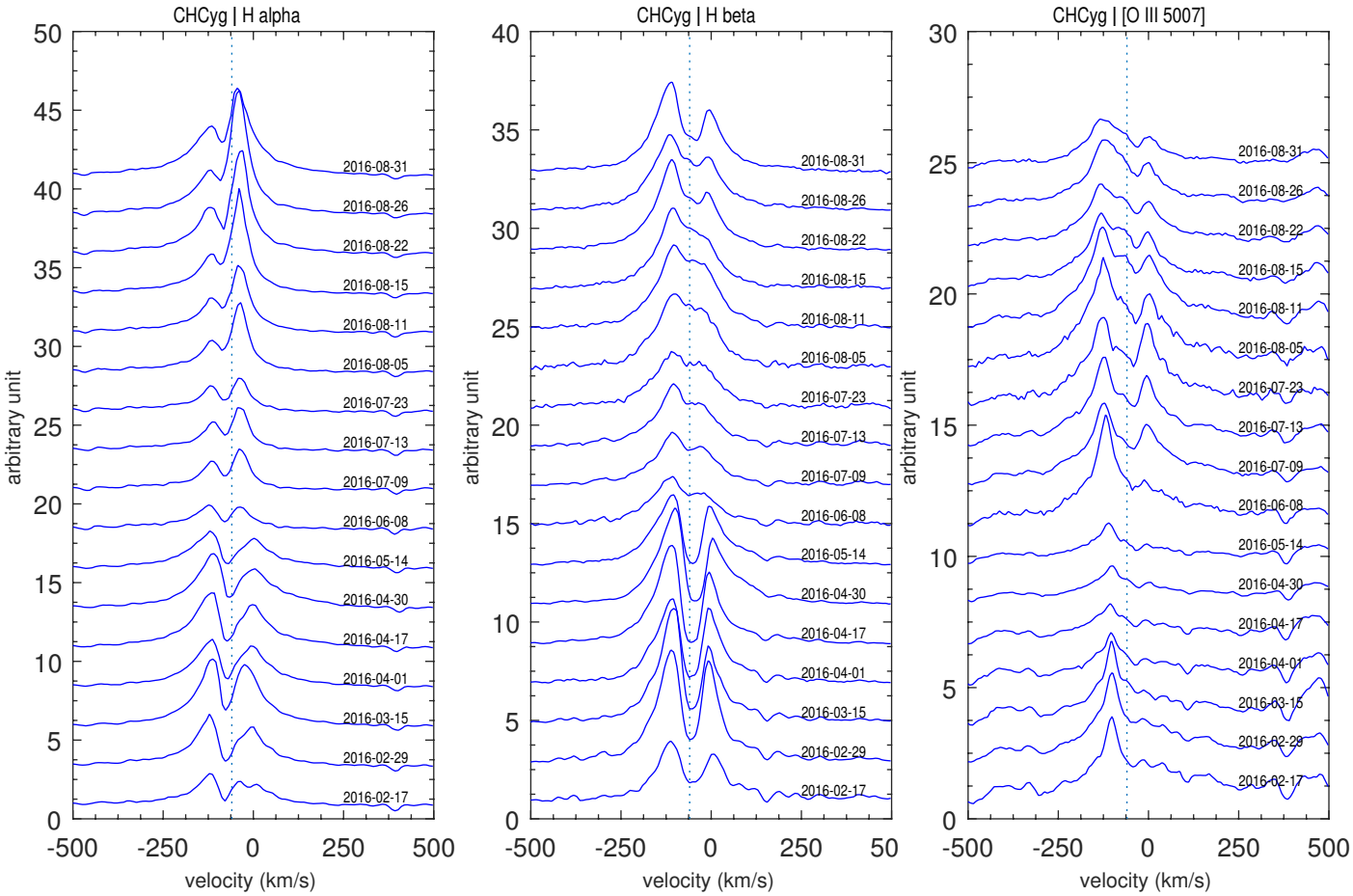


CH Cyg in 2016 by F. Teyssier

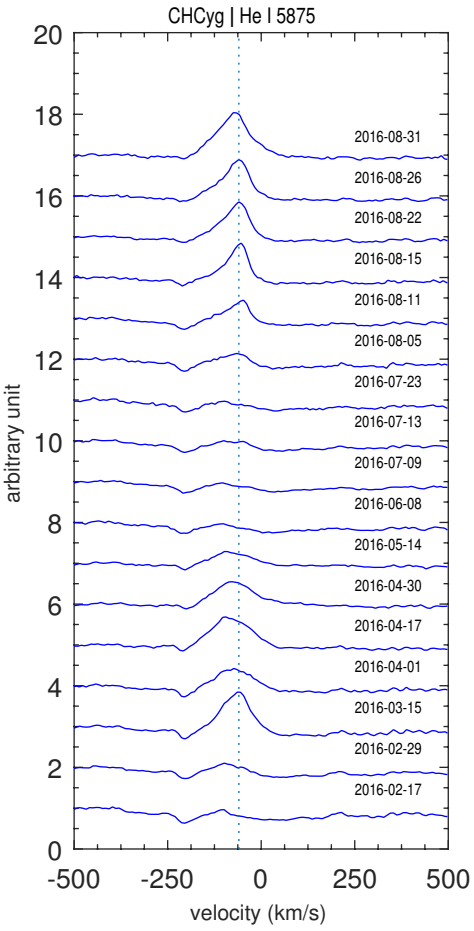
Eshel (R = 11000)
F Teyssier

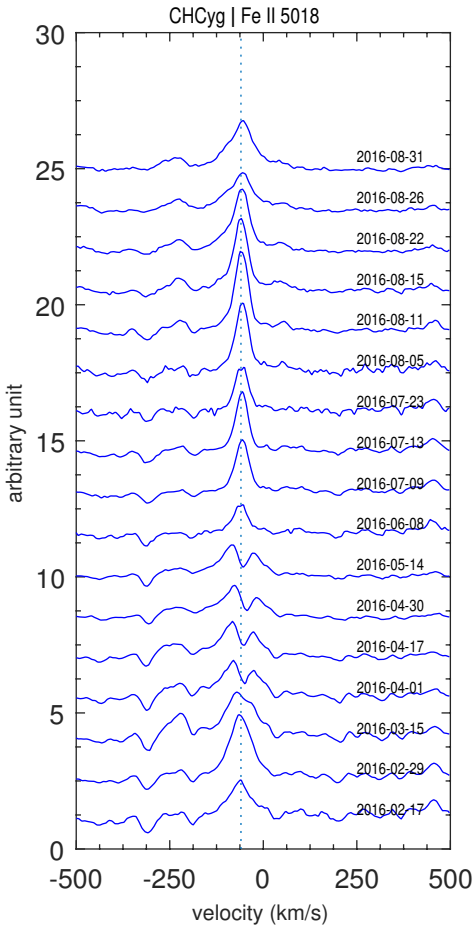
17/02/2016	04:22	2457435.694
29/02/2016	05:03	2457447.721
15/03/2016	04:25	2457462.700
01/04/2016	03:40	2457479.662
17/04/2016	00:38	2457495.537
14/05/2016	22:31	2457523.455
08/06/2016	22:16	2457548.444
09/07/2016	21:11	2457579.394
13/07/2016	21:03	2457583.388
23/07/2016	21:05	2457593.393
05/08/2016	22:35	2457606.457
11/08/2016	22:47	2457612.478
15/08/2016	20:28	2457616.366
22/08/2016	21:32	2457623.411
26/08/2016	20:22	2457627.362
31/08/2016	19:43	2457632.336





CH Cyg


CHCyg | He I 5875
arbitrary unit
velocity (km/s)
2016-08-31
2016-08-26
2016-08-22
2016-08-15
2016-08-11
2016-08-05
2016-07-23
2016-07-13
2016-07-09
2016-06-08
2016-05-14
2016-04-30
2016-04-17
2016-04-01
2016-03-15
2016-02-29
2016-02-17


CHCyg | Fe II 5018
arbitrary unit
velocity (km/s)
2016-08-31
2016-08-26
2016-08-22
2016-08-15
2016-08-11
2016-08-05
2016-07-23
2016-07-13
2016-07-09
2016-06-08
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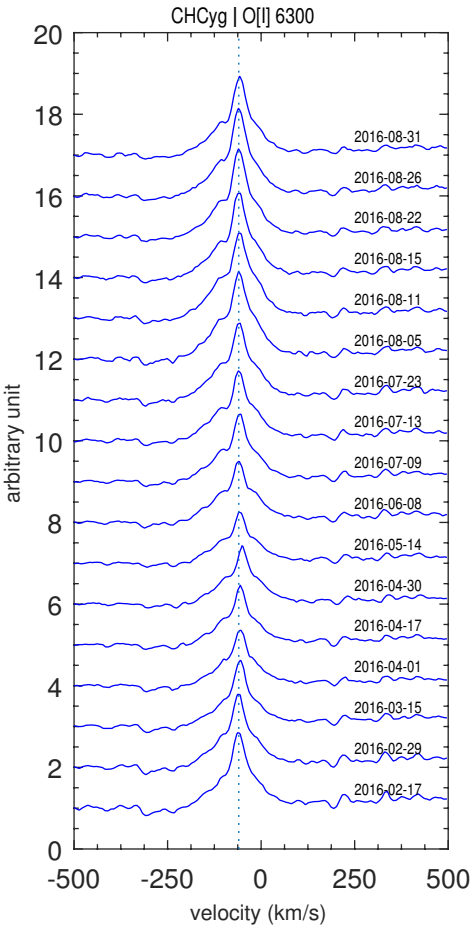
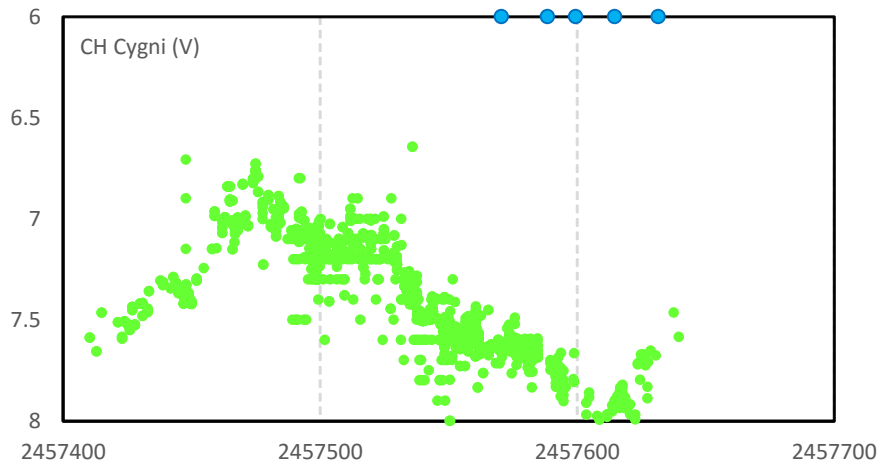
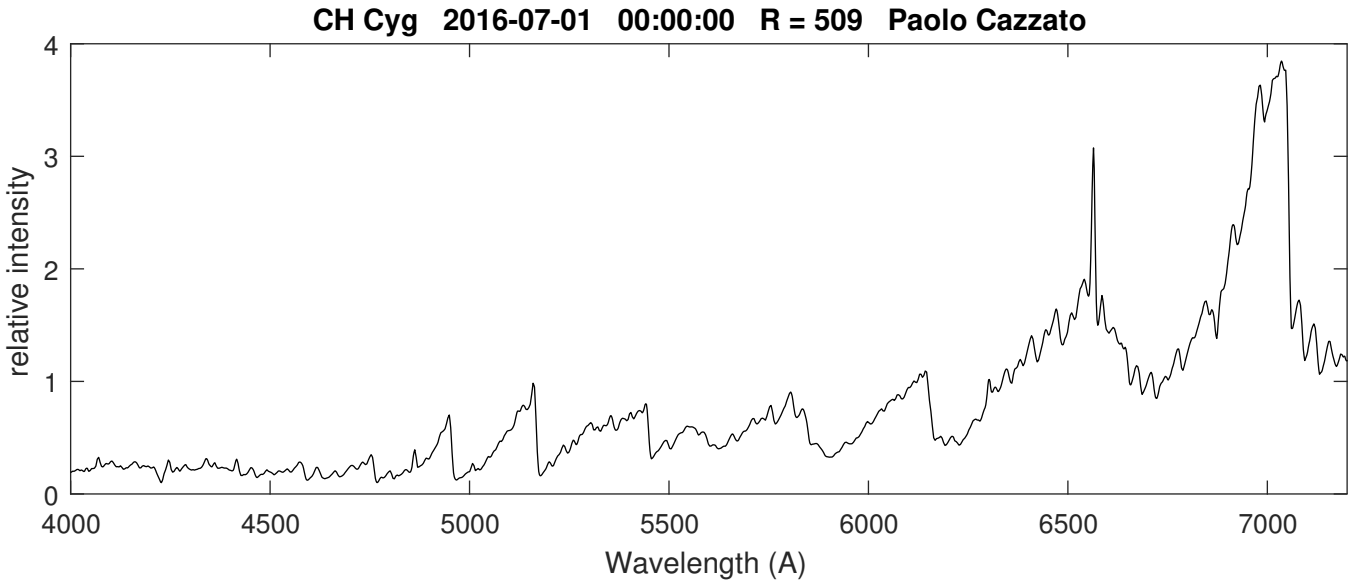
2016-04-01
2016-03-15
2016-02-29
2016-02-17

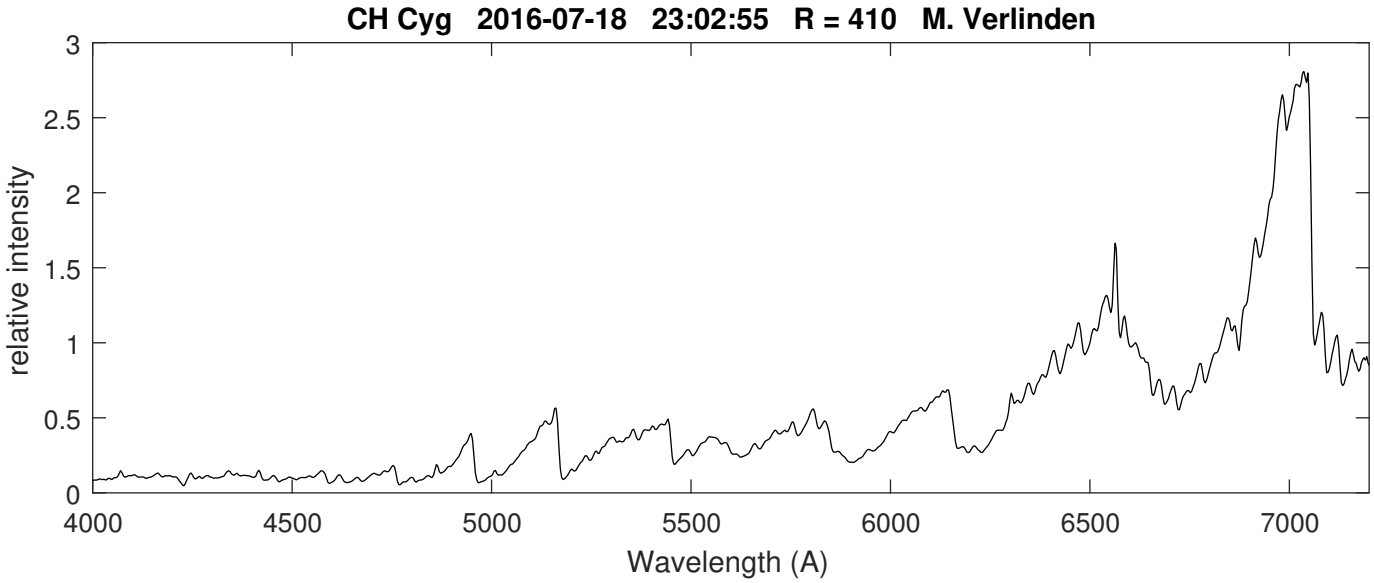

CHCyg | O[I] 6300
arbitrary unit
velocity (km/s)
2016-08-31
2016-08-26
2016-08-22
2016-08-15
2016-08-11
2016-08-05
2016-07-23
2016-07-13
2016-07-09
2016-06-08
2016-05-14
2016-04-30
2016-04-17
2016-04-01
2016-03-15
2016-02-29
2016-02-17

CH Cyg Evolution in July-August2016 at low resolution

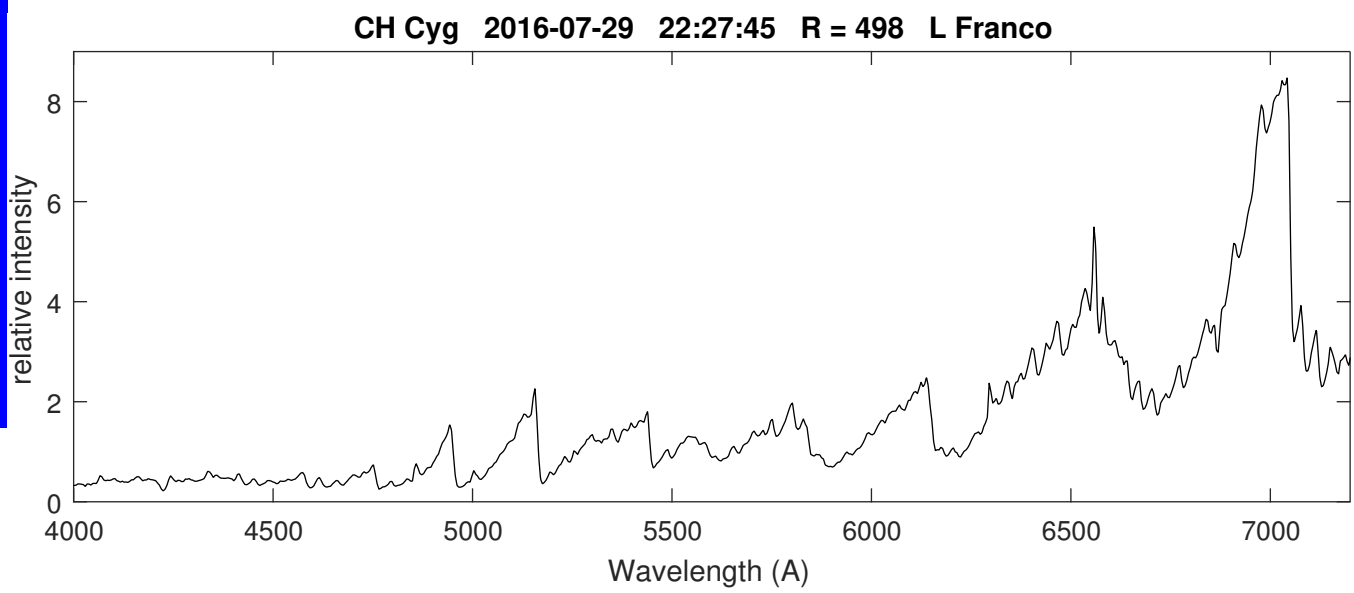


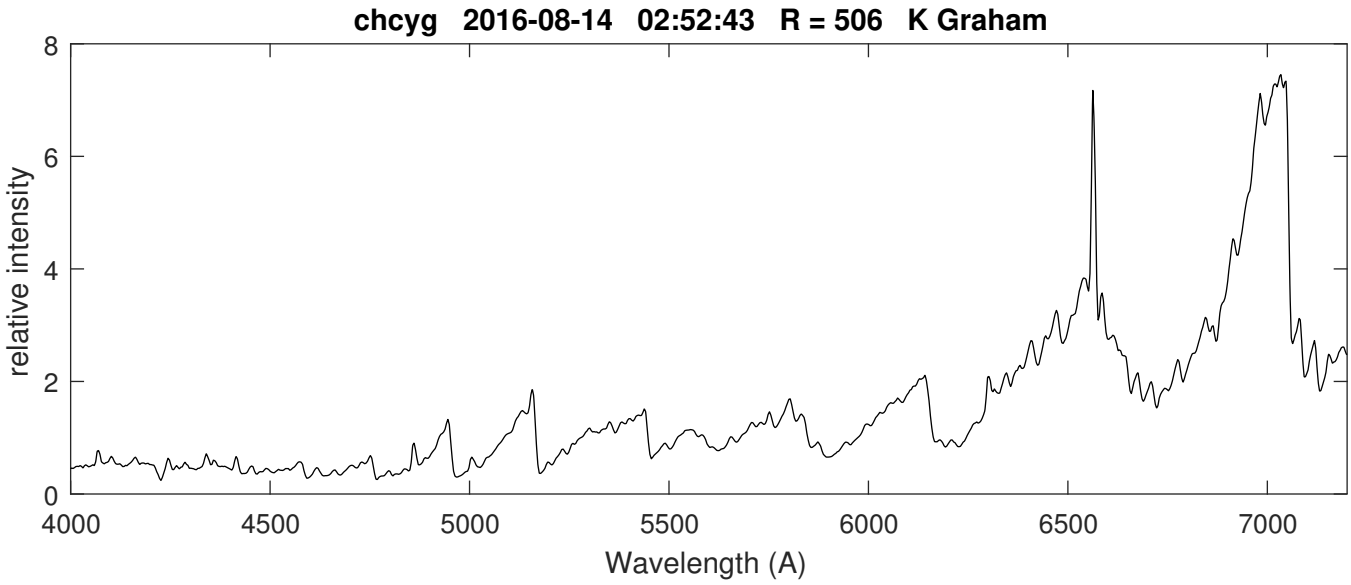
Date	Hour	J.D.	Observer	Observatory
01/07/2016	00:00	2457570.501	PCA	LEC-IT
18/07/2016	23:02	2457588.473	MVE	MAU-FR
29/07/2016	22:27	2457599.441	FRA	BAL-IT
14/08/2016	02:52	2457614.634	K. Graham	GRL-US
30/08/2016	23:28	2457631.482	JP.. Masviel	AMP-FR





CH Cyg


CH Cyg 2016-07-29 22:27:45 R = 498 L Franco
relative intensity
Wavelength (A)
0
2
4
6
8
4000
4500
5000
5500
6000
6500
7000


chcyg 2016-08-14 02:52:43 R = 506 K Graham
relative intensity
Wavelength (A)
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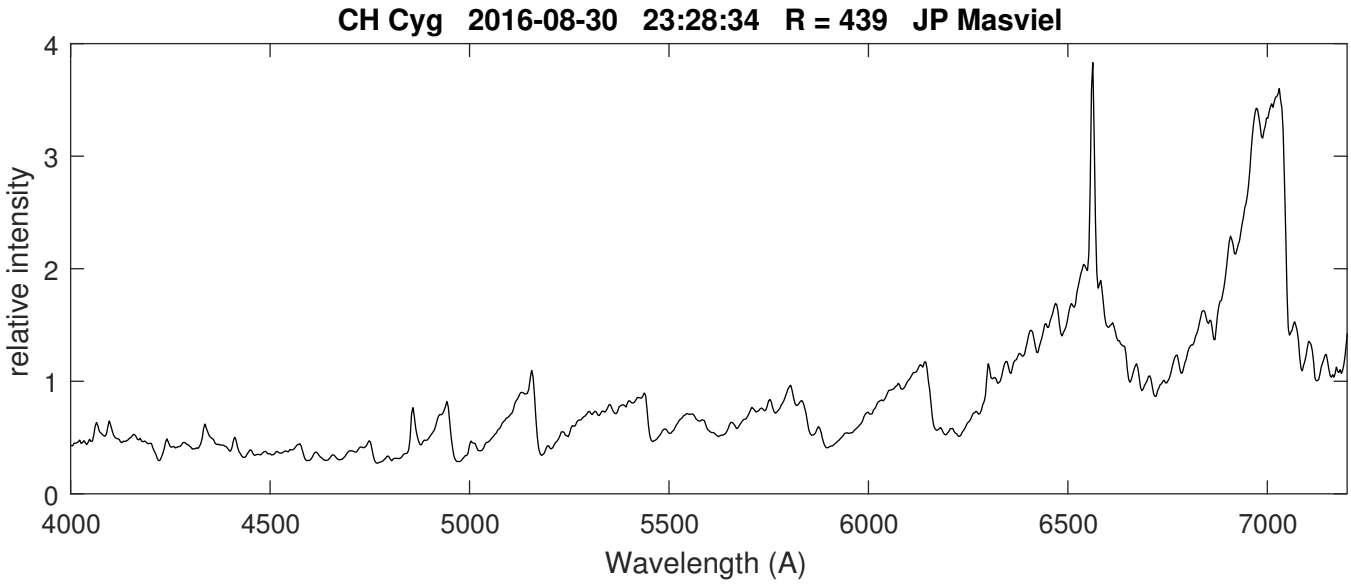
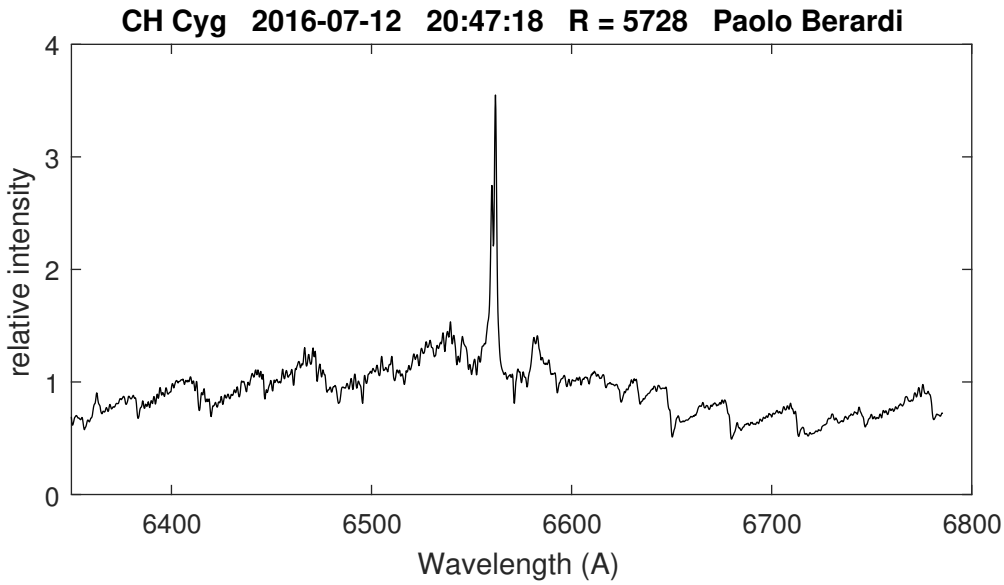
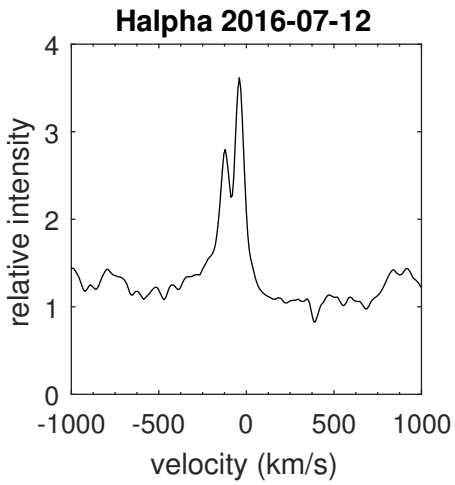
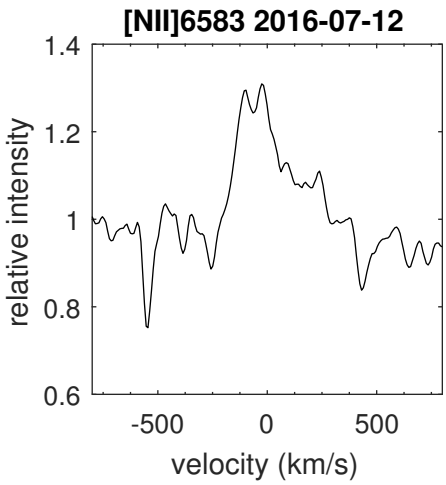
2
4
6
8
4000
4500
5000
5500
6000
6500
7000

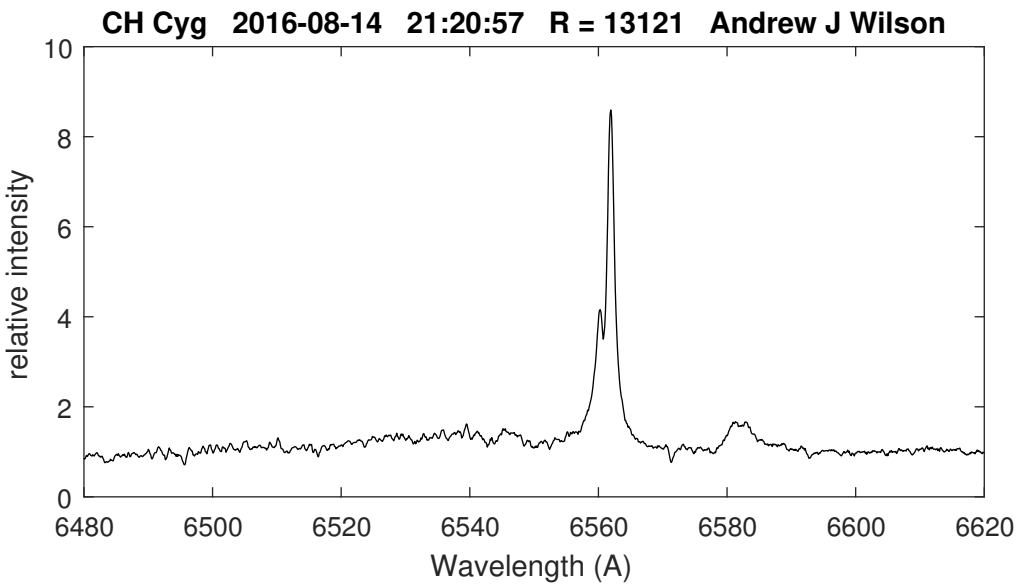

CH Cyg 2016-08-30 23:28:34 R = 439 JP Masviel
relative intensity
Wavelength (A)
0
1
2
3
4
4000
4500
5000
5500
6000
6500
7000

CH Cyg







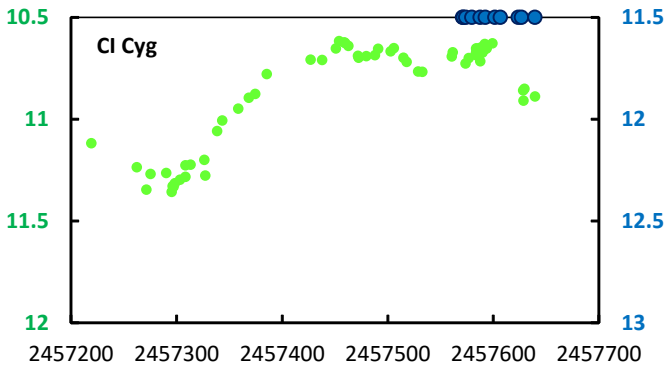


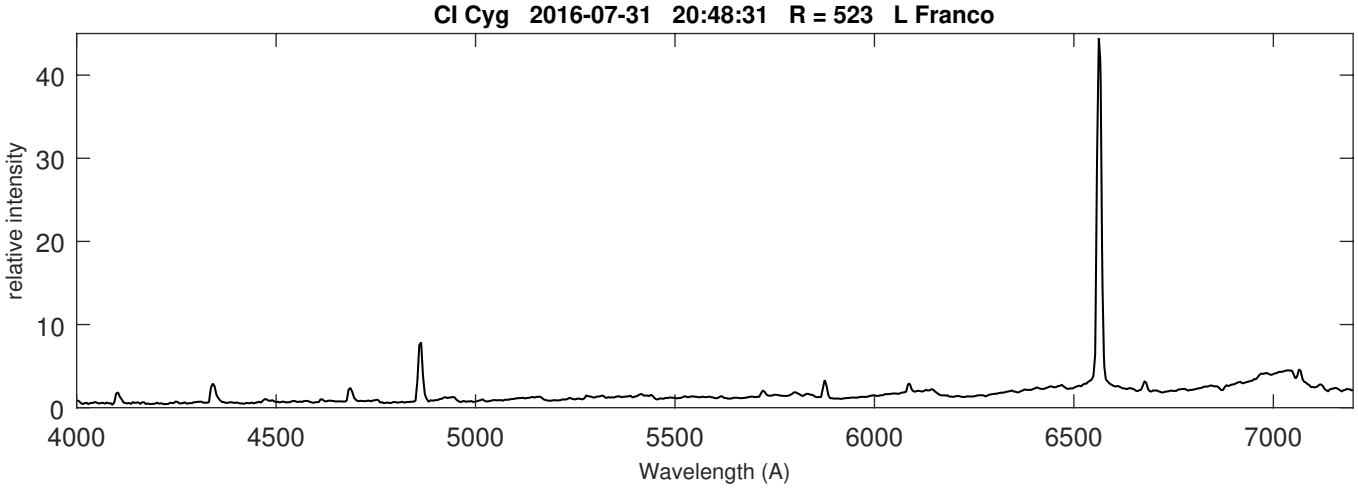
H alpha line by A. Wilson Lhires III 2400 ln/mm R = 13000
Note [NII] 6583

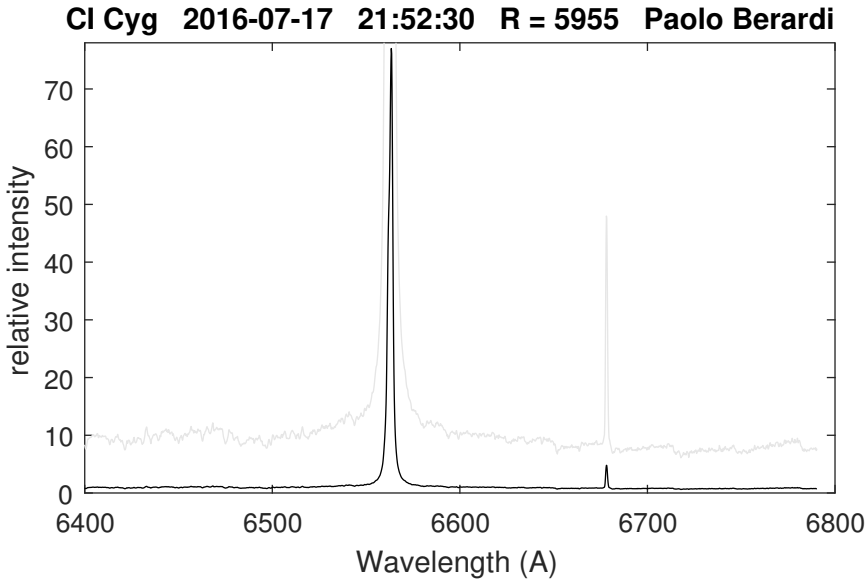
CI Cyg

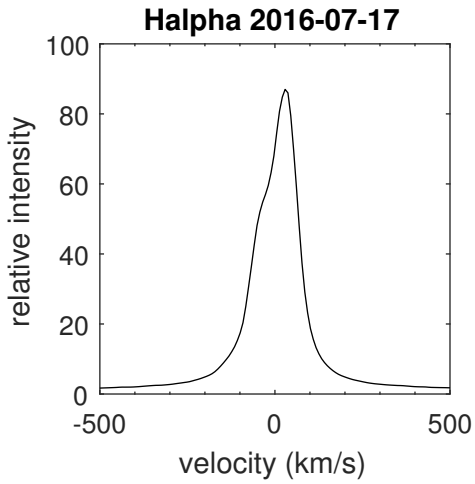
Coordinates (2000.0)	
R.A.	19 50 11.8
Dec	35 41 30
Mag	10.9 (09-2016)

Decclining luminosity in August (from Mag V = 10.6 to 10.9)



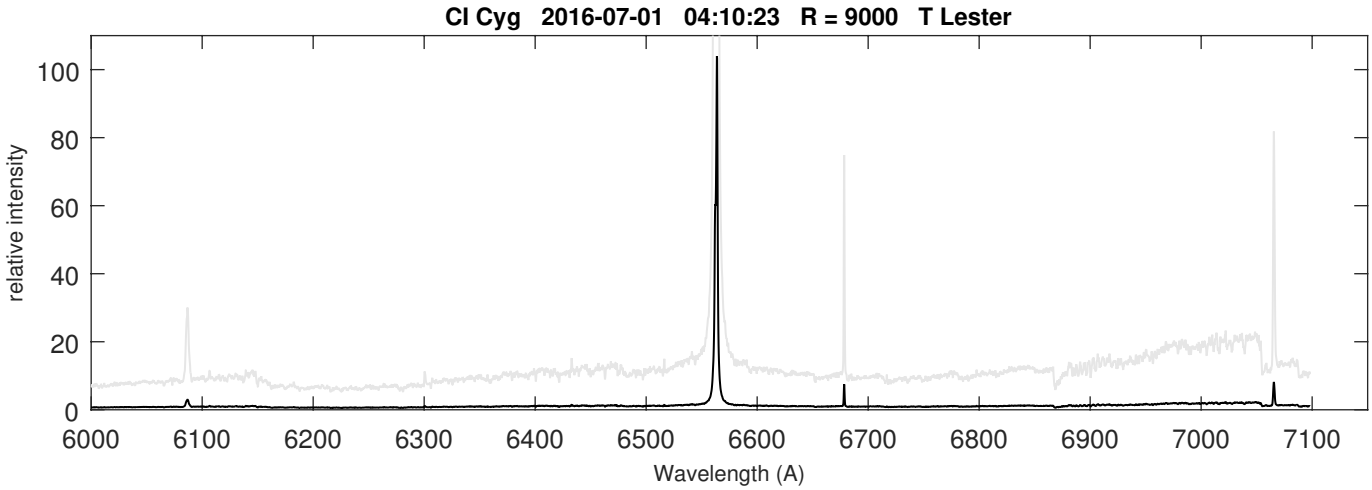


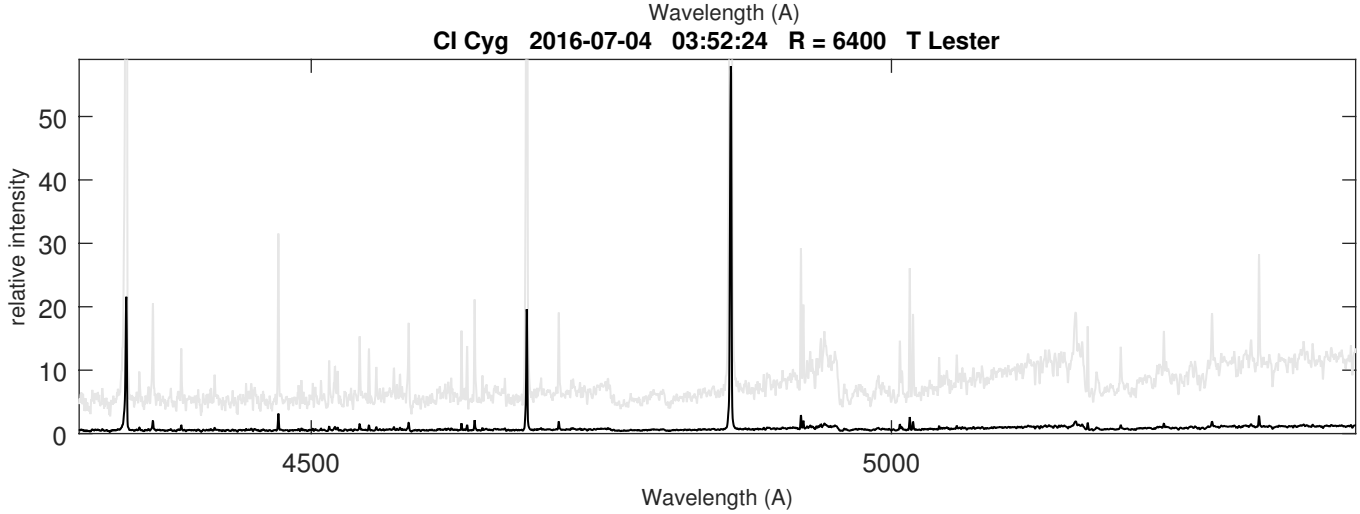


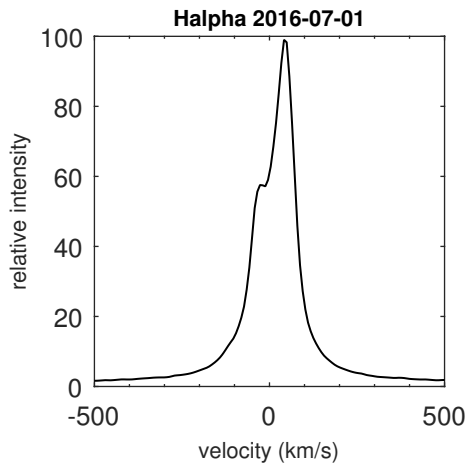


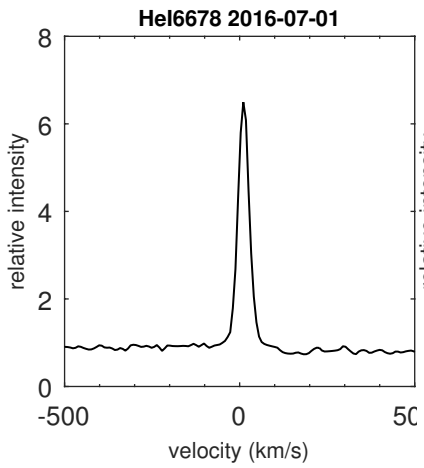
H alpha region by Paolo Berardi Lhires III 1200 ln/mm R = 6000

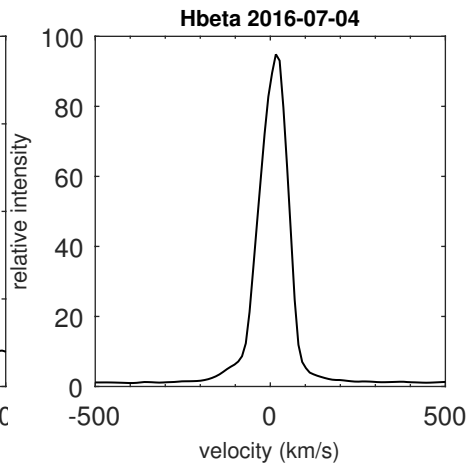
CI Cyg

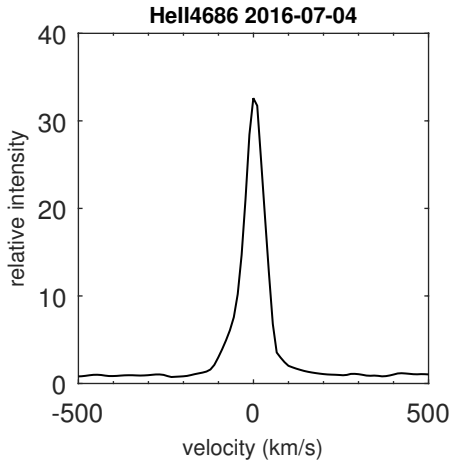

CI Cyg 2016-07-01 04:10:23 R = 9000 T Lester
relative intensity
Wavelength (A)

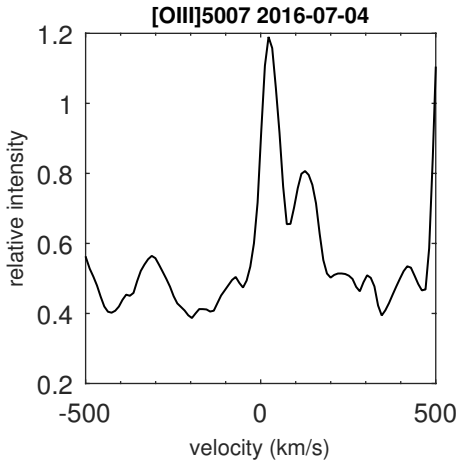

CI Cyg 2016-07-04 03:52:24 R = 6400 T Lester
relative intensity
Wavelength (A)


Halpha 2016-07-01
relative intensity
velocity (km/s)


HeI6678 2016-07-01
relative intensity
velocity (km/s)

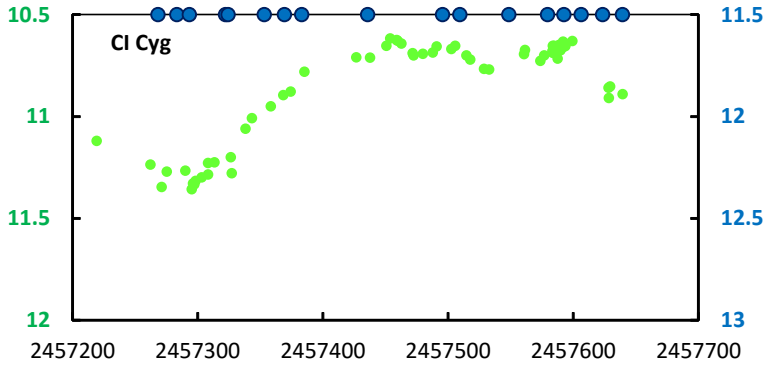

Hbeta 2016-07-04
relative intensity
velocity (km/s)

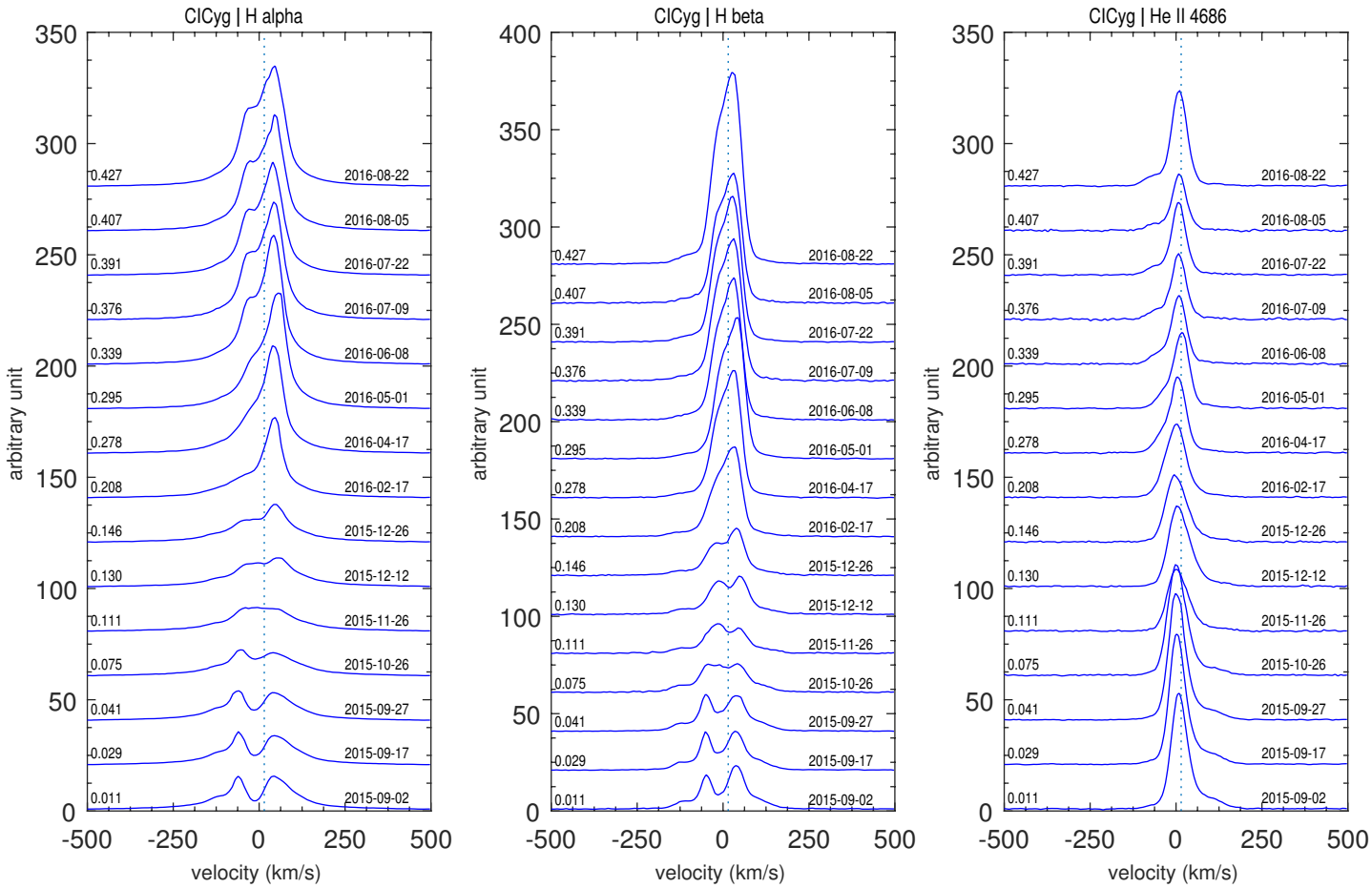

HeII4686 2016-07-04
relative intensity
velocity (km/s)


[OIII]5007 2016-07-04
relative intensity
velocity (km/s)

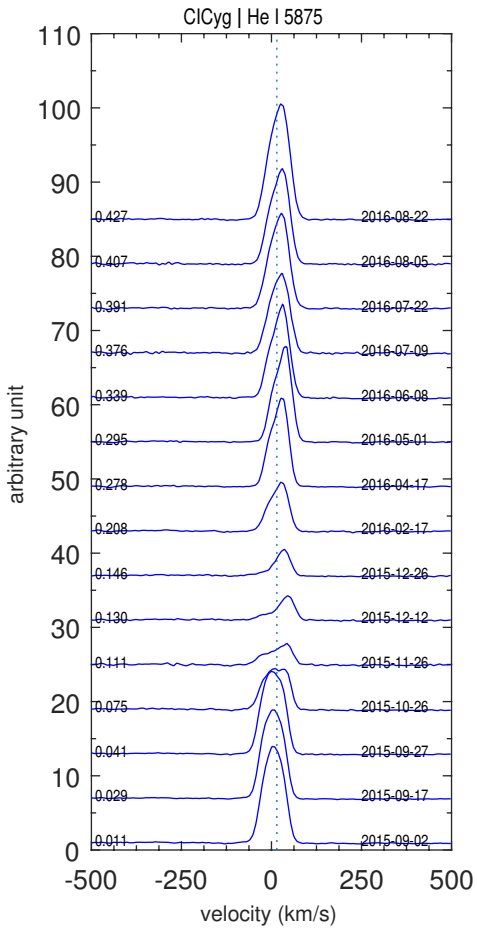
CI Cyg

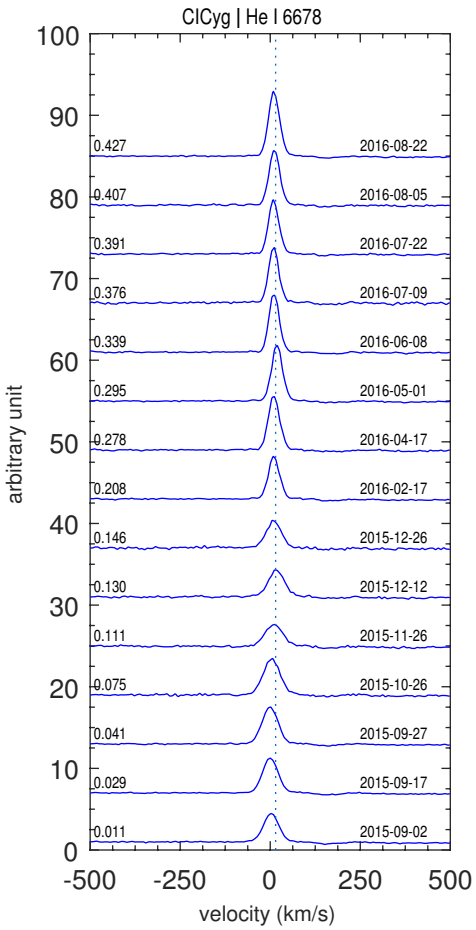
eshel spectra (F. Teyssier)

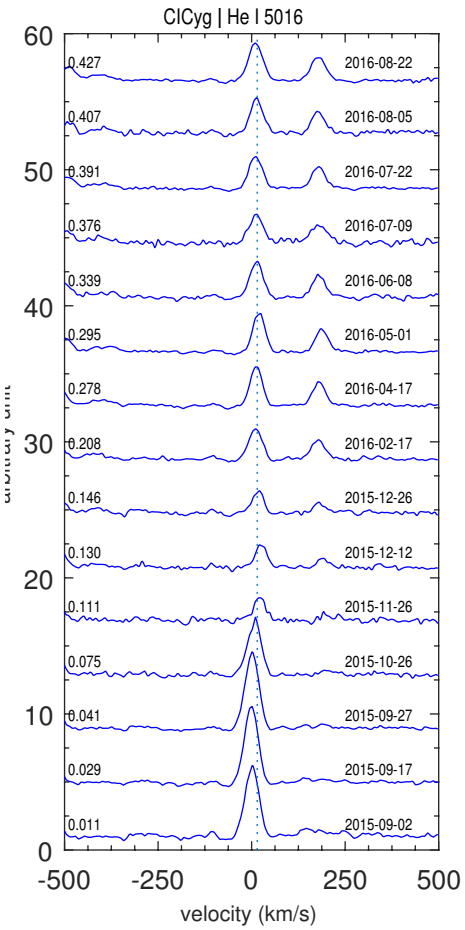


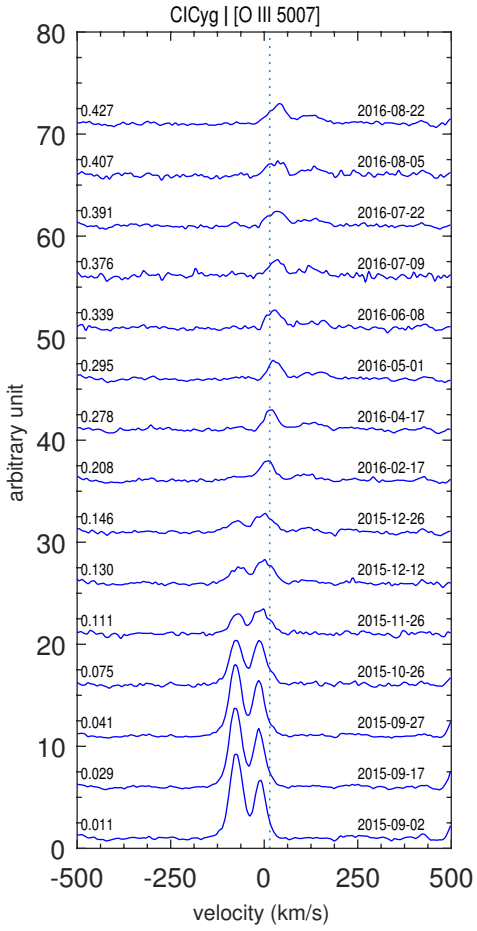


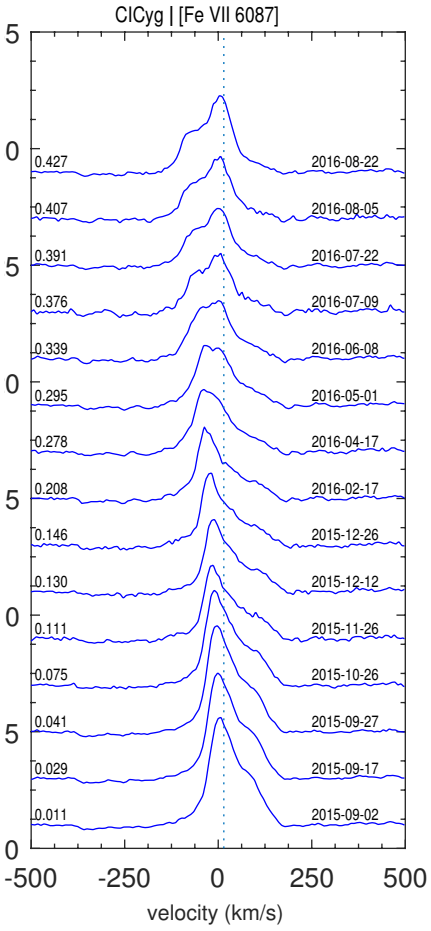
CI Cyg


CICyg | He I 5875
arbitrary unit
velocity (km/s)
0.427 2016-08-22
0.407 2016-08-05
0.391 2016-07-22
0.376 2016-07-09
0.339 2016-06-08
0.295 2016-05-01
0.278 2016-04-17
0.208 2016-02-17
0.146 2015-12-26
0.130 2015-12-12
0.111 2015-11-26
0.075 2015-10-26
0.041 2015-09-27
0.029 2015-09-17
0.011 2015-09-02


CICyg | He I 6678
arbitrary unit
velocity (km/s)
0.427 2016-08-22
0.407 2016-08-05
0.391 2016-07-22
0.376 2016-07-09
0.339 2016-06-08
0.295 2016-05-01
0.278 2016-04-17
0.208 2016-02-17
0.146 2015-12-26
0.130 2015-12-12
0.111 2015-11-26
0.075 2015-10-26
0.041 2015-09-27
0.029 2015-09-17
0.011 2015-09-02

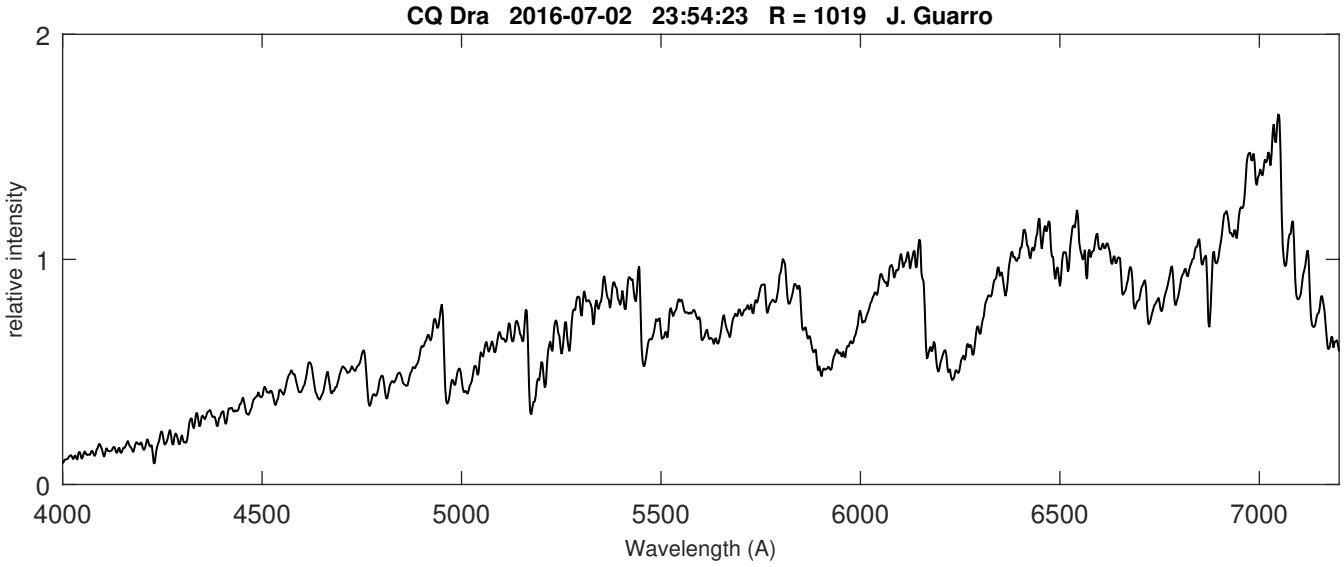

CICyg | He I 5016
velocity (km/s)
0.427 2016-08-22
0.407 2016-08-05
0.391 2016-07-22
0.376 2016-07-09
0.339 2016-06-08
0.295 2016-05-01
0.278 2016-04-17
0.208 2016-02-17
0.146 2015-12-26
0.130 2015-12-12
0.111 2015-11-26
0.075 2015-10-26
0.041 2015-09-27
0.029 2015-09-17
0.011 2015-09-02

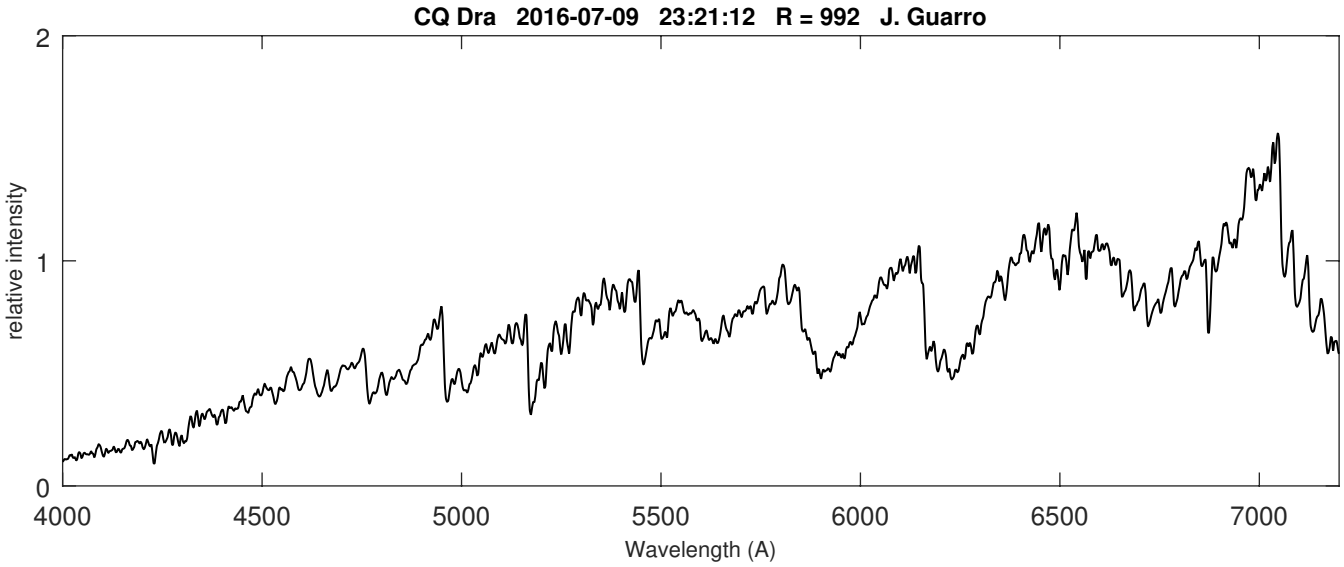

CICyg | [O III 5007]
arbitrary unit
velocity (km/s)
0.427 2016-08-22
0.407 2016-08-05
0.391 2016-07-22
0.376 2016-07-09
0.339 2016-06-08
0.295 2016-05-01
0.278 2016-04-17
0.208 2016-02-17
0.146 2015-12-26
0.130 2015-12-12
0.111 2015-11-26
0.075 2015-10-26
0.041 2015-09-27
0.029 2015-09-17
0.011 2015-09-02


CICyg | [Fe VII 6087]
velocity (km/s)
0.427 2016-08-22
0.407 2016-08-05
0.391 2016-07-22
0.376 2016-07-09
0.339 2016-06-08
0.295 2016-05-01
0.278 2016-04-17
0.208 2016-02-17
0.146 2015-12-26
0.130 2015-12-12
0.111 2015-11-26
0.075 2015-10-26
0.041 2015-09-27
0.029 2015-09-17
0.011 2015-09-02

CQ Dra

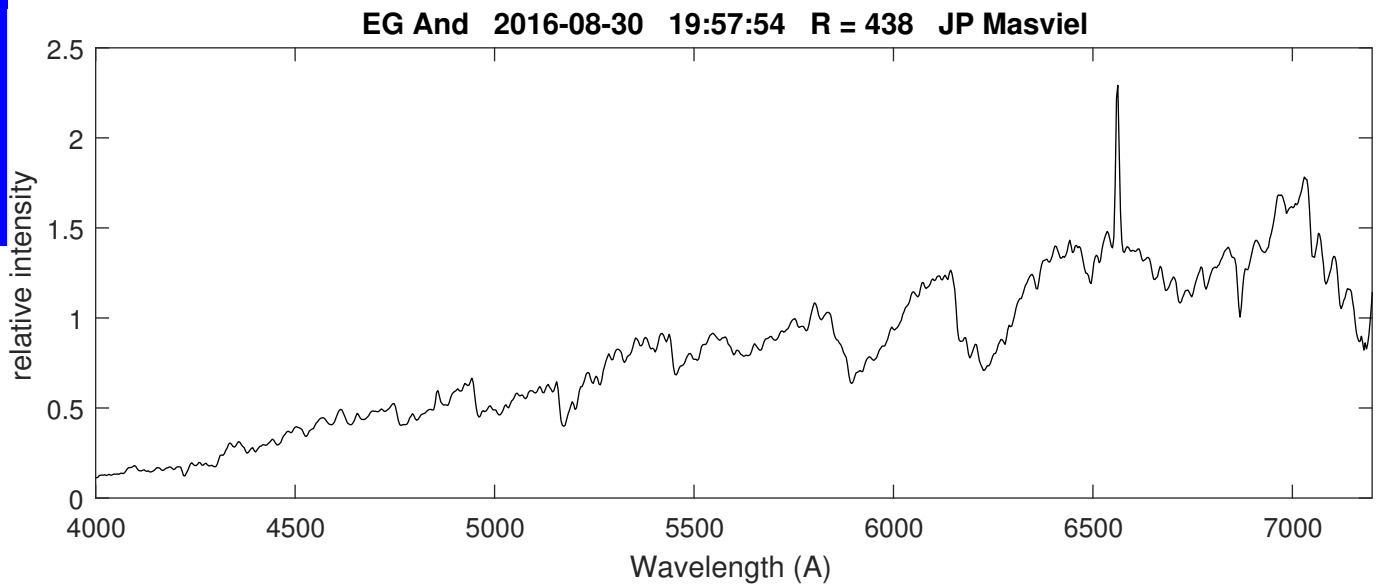
Coordinates (2000.0)	
R.A.	12 30 06.6
Dec	+69 12 04.1
Mag	5





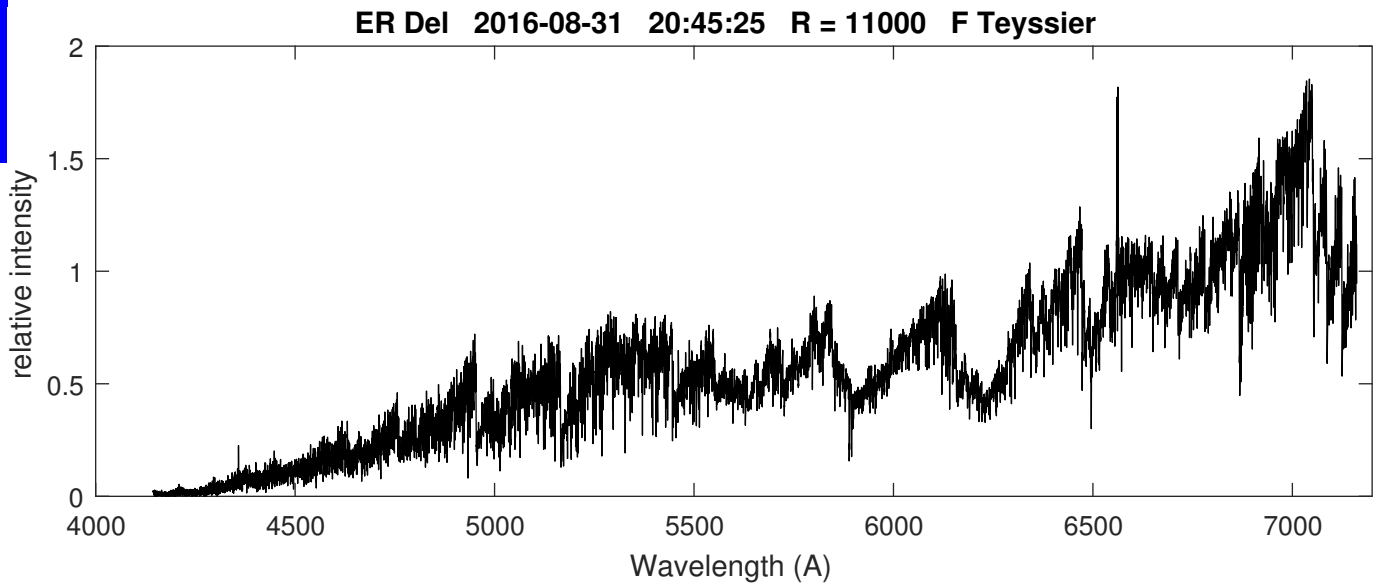
EG And

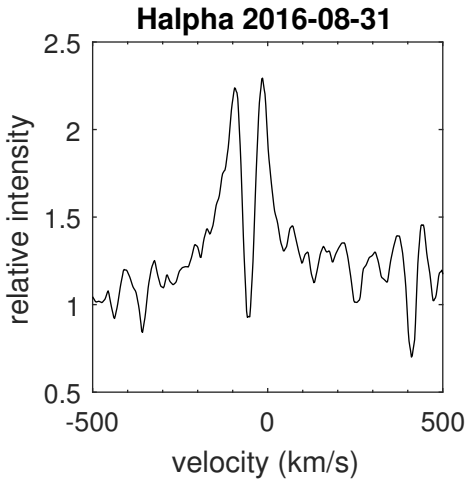
Coordinates (2000.0)	
R.A.	00 44 37.2
Dec	+40 40 45.7
Mag	7.0-7.4

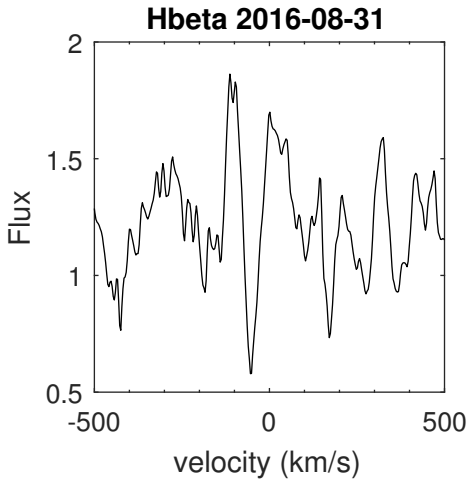


ER Del

Coordinates (2000.0)	
R.A.	20 42 46.5
Dec	+08 41 13.5
Mag	Vis. ~ 10.9



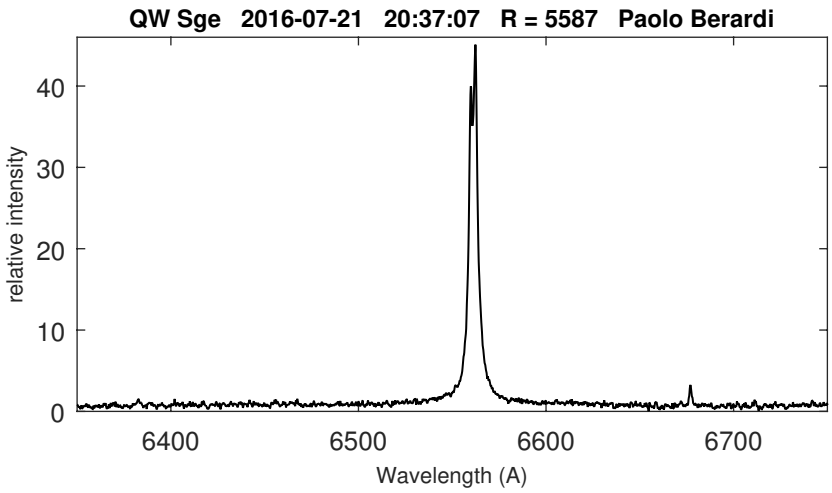


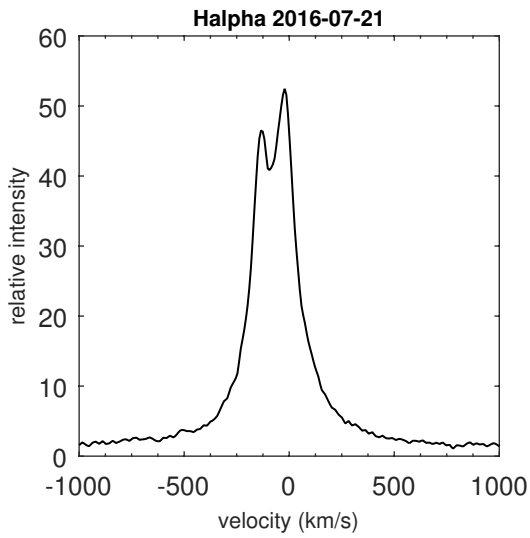


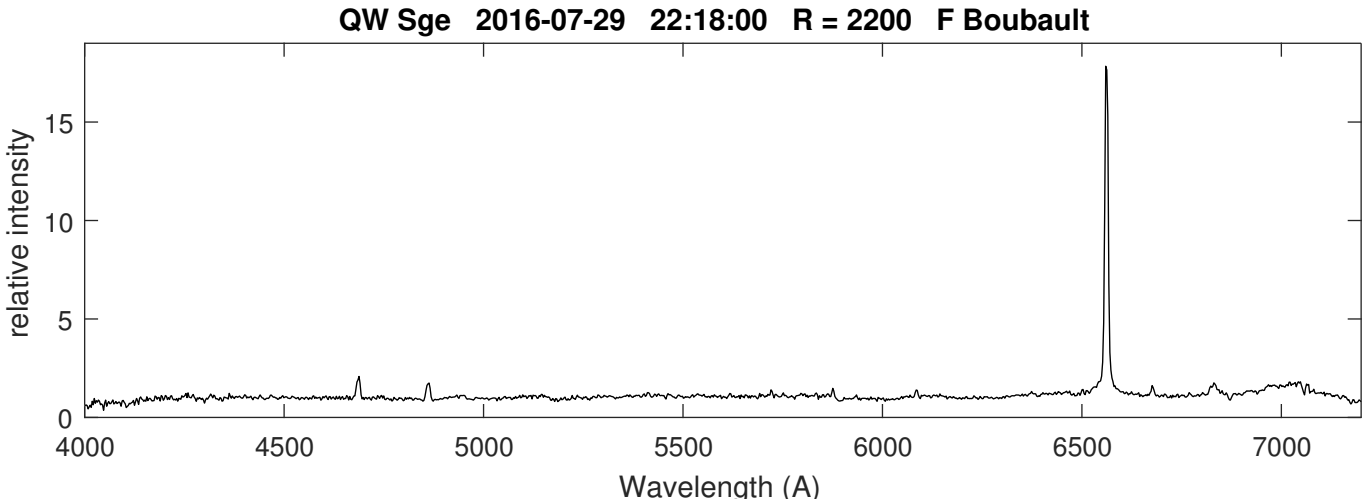
QW Sge

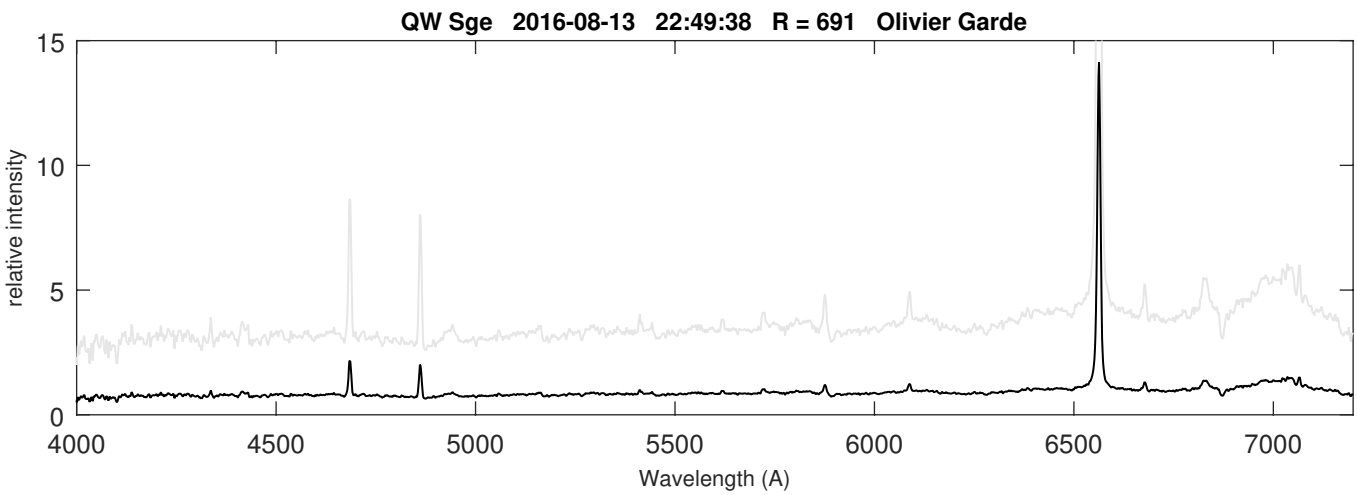
Coordinates (2000.0)	
R.A.	19 45 49.5
Dec	+18 36 47.8
Mag	12.7 (Vis.)

First spectra of QW Sge in ARAS data base
Note [Fe VII] lines and strong Raman OVI band in low resolution spectra



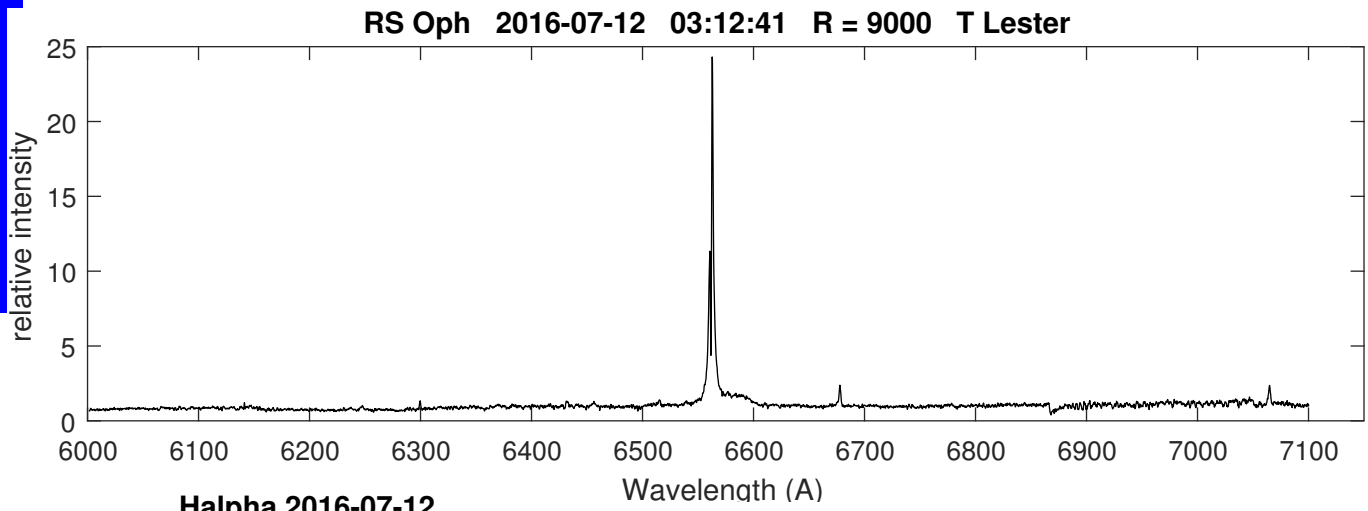


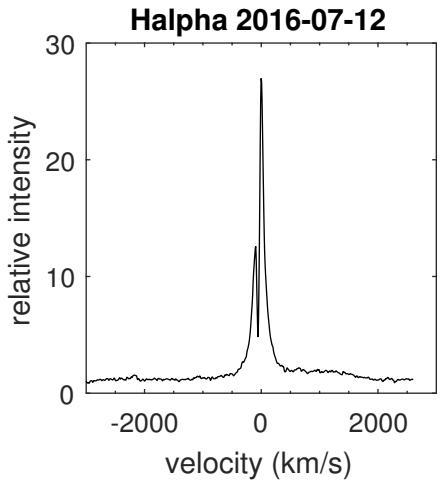


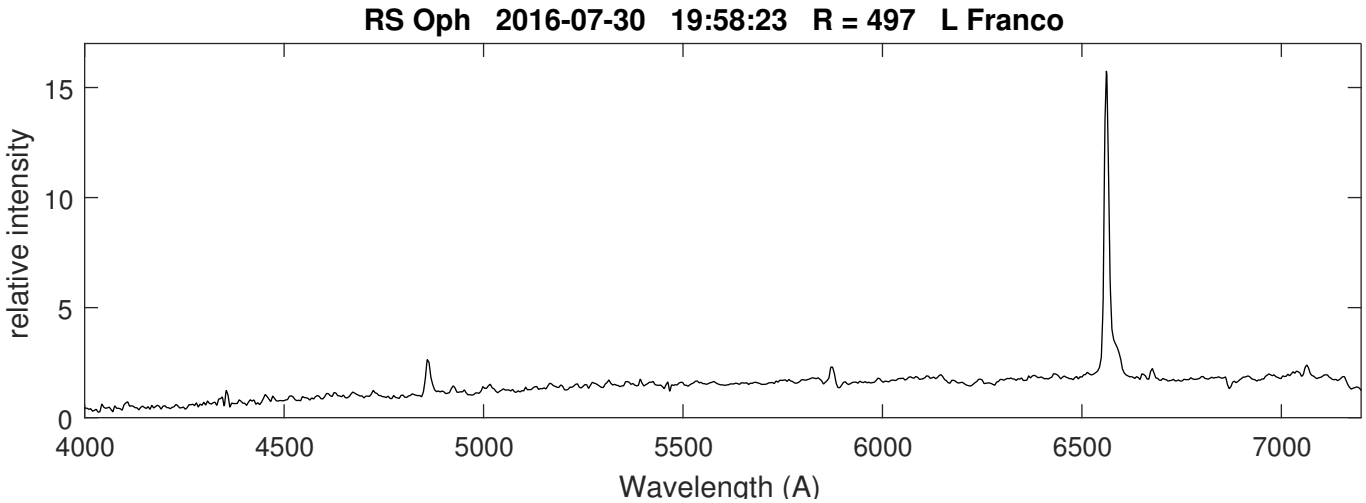


RS Oph

Coordinates (2000.0)	
R.A.	17 50 13.2
Dec	-06 42 28.48
Mag	11.4 (07-2016)



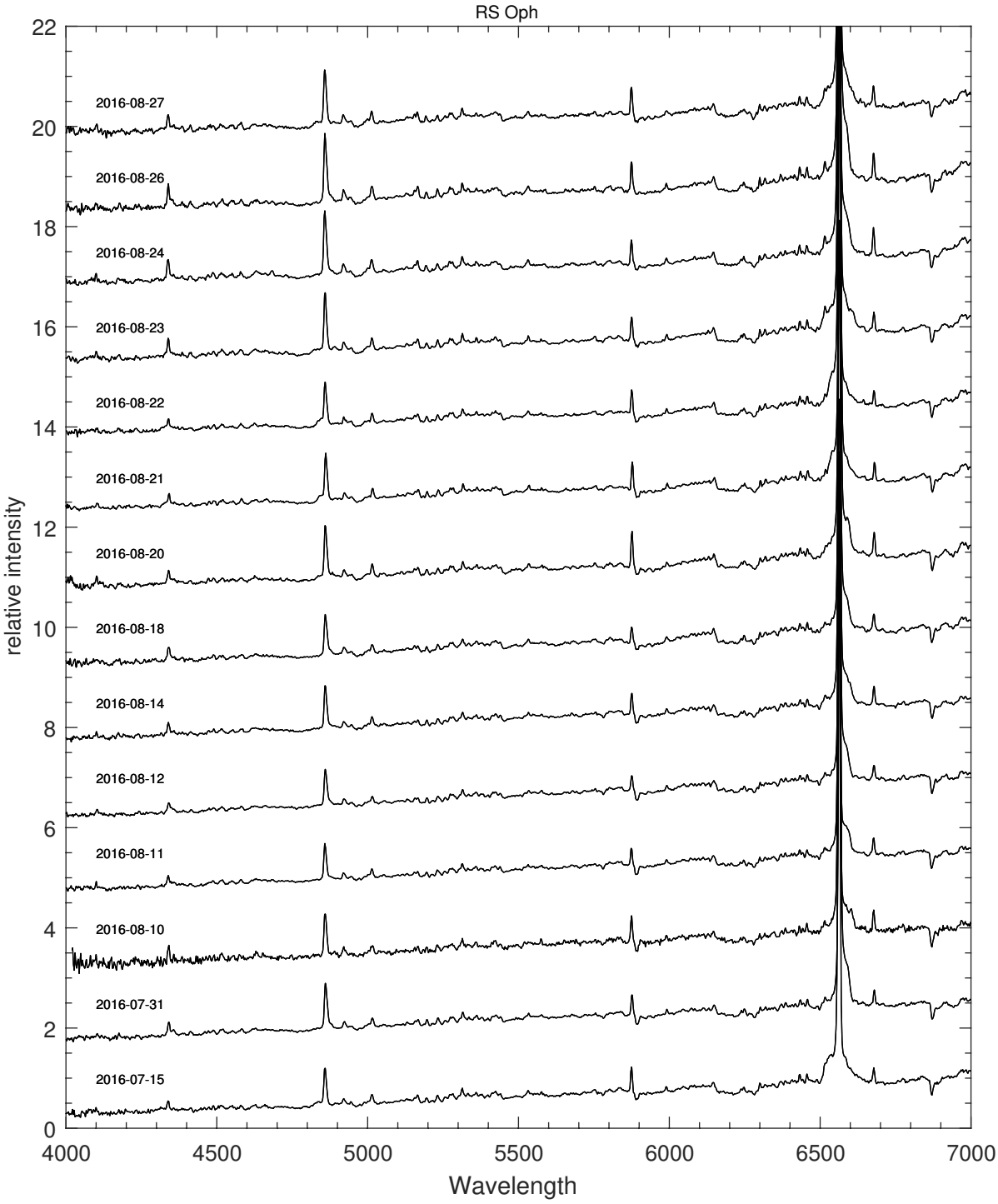




RS Oph by Joan Guarro in July-August 2016

Joan Guarro uses its remote telescope and home-made spectrograph(R = 1000) to acquire a series of the recurrent nova RS Oph in july-august 2016

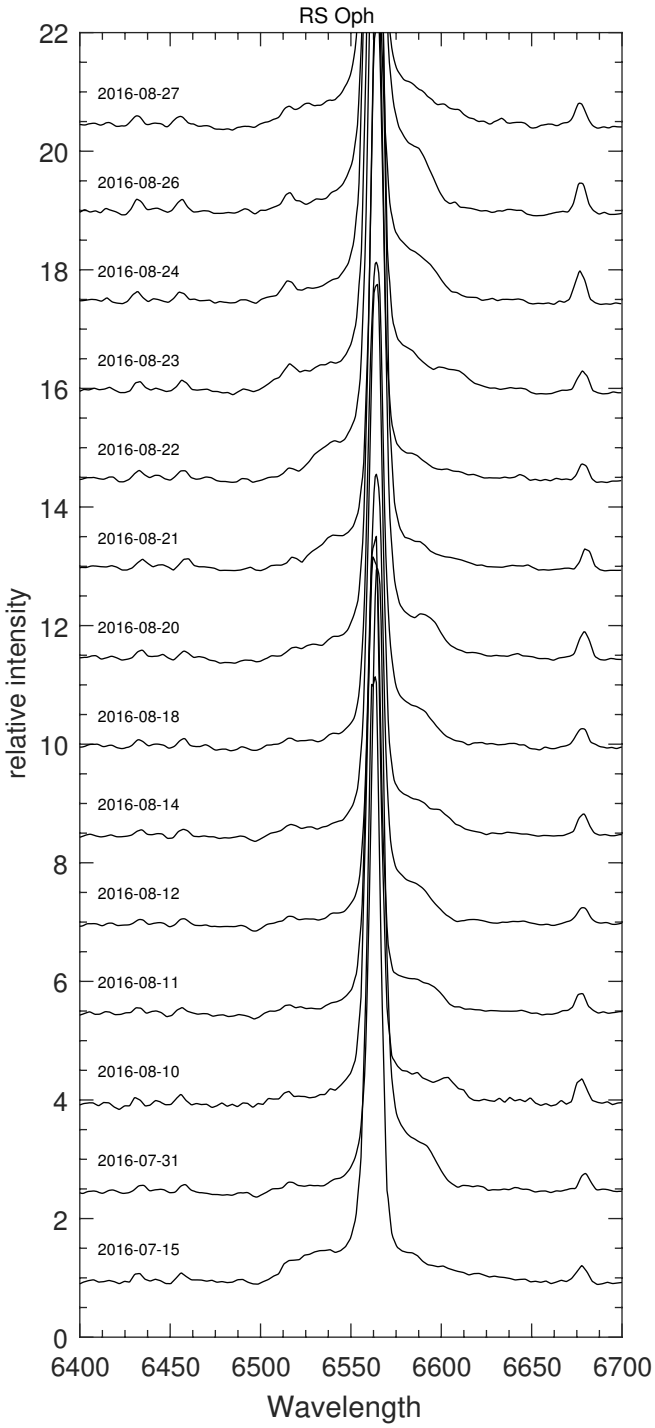
Note the rapid changes in the broad component of H alpha line



RS Oph by Joan Guarro in July-August 2016

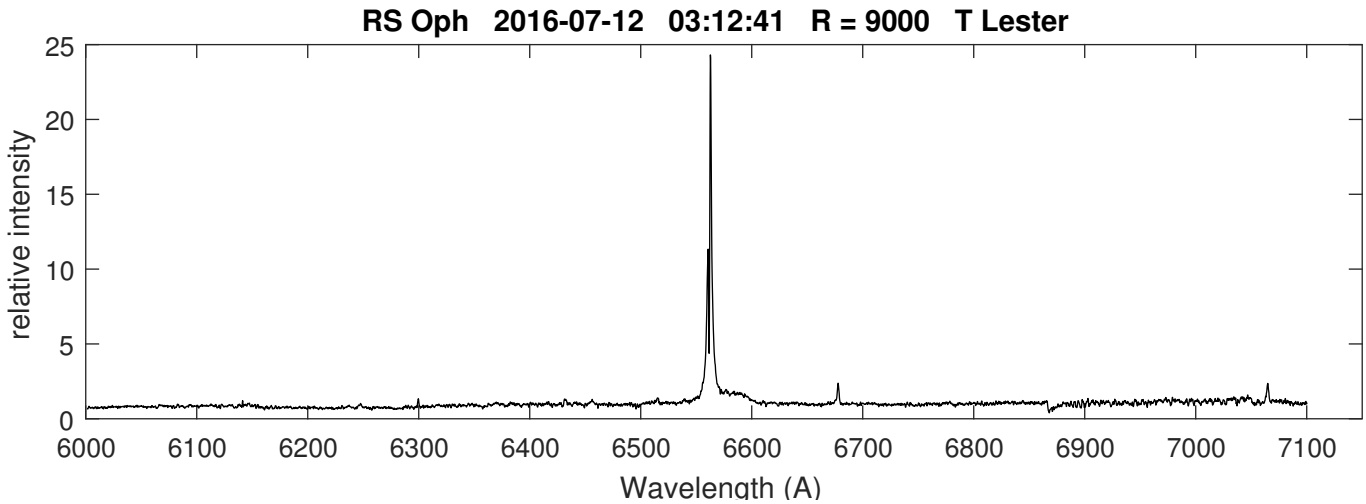
Journal of observations

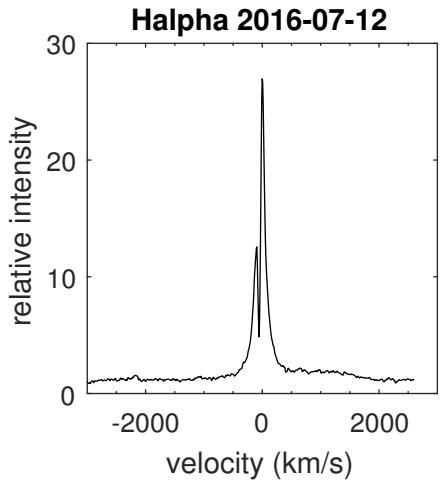
Date	UT	J.D.
15/07/2016	20:56	2457585.396
31/07/2016	21:45	2457601.433
10/08/2016	21:32	2457611.409
11/08/2016	20:09	2457612.363
12/08/2016	20:23	2457613.373
14/08/2016	20:31	2457615.378
18/08/2016	20:05	2457619.362
20/08/2016	21:46	2457621.43
21/08/2016	20:10	2457622.364
22/08/2016	19:41	2457623.339
23/08/2016	20:06	2457624.357
24/08/2016	19:31	2457625.335
26/08/2016	20:22	2457627.367
27/08/2016	19:56	2457628.358
01/09/2016	20:10	2457633.357

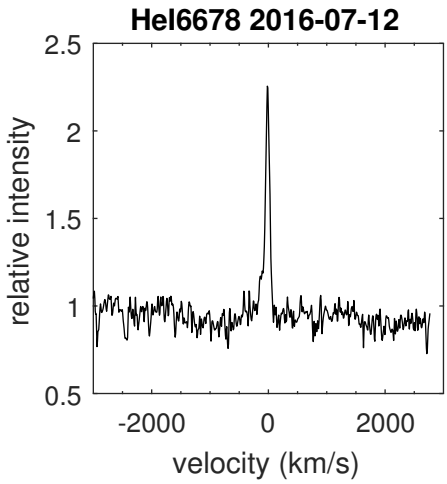


Crop on H alpha line

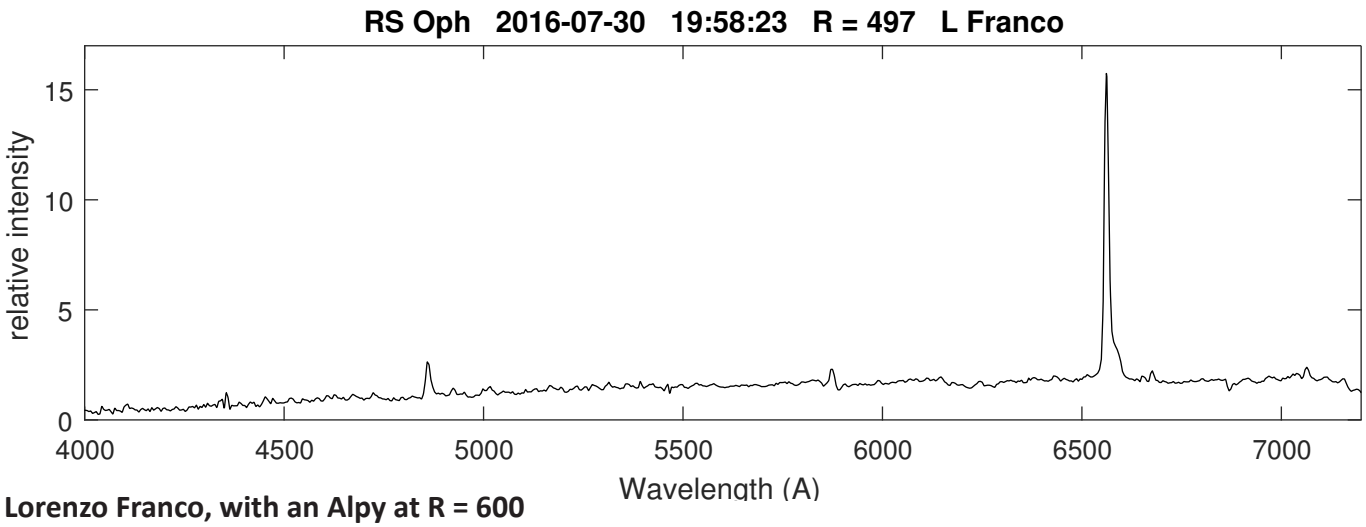
RS Oph







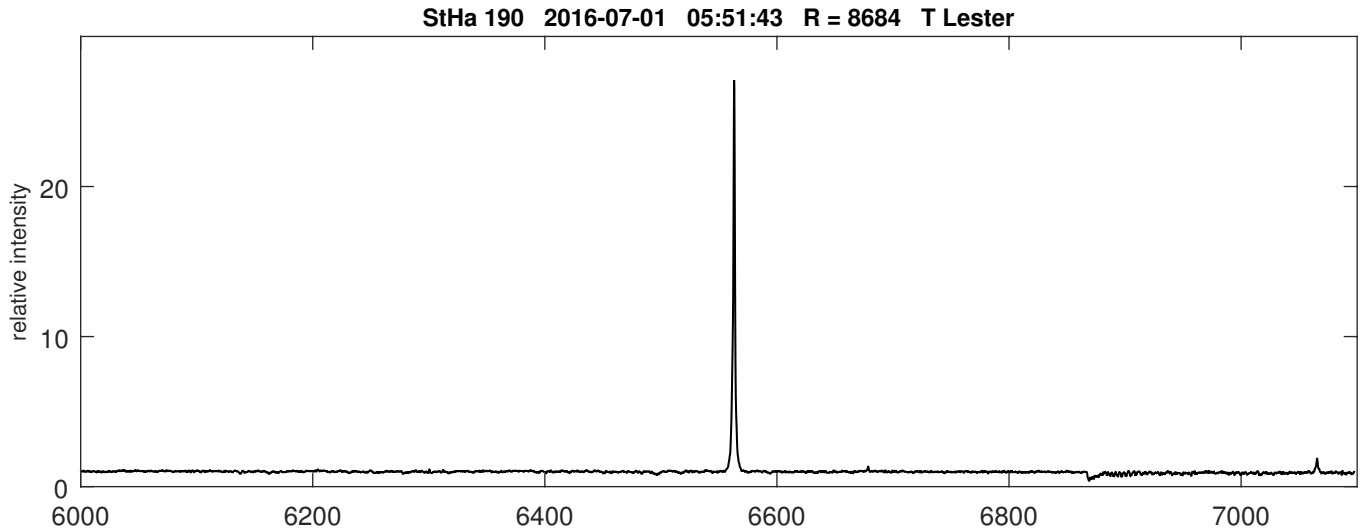
Note the broad component in the red side of H alpha line, up to 2000 km.s^{-1}

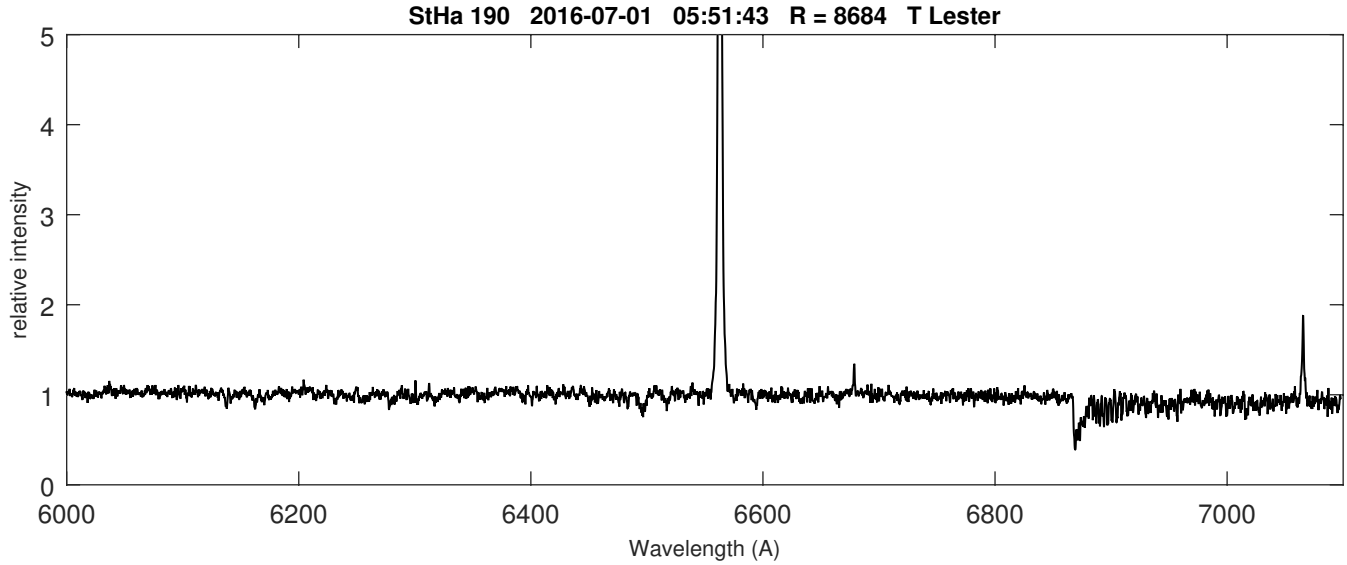


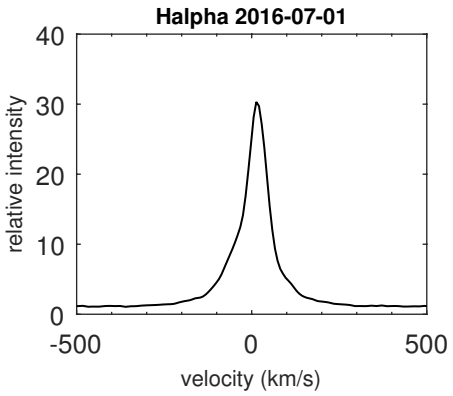
Lorenzo Franco, with an Alpy at R = 600
The shape of Halpha line remains visible at that resolution

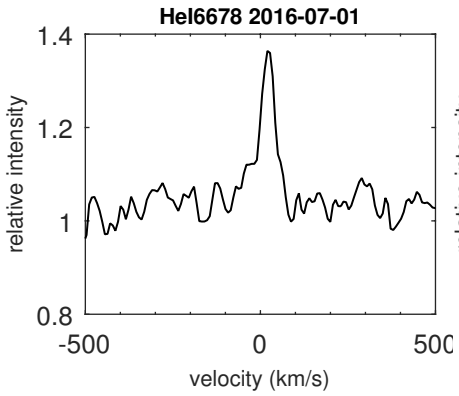
StHa 190

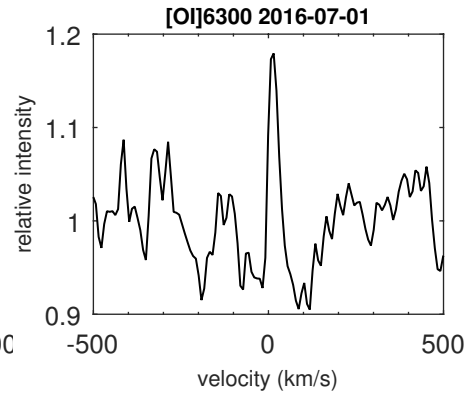
Coordinates (2000.0)	
R.A.	21 41 44.89
Dec	+02 43 54.4
Mag	10.3 (Vis.)



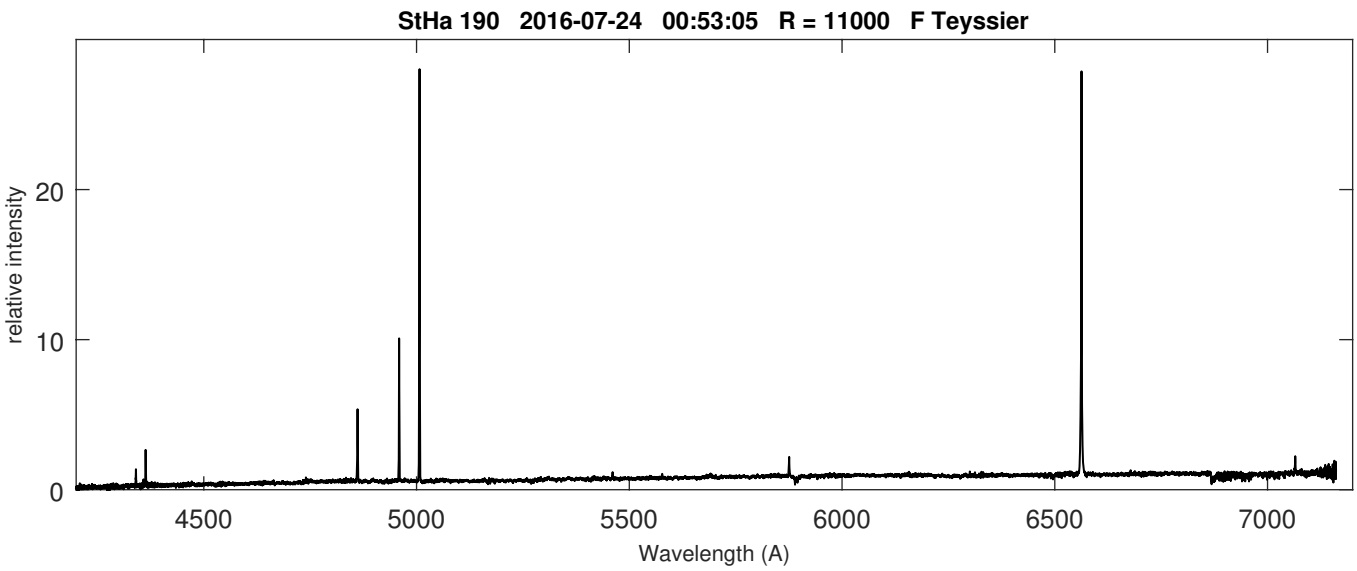


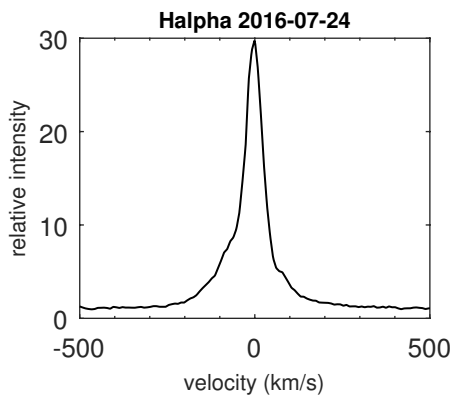


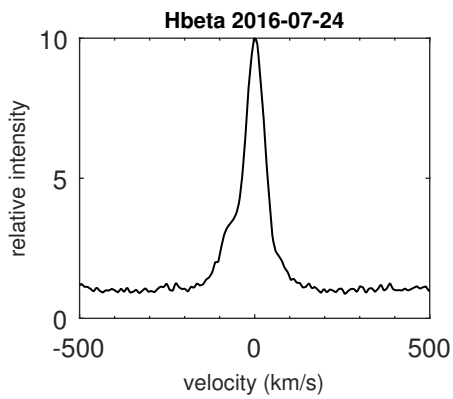


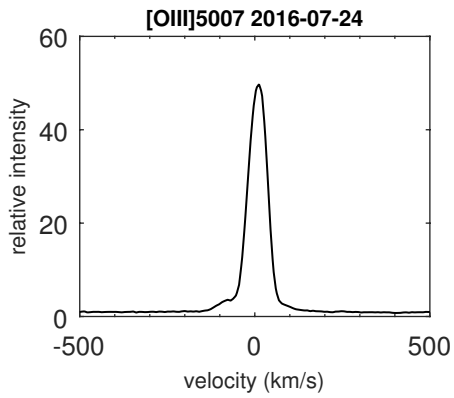


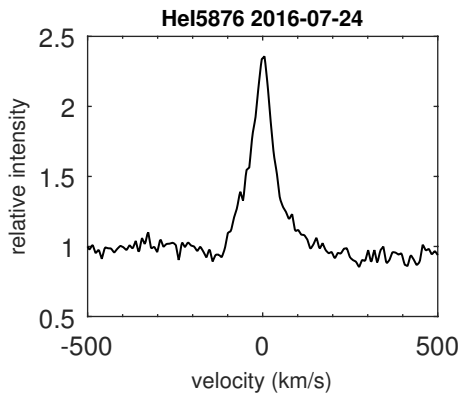
StHa 190

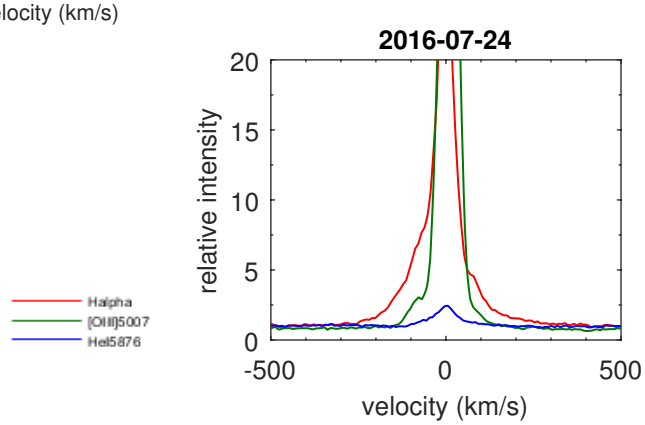

StHa 190 2016-07-24 00:53:05 R = 11000 F Teyssier
relative intensity
Wavelength (A)


Halpha 2016-07-24
relative intensity
velocity (km/s)


Hbeta 2016-07-24
relative intensity
velocity (km/s)


[OIII]5007 2016-07-24
relative intensity
velocity (km/s)

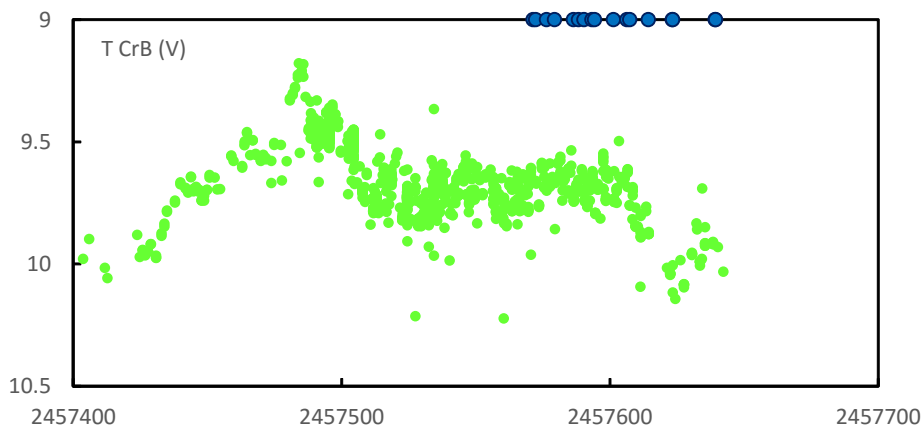

HeI5876 2016-07-24
relative intensity
velocity (km/s)

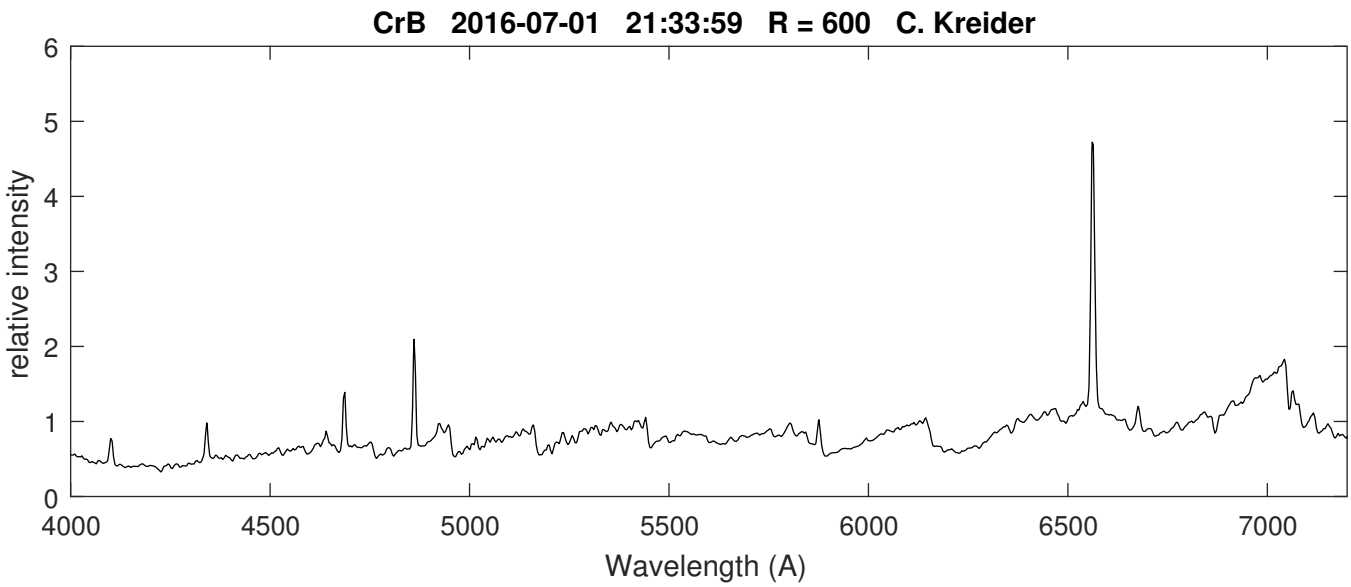

2016-07-24
relative intensity
velocity (km/s)
Halpha
[OIII]5007
HeI5876

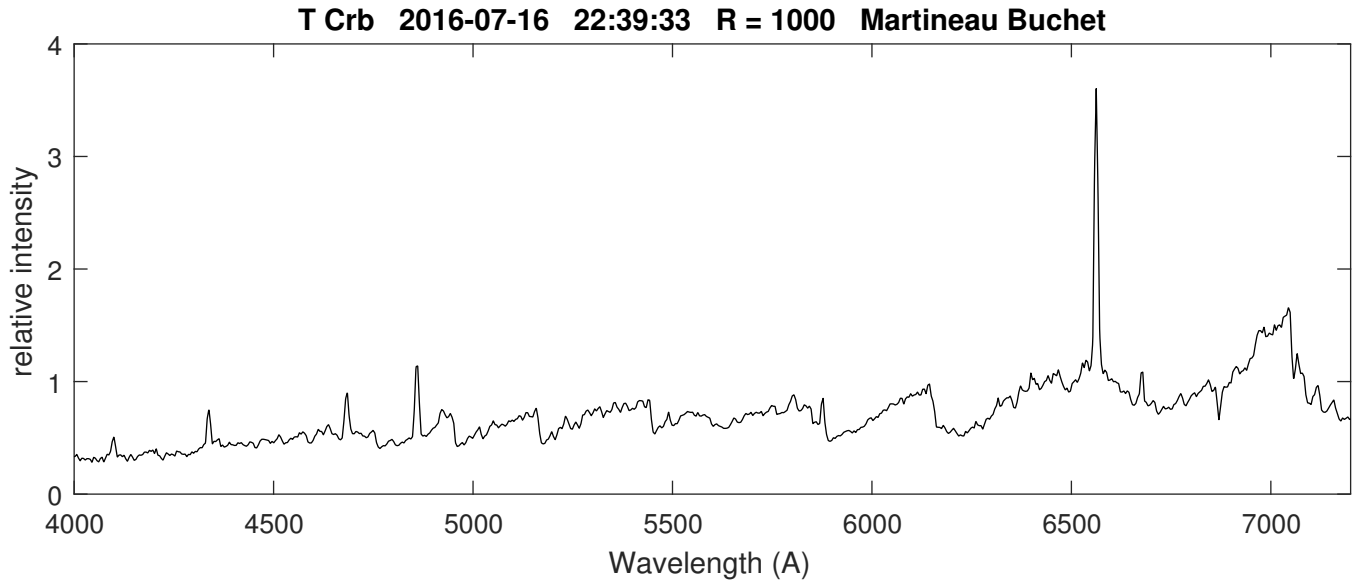
T CrB

Coordinates (2000.0)	
R.A.	15 59 30.2
Dec	+25 55 12.6
Mag	10 (04-2016)

Almost stable between from may to July at Mag V = 9.7 +/- 0.2, the luminosity of T CrB declined suddently early August and reached a minimum on August, 23 th (mag V = 10.2) CH Cyg brightens again late August

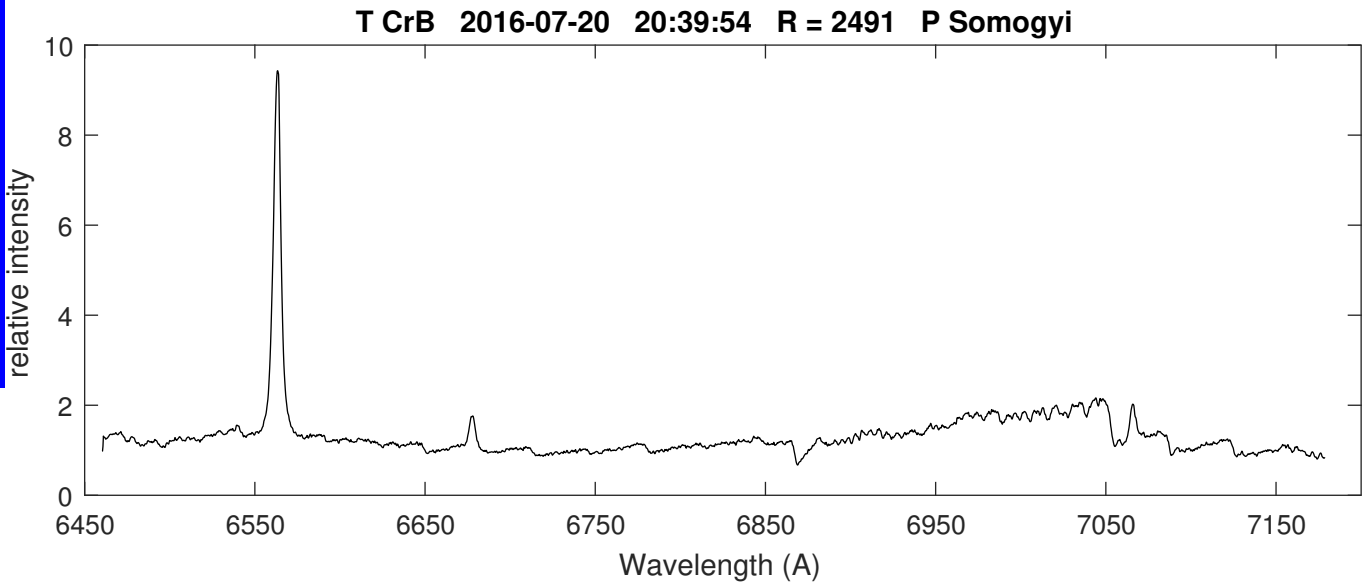


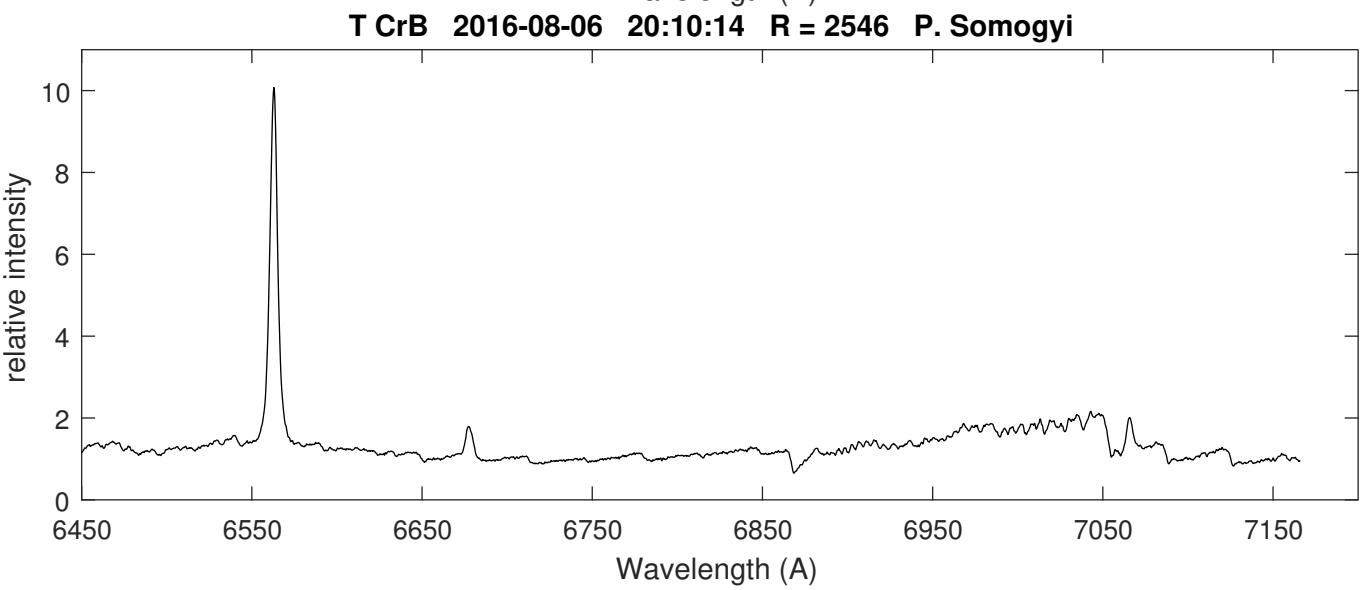




Spectra obtained with a LISA by Christian Kreider (01-07-2016) and Gérard Martineau & Yolande -Buchet (16-07-2016)

T CrB

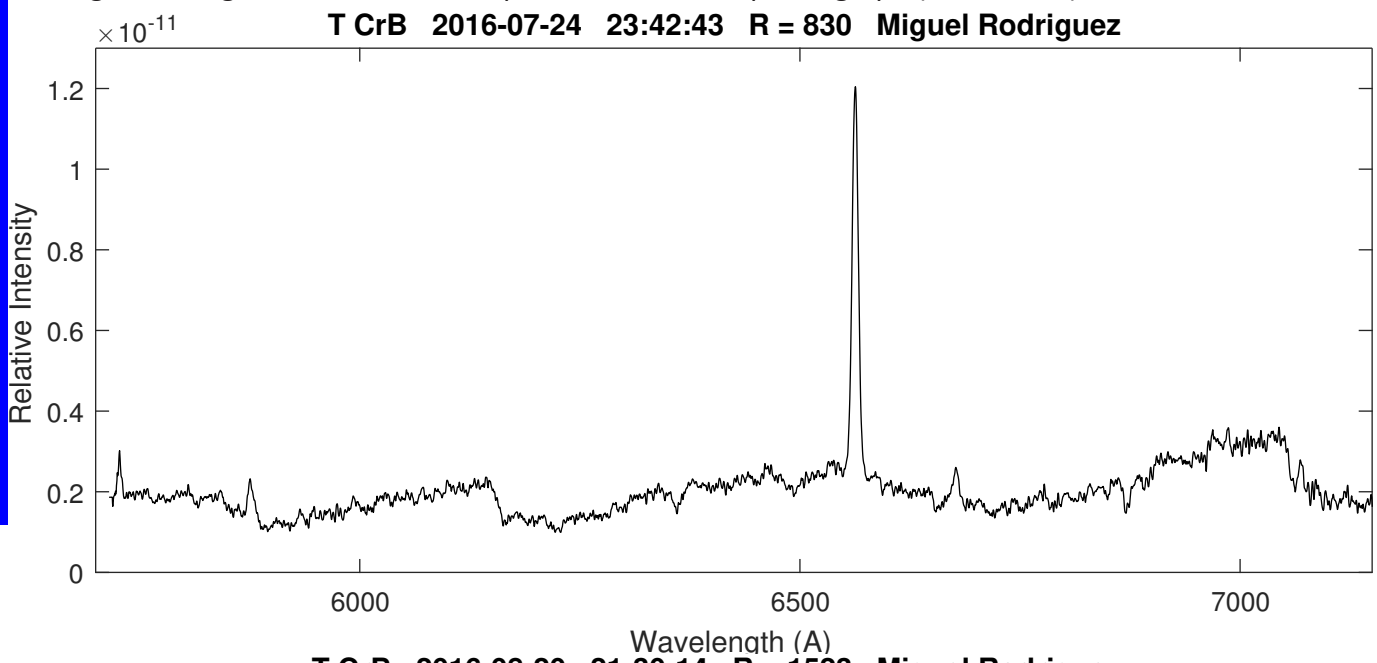


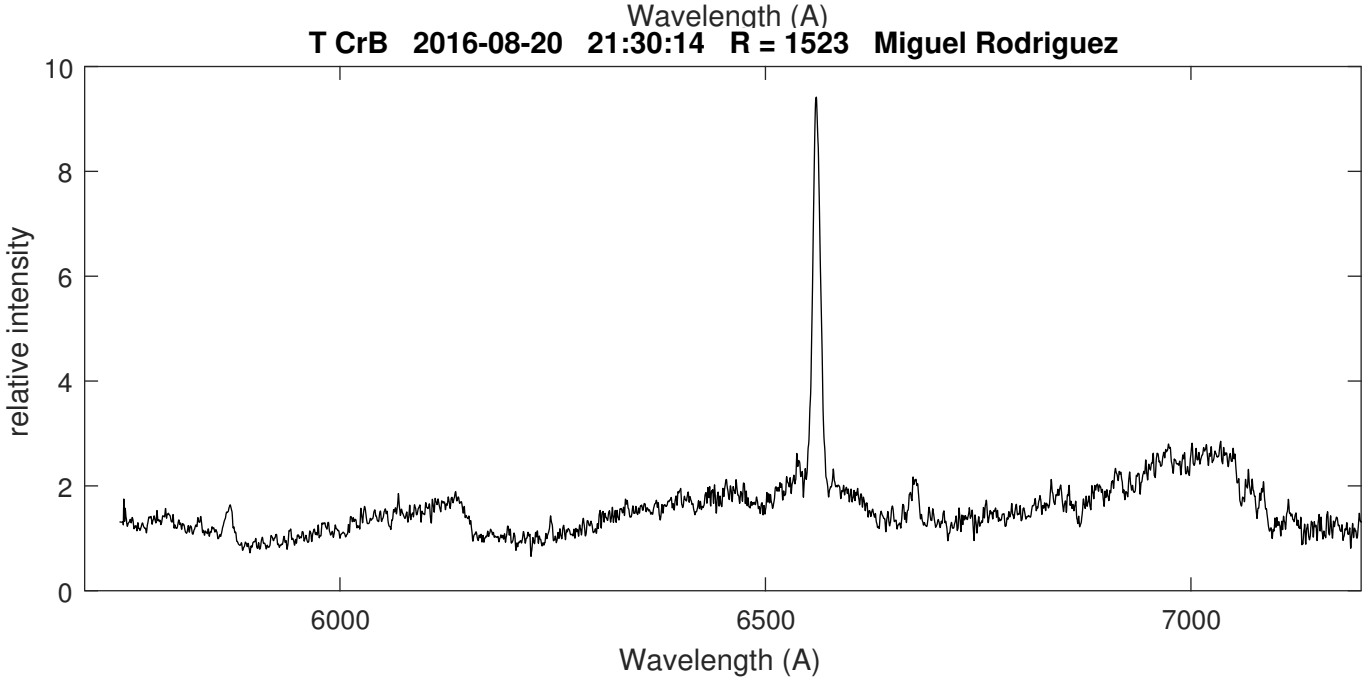


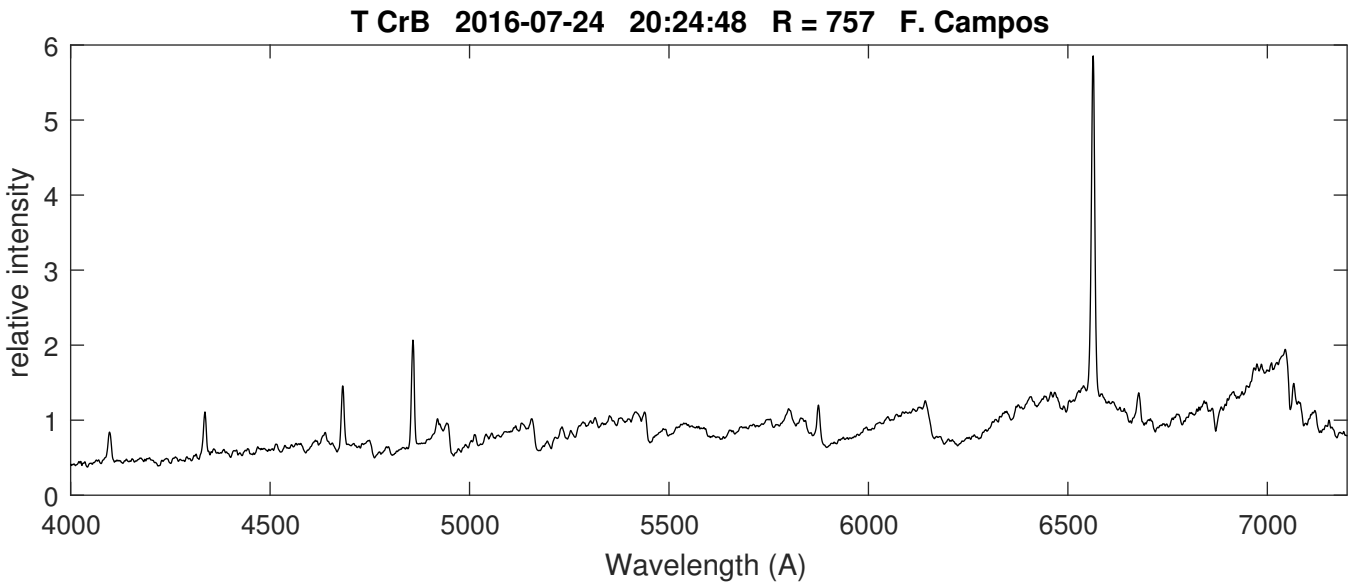
Peter Somogyi H alpha region with a Lhires III 600 ln/mm

T CrB

Miguel Rodrigues obtained these spectra with L-200 spectrograph (300 ln/mm)



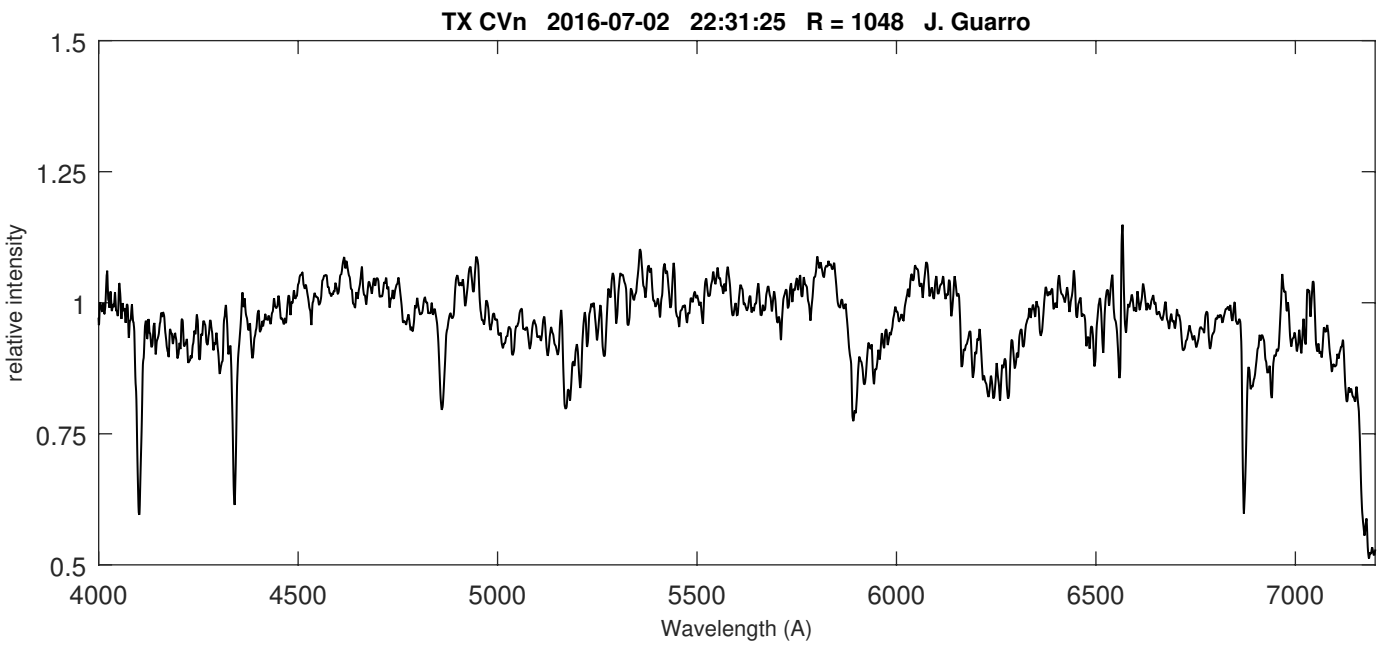




Francisco Campos with a DADOS 200 ln/mm

TX CVn

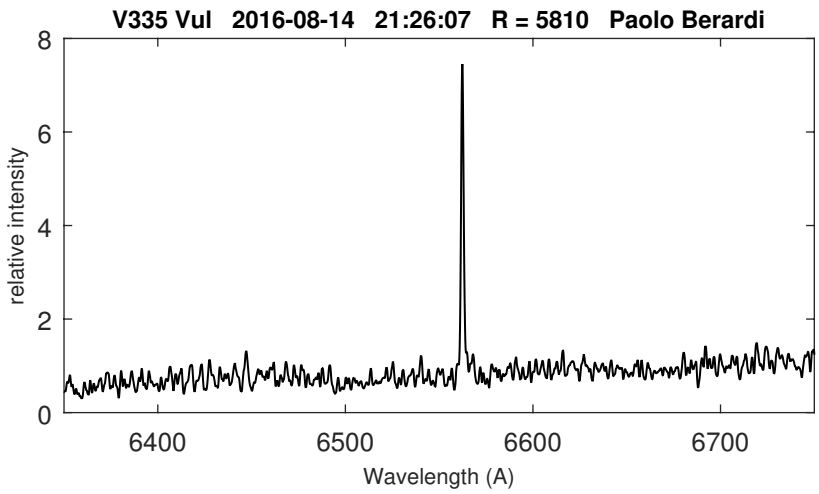
Coordinates (2000.0)	
R.A.	12 44 42.0
Dec	+36 45 50.7
Mag	10 (04-2016)

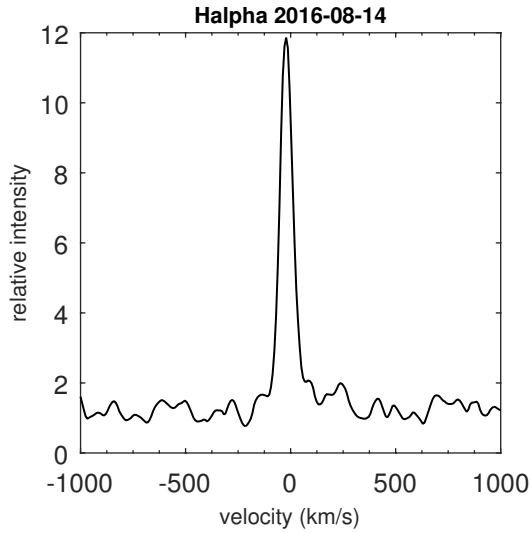


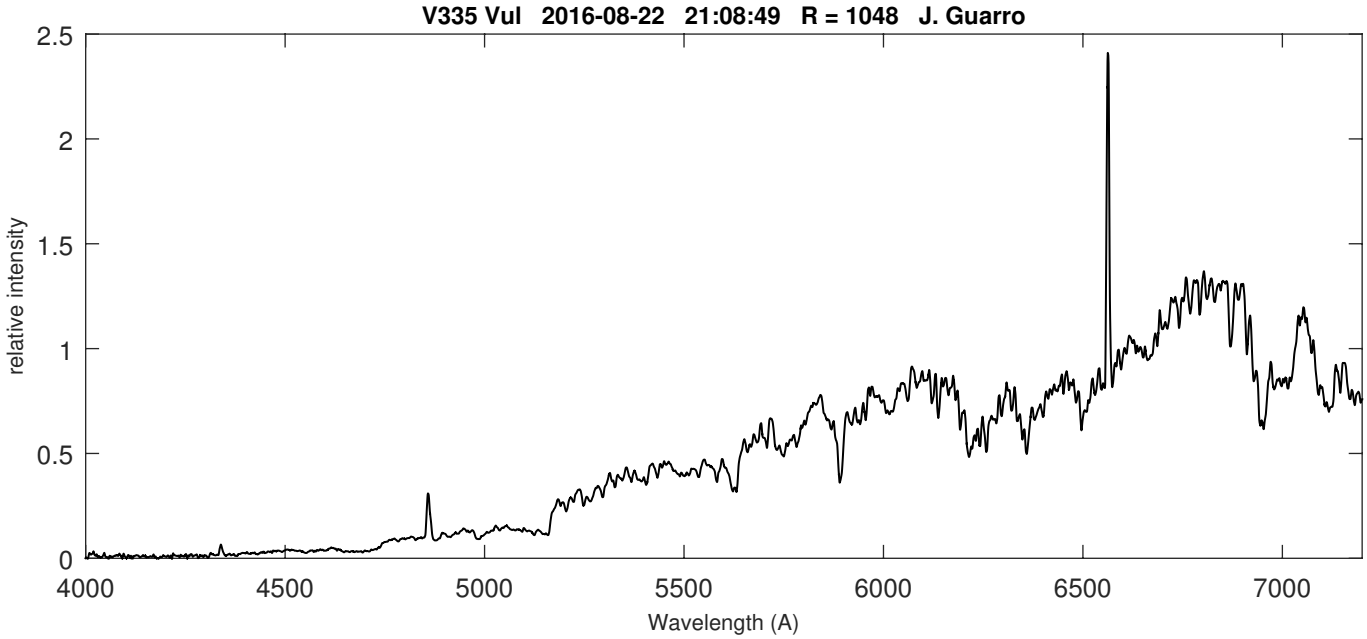
V335 Vul

Coordinates (2000.0)	
R.A.	19 23 14.1
Dec	+24 27 39.6
Mag	~ 11.8 (Vis.)

V335 Vul is a poorly studied star. It is classified as possible symbiotic containing a carbon giant. Paolo Berardi obtained a spectrum of H alpha region showing a narrow Ha line ( ). The spectrum of Joan Guarro shows the shape of the carbon star.



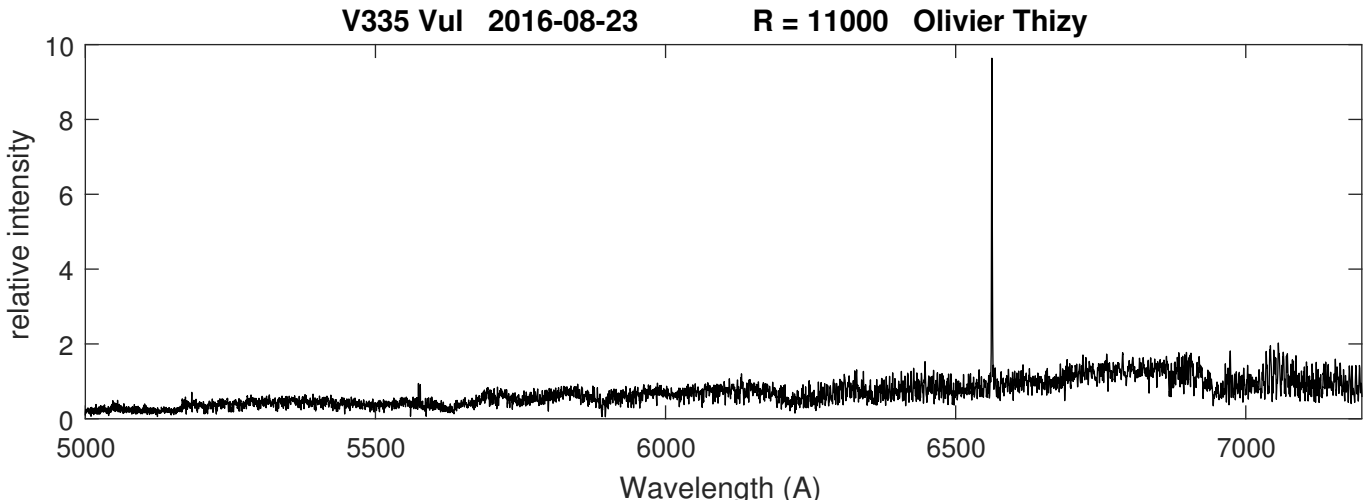


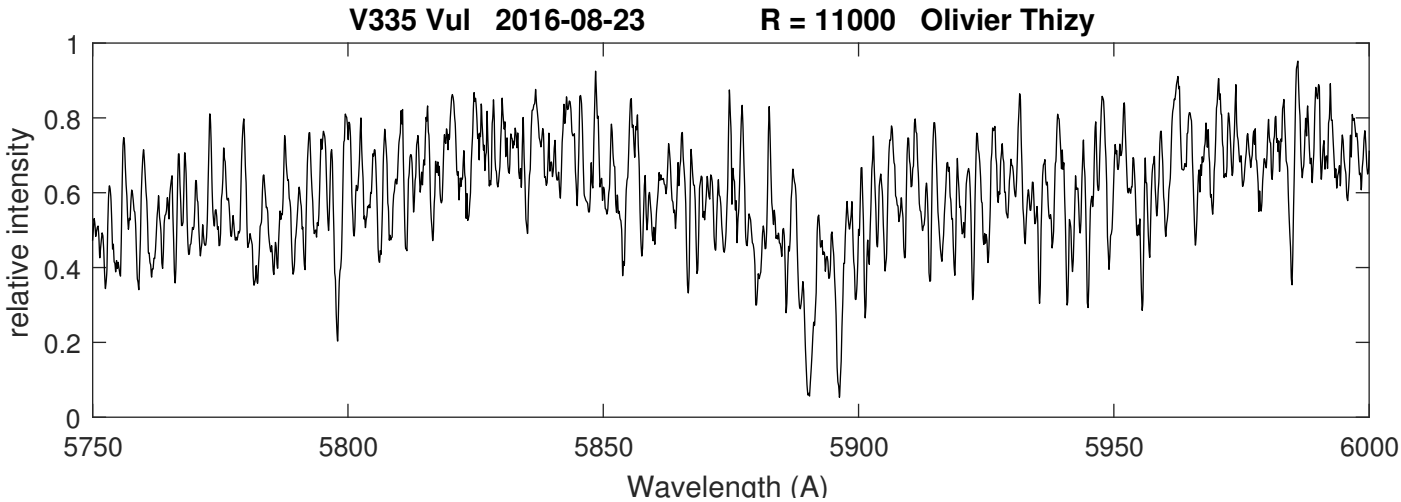


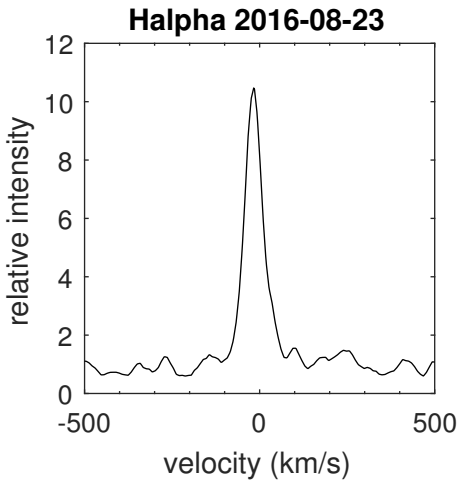
Description of V335 Vul in Catalog of Symbiotic stars (Belczinski & al., 2000)

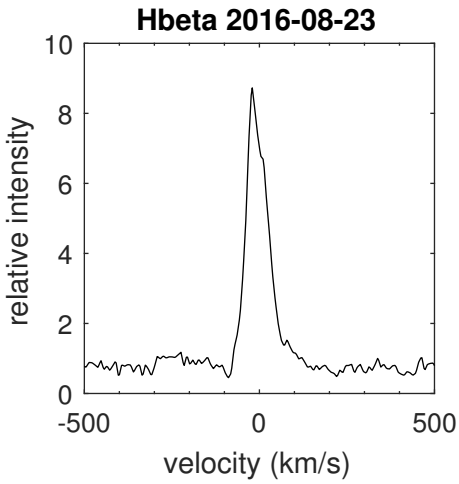
V335 Vul Suspected in [225]: presence of carbon giant and optical emission-line spectrum (H i) displaying hot continuum in blue. We agree with this classification although this object might be a single pulsating star: (i) the carbon star might pulsate with period of 342 days [55]and then emission lines behave as for a Mira variable – they disappear near minimum light and show up again at maximum (see spectra in [225]); (ii) Hα is very narrow: 2˚A (90 km s^{-1}) and for a symbiotic star we would expect a width of about 300–500 km s^{-1}; (iii) the Balmer decrement is different than that observed for symbiotic stars (it resembles that of Mira variable), although the authors of [225] claim that the Balmer decrement resembles that of a symbiotic star.

V335 Vul


V335 Vul 2016-08-23 R = 11000 Olivier Thizy
relative intensity
Wavelength (A)
0
2
4
6
8
10
5000
5500
6000
6500
7000

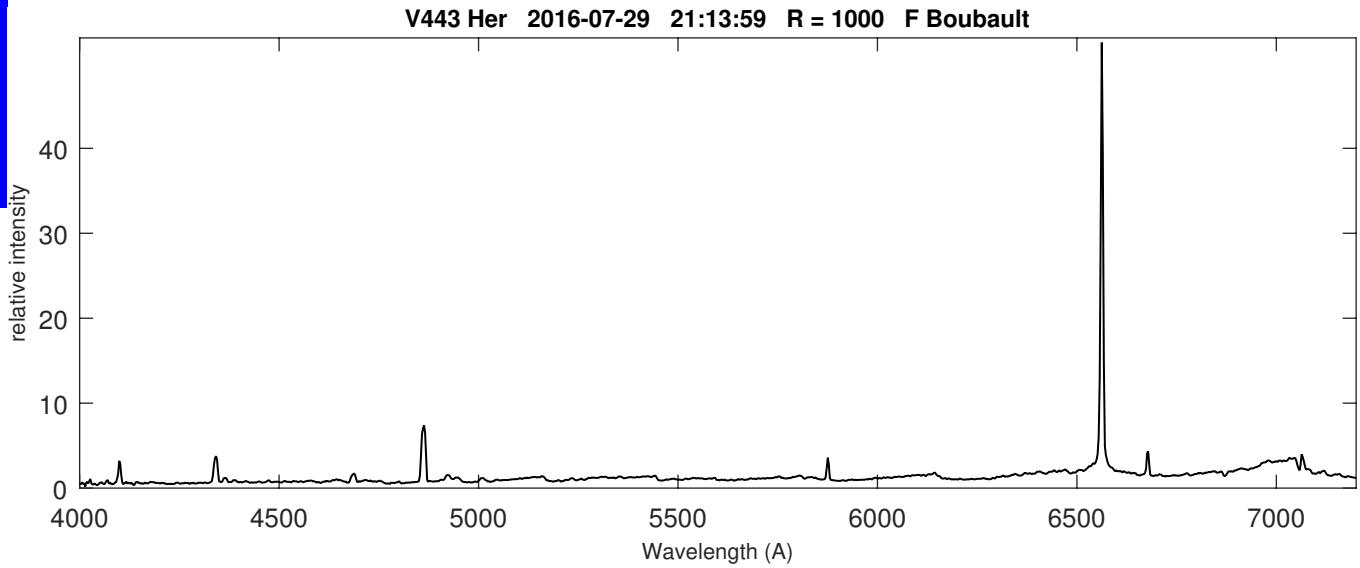

V335 Vul 2016-08-23 R = 11000 Olivier Thizy
relative intensity
Wavelength (A)
0
0.2
0.4
0.6
0.8
1
5750
5800
5850
5900
5950
6000

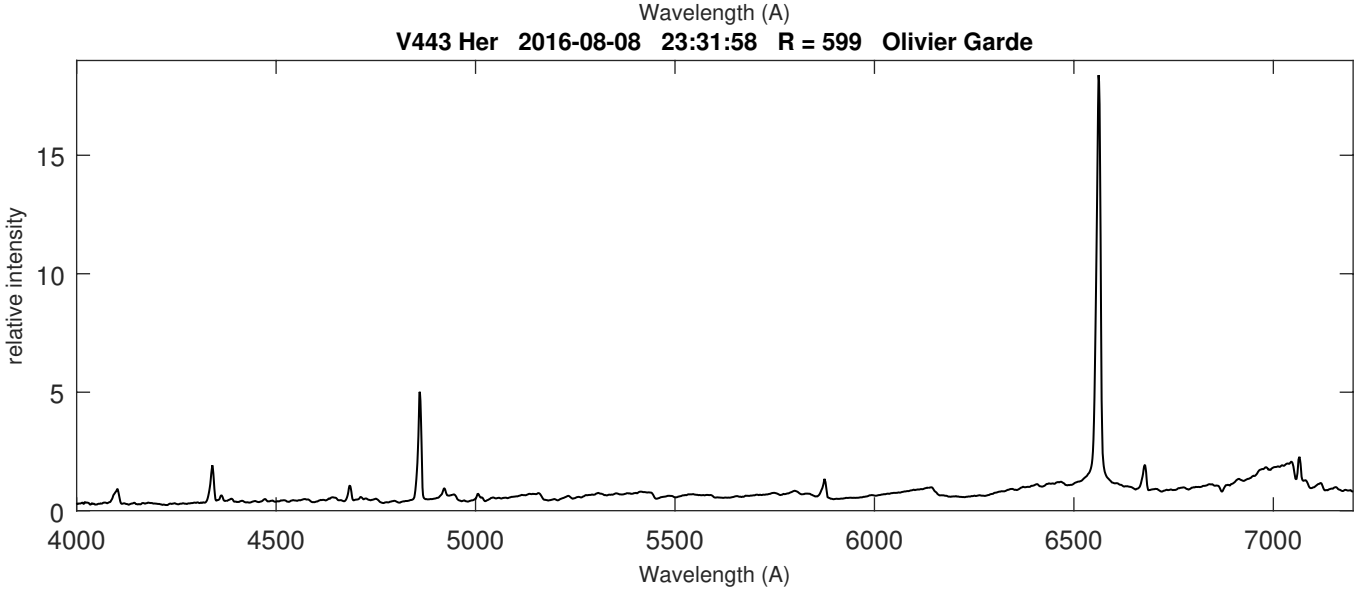

Halpha 2016-08-23
relative intensity
velocity (km/s)
0
2
4
6
8
10
12
-500
0
500

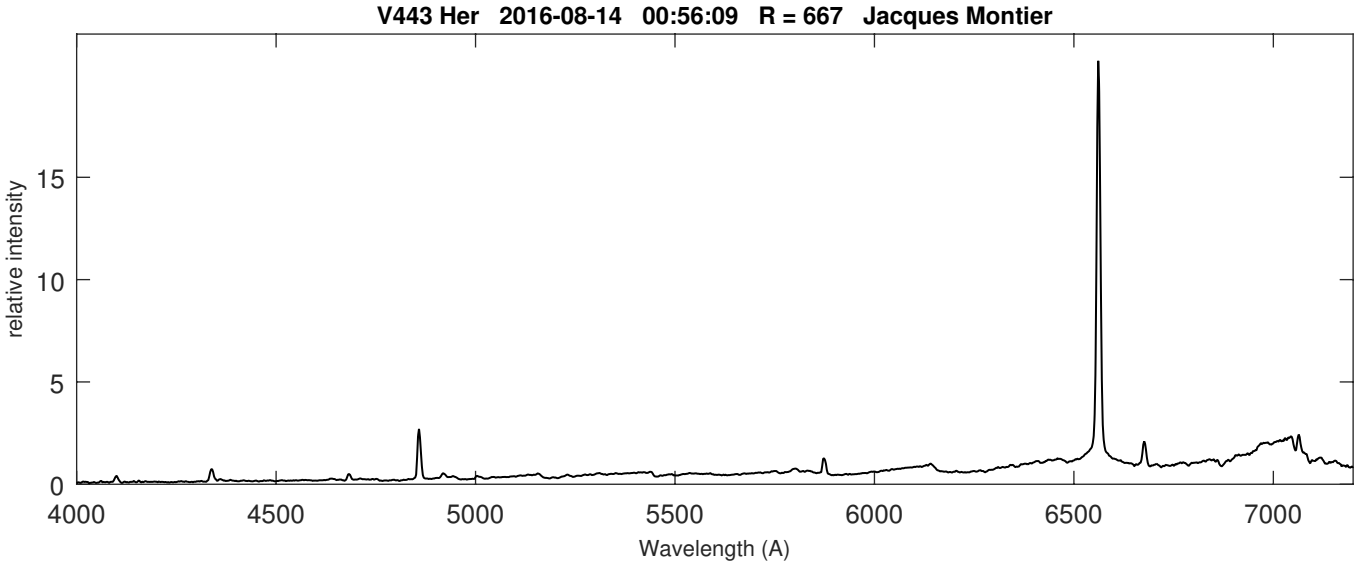

Hbeta 2016-08-23
relative intensity
velocity (km/s)
0
2
4
6
8
10
-500
0
500

V443 Her

Coordinates (2000.0)	
R.A.	18 22 07.8
Dec	+23 27 20.0
Mag	~ 11.5

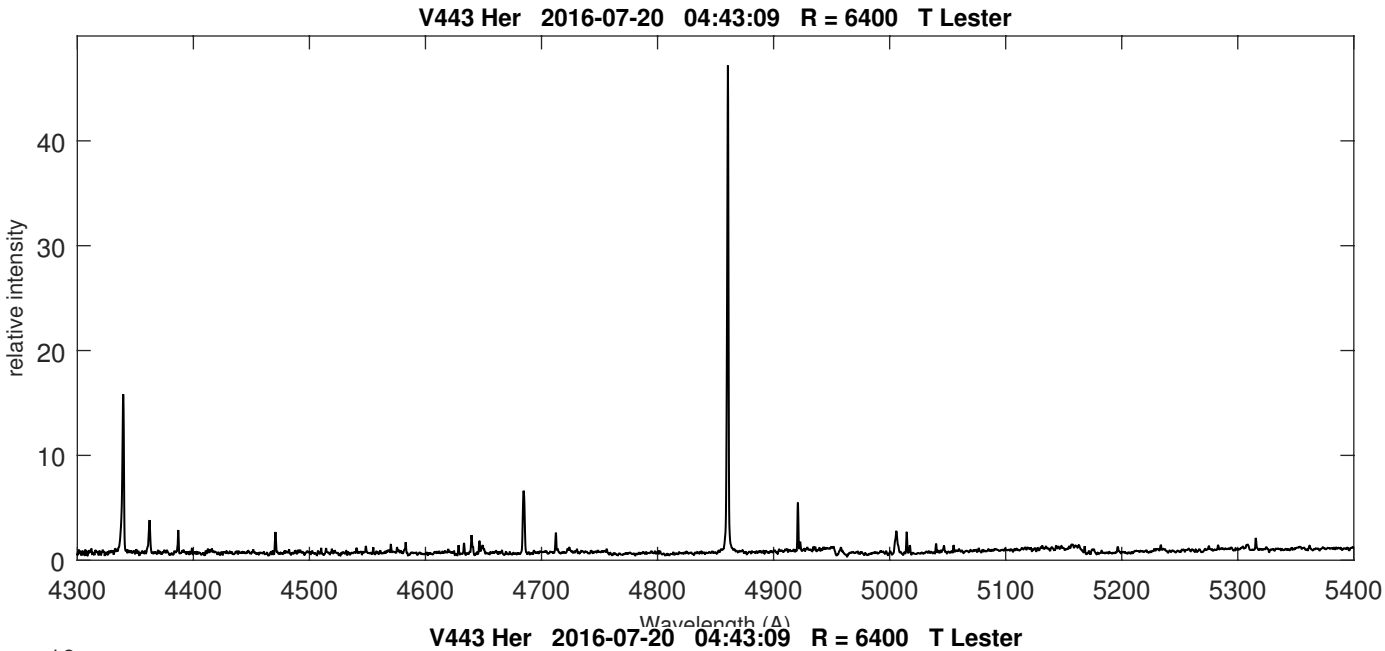


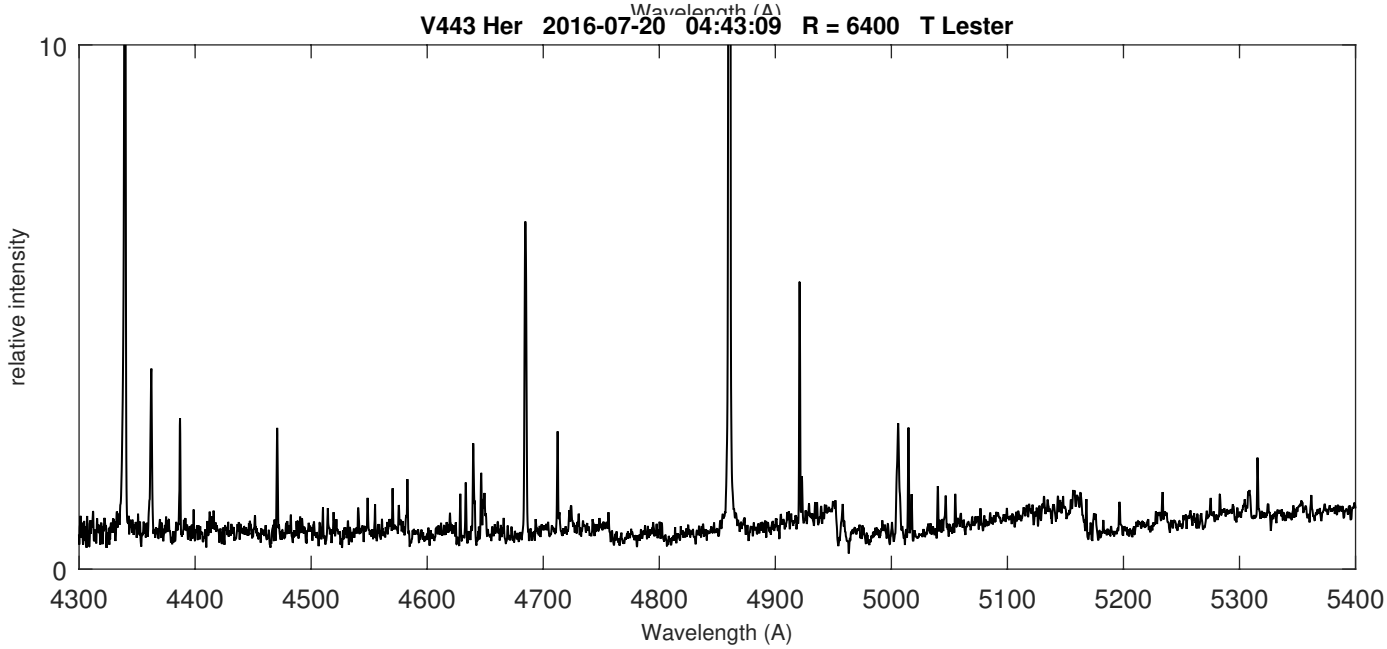


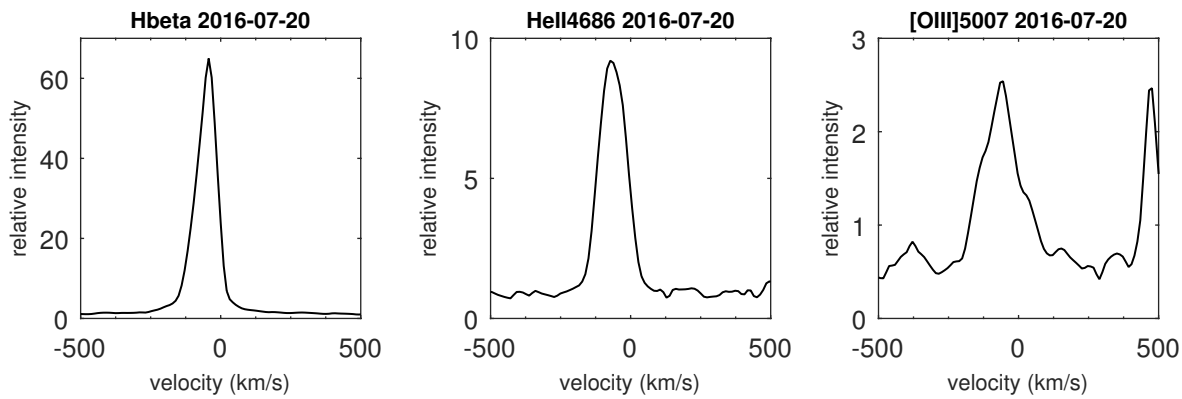


V443 Her

Coordinates (2000.0)	
R.A.	18 22 07.8
Dec	+23 27 20.0
Mag	~ 11.5

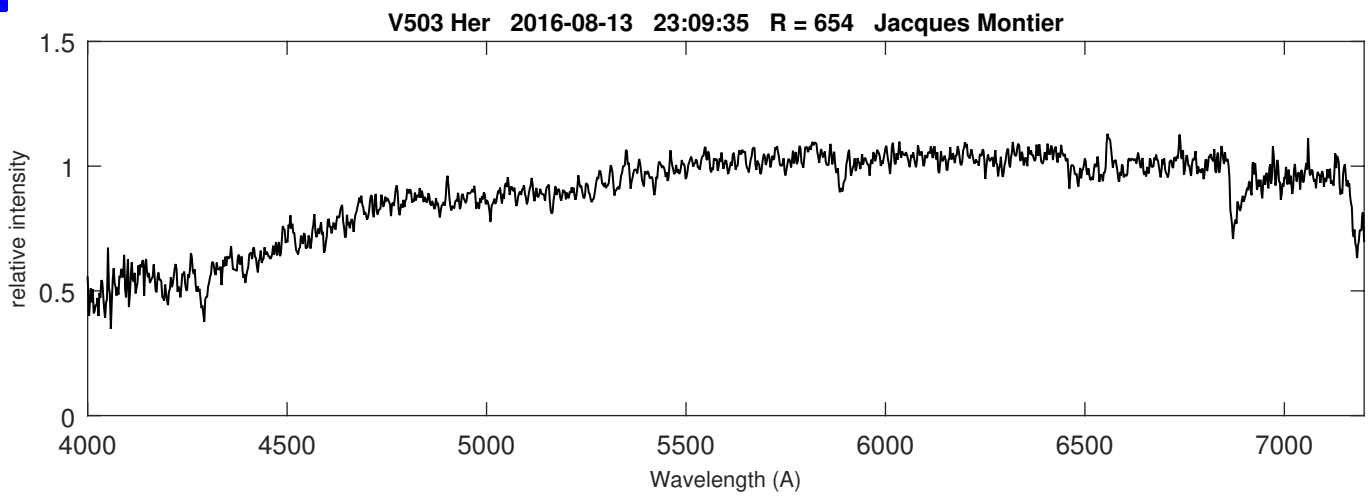


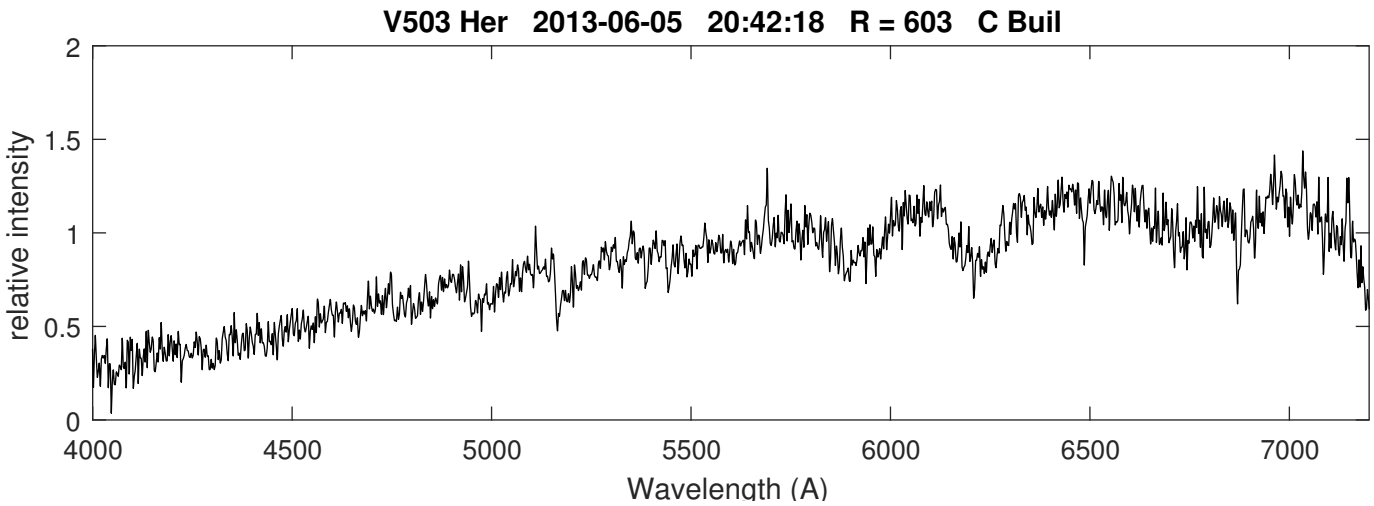




V503 Her

Coordinates (2000.0)	
R.A.	17 36 40.46
Dec	+23 18 12.0
Mag	12.6 (06-2016)

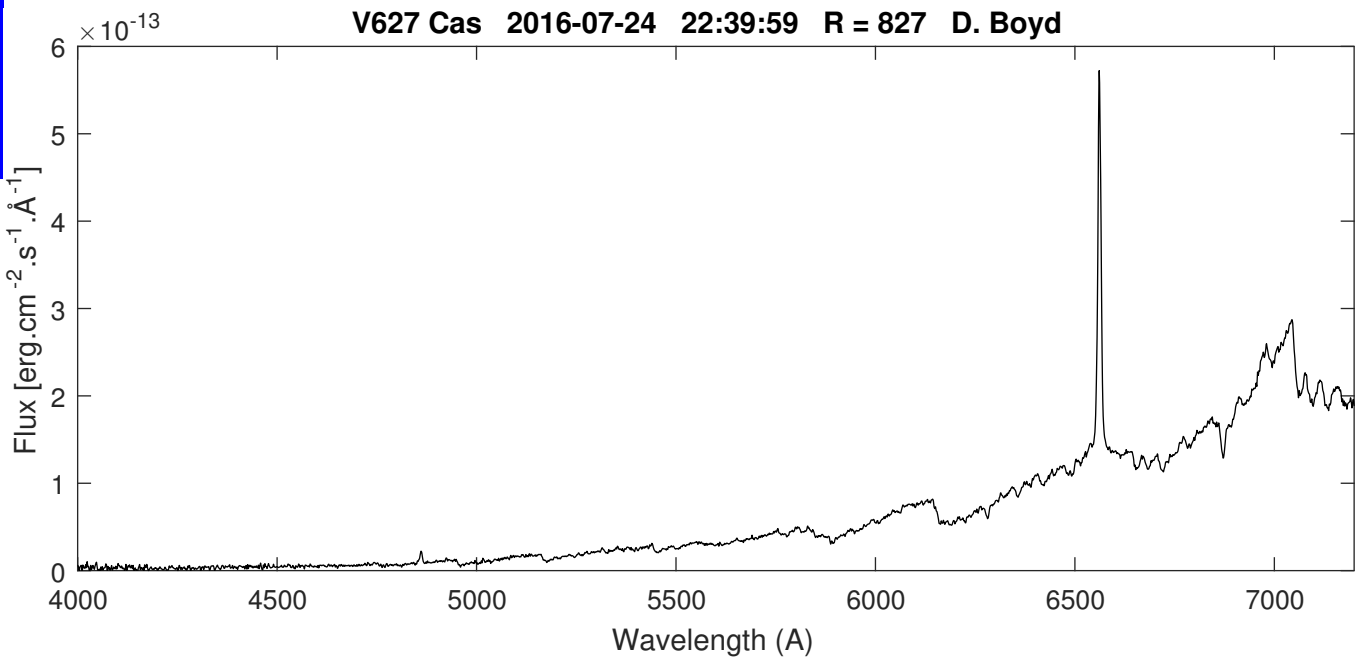


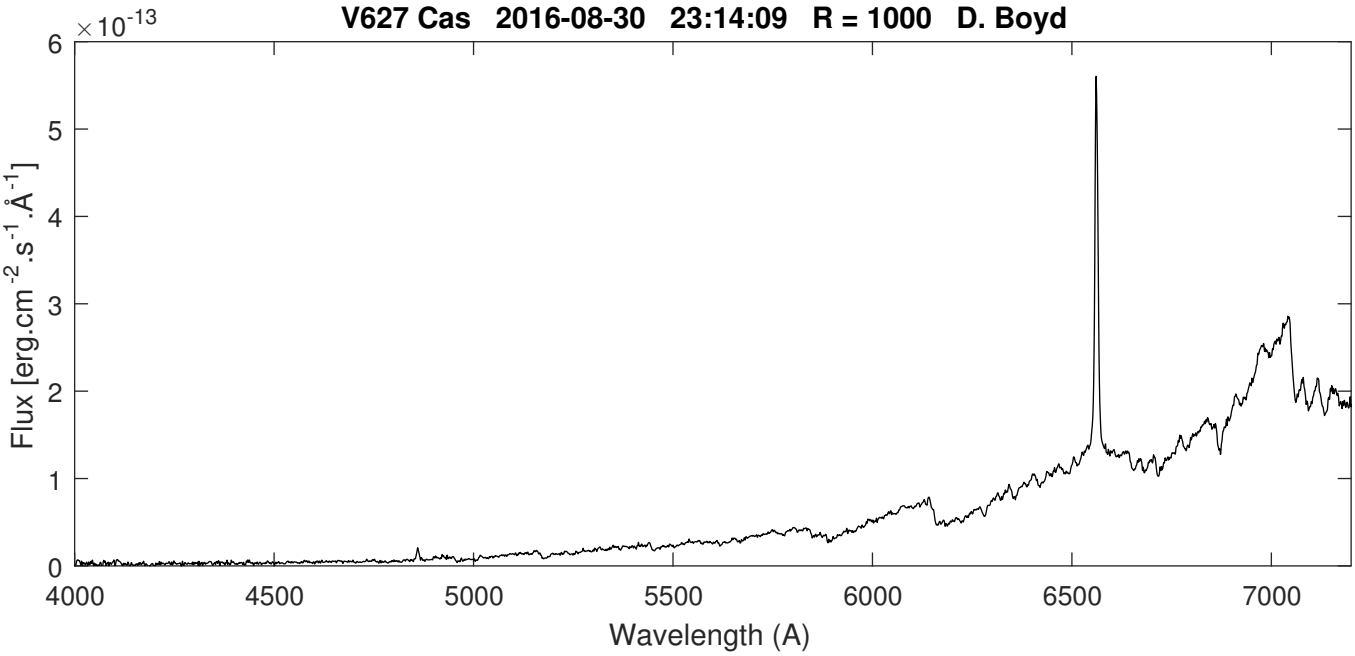


Comparison with a spectrum obtained in 2013 by Christian Buil

V627 Cas

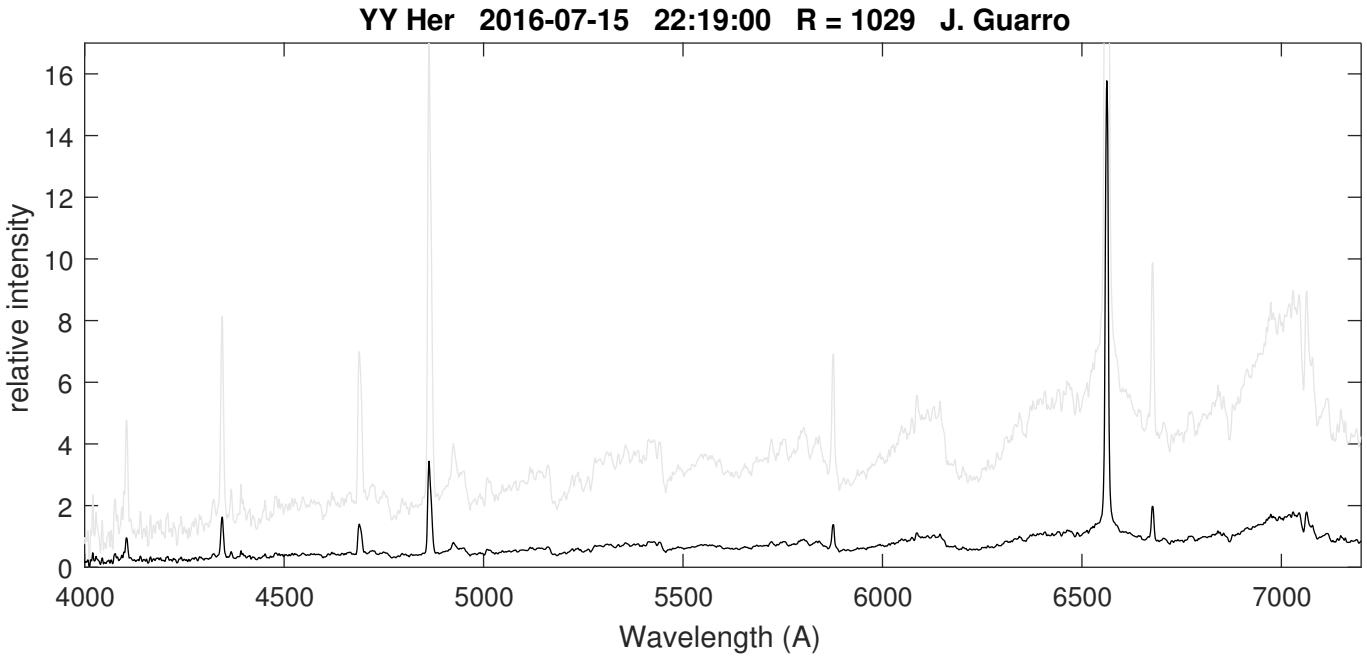
Coordinates (2000.0)	
R.A.	22 57 41.0
Dec	+58 49 12.5
Mag	12.9





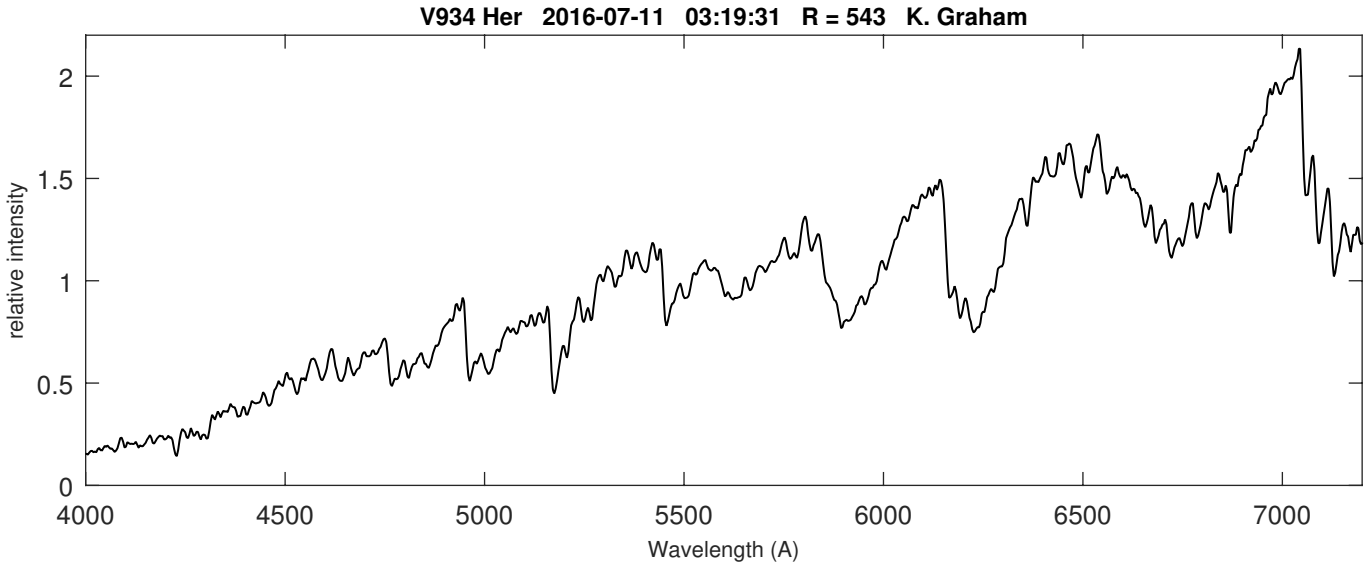
V934 Her

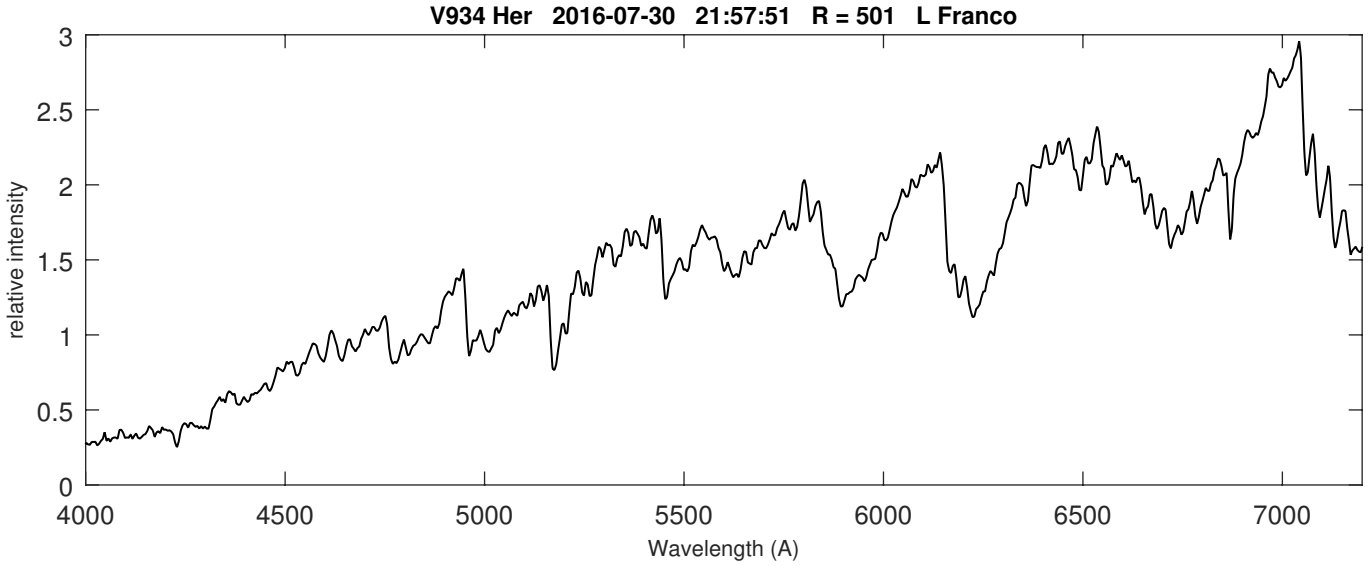
Coordinates (2000.0)	
R.A.	17 06 34.5
Dec	+23 58 18.5
Mag	~ 7.5

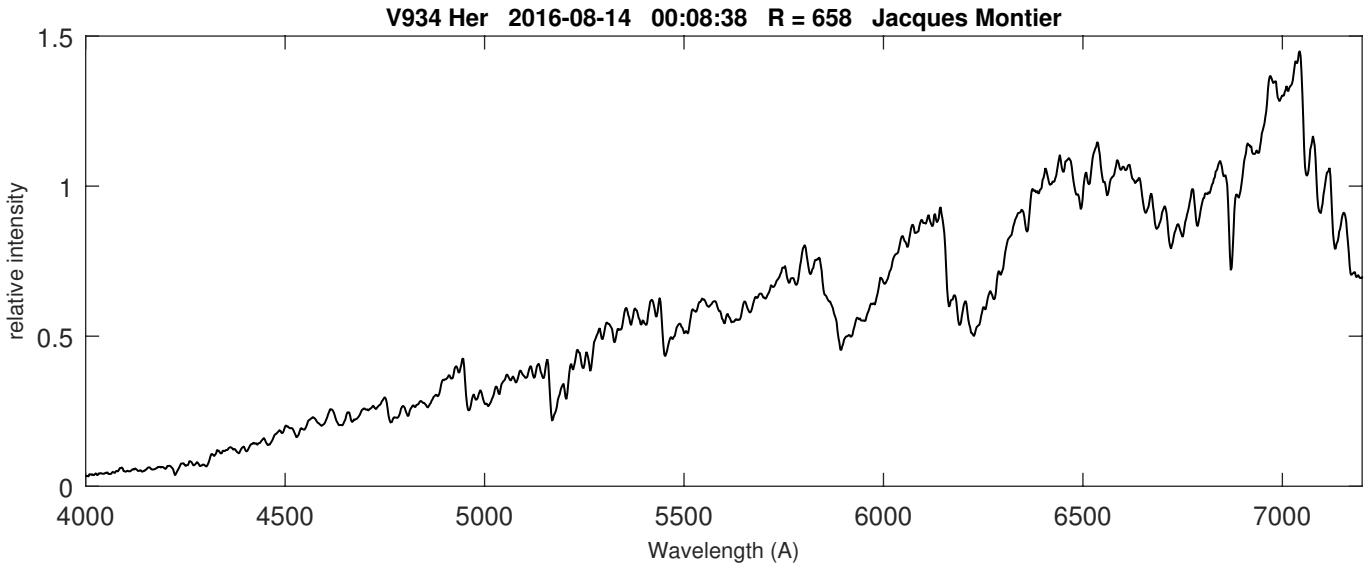


V934 Her

Coordinates (2000.0)	
R.A.	
Dec	
Mag	



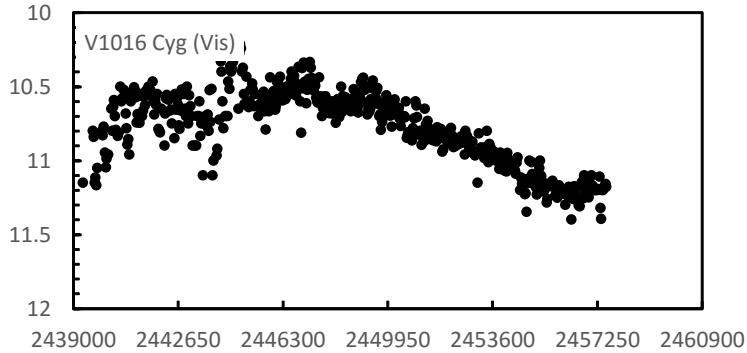




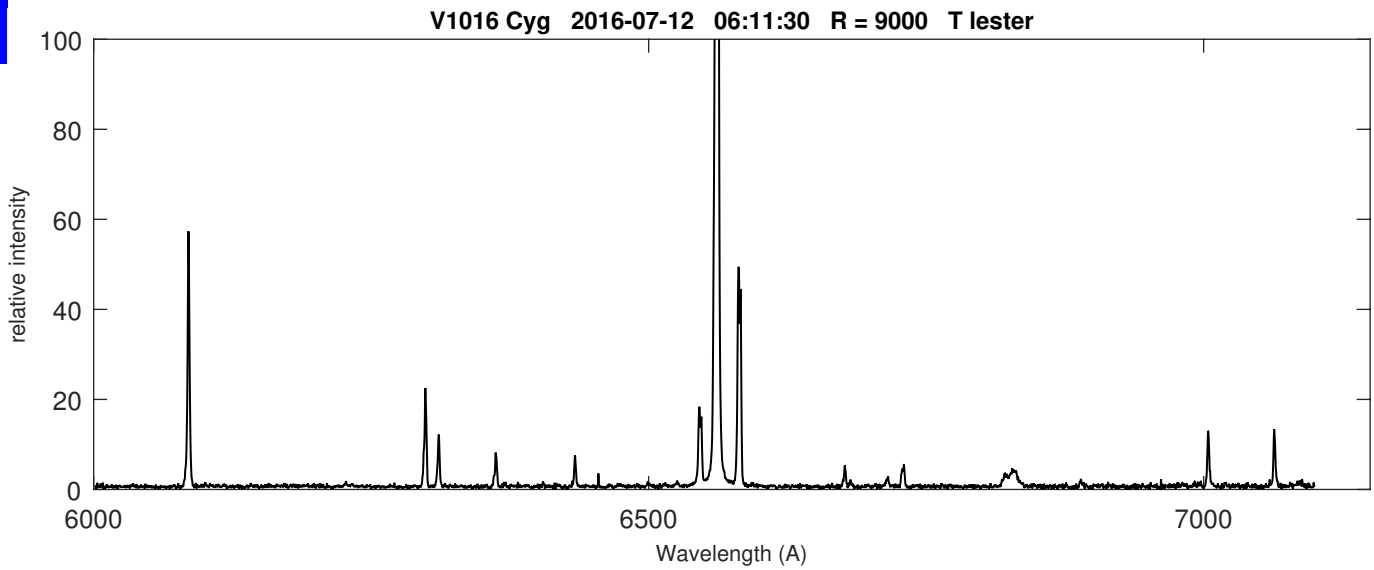
V1016 Cyg

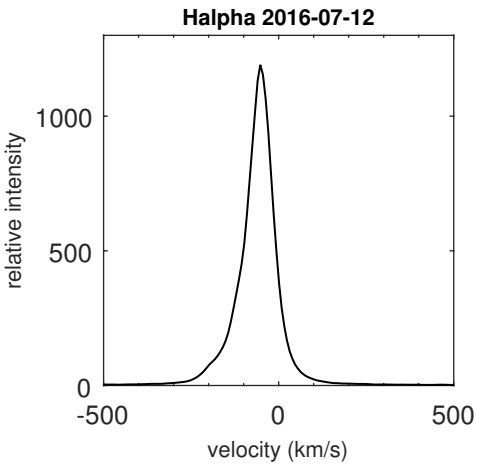
Coordinates (2000.0)	
R.A.	19 57 05.0
Dec	+39 49 36.3
Mag	11.7 (V)

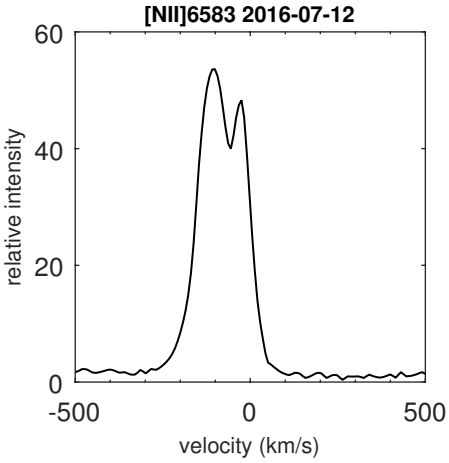
Symbiotic nova V1016 Cyg at high resolution

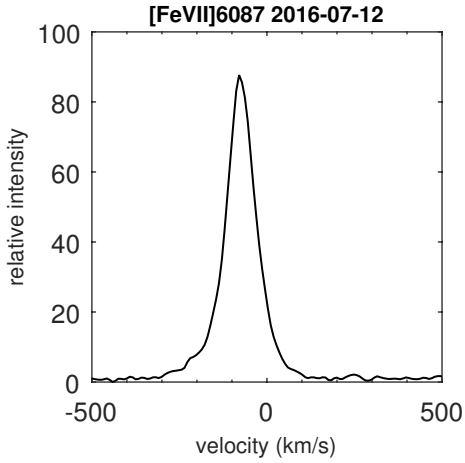


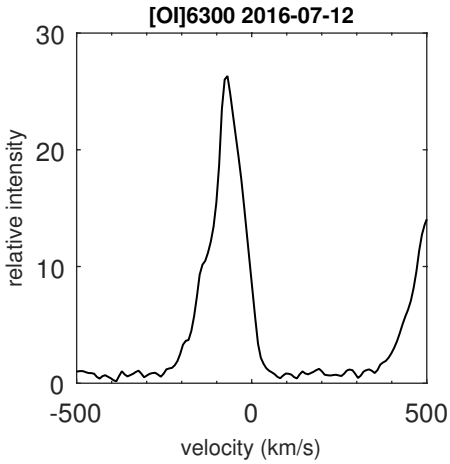
AAVSO light of the nova event (Visible) from 1965 to now



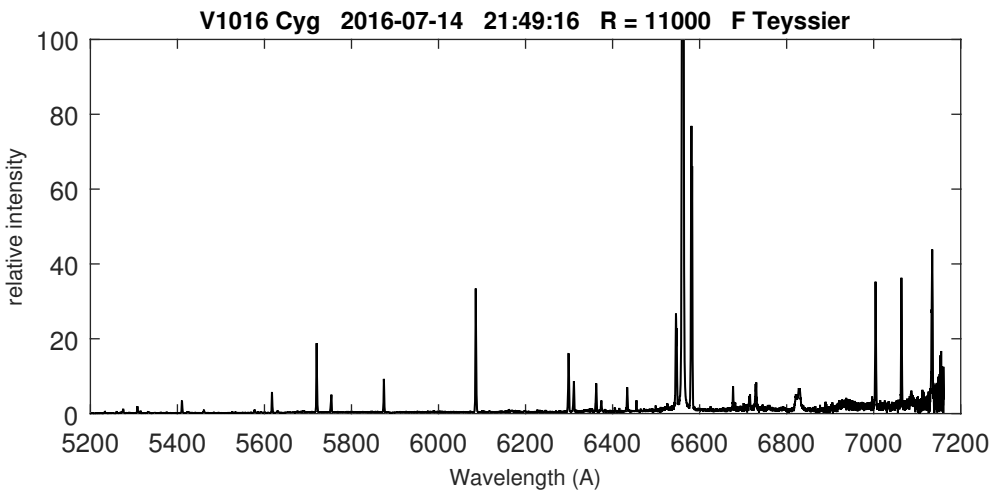


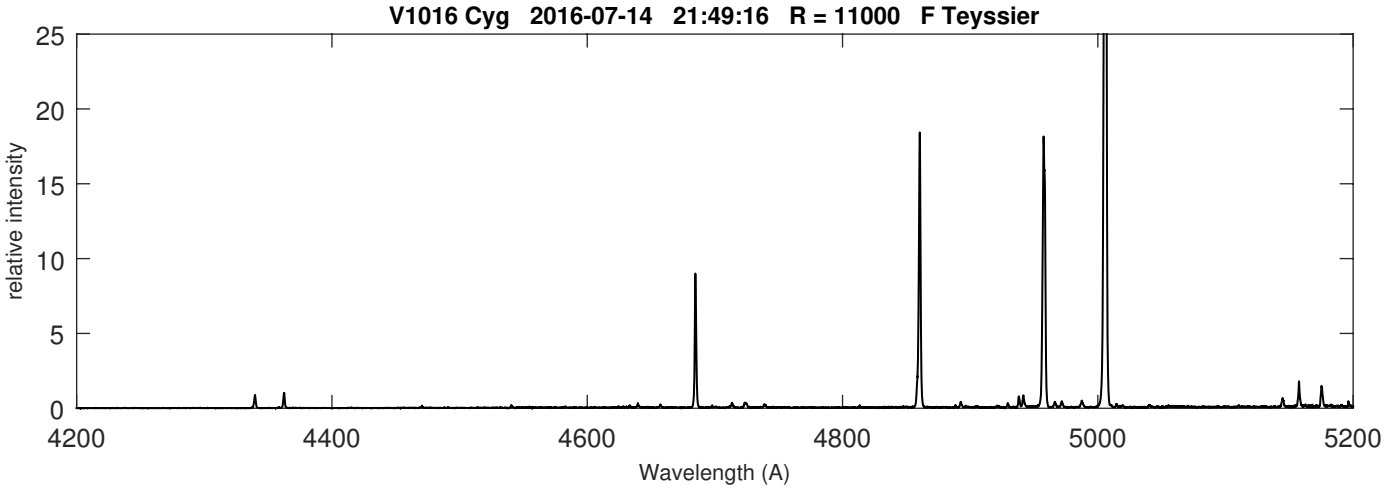


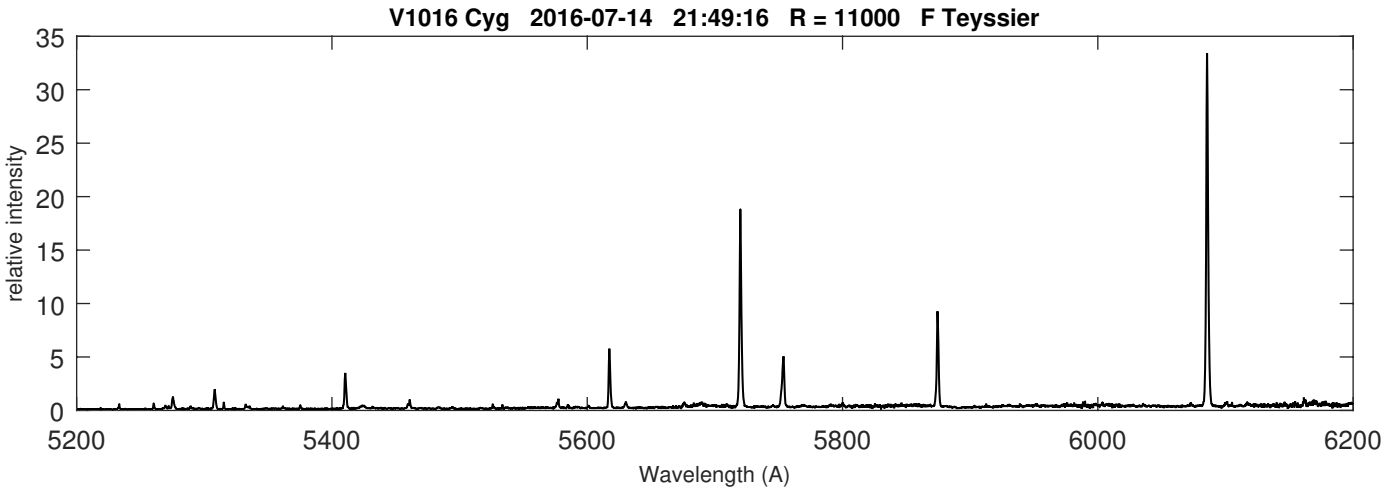


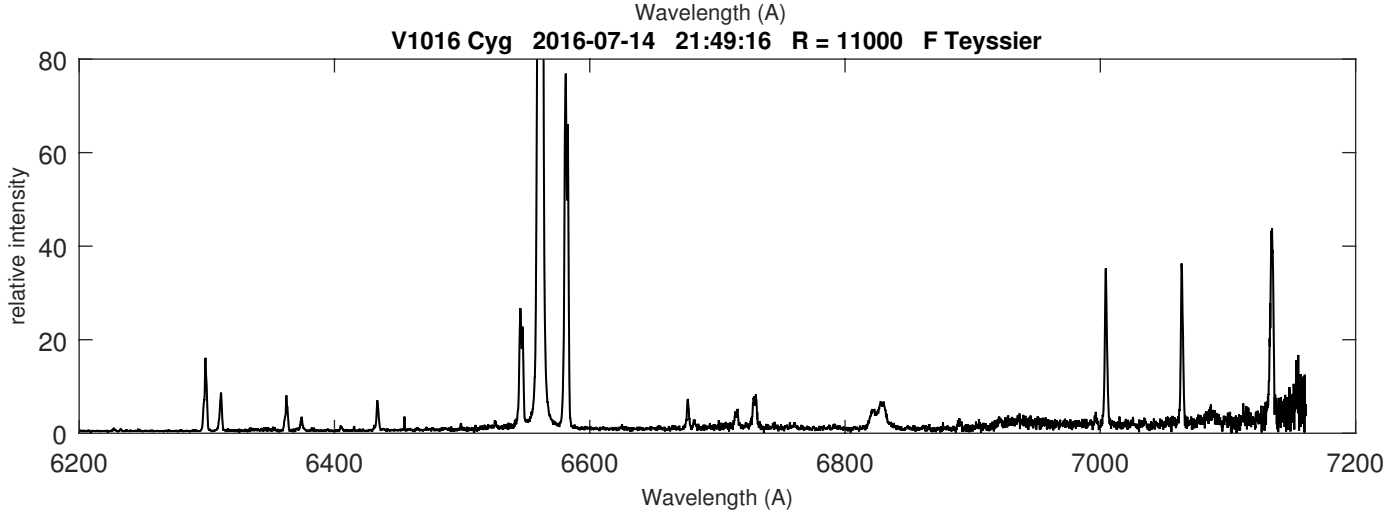


V1016 Cyg


V1016 Cyg 2016-07-14 21:49:16 R = 11000 F Teyssier
relative intensity
Wavelength (A)


V1016 Cyg 2016-07-14 21:49:16 R = 11000 F Teyssier
relative intensity
Wavelength (A)

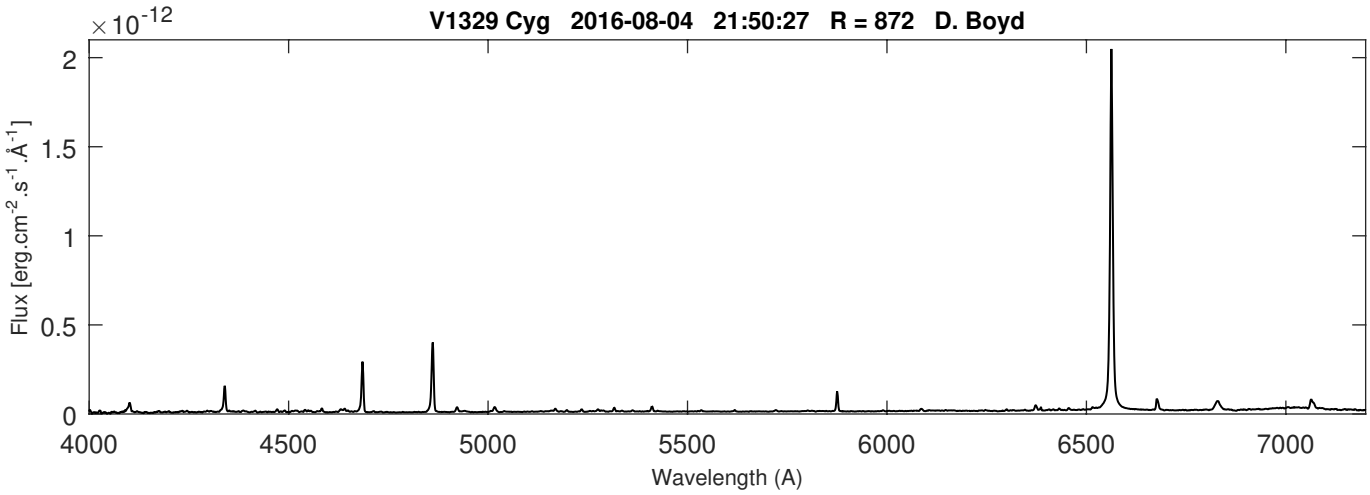

V1016 Cyg 2016-07-14 21:49:16 R = 11000 F Teyssier
relative intensity
Wavelength (A)

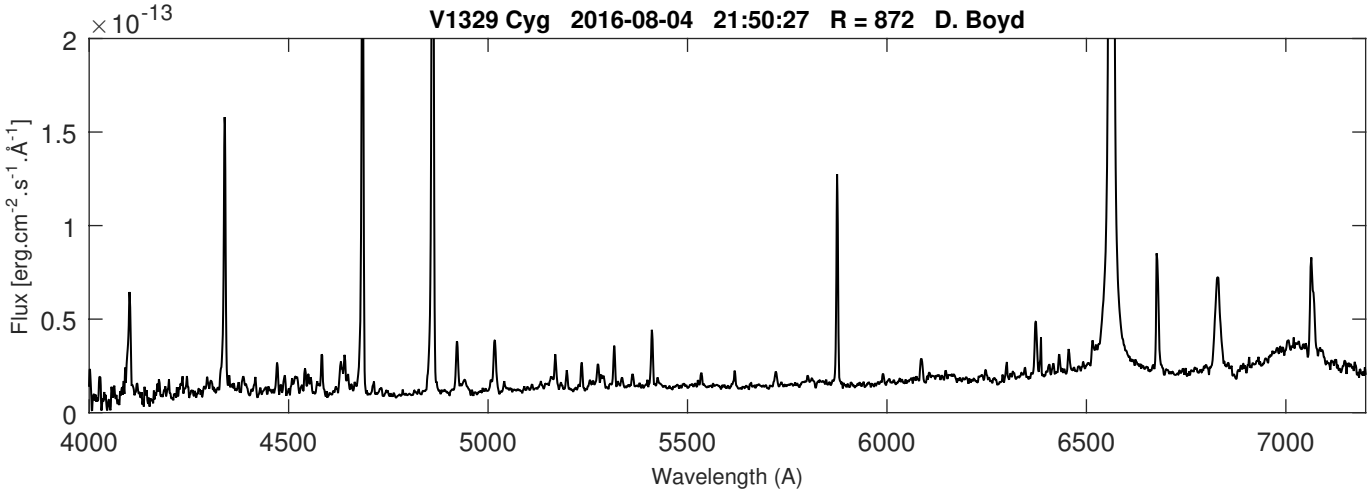

V1016 Cyg 2016-07-14 21:49:16 R = 11000 F Teyssier
relative intensity
Wavelength (A)

V1329 Cyg

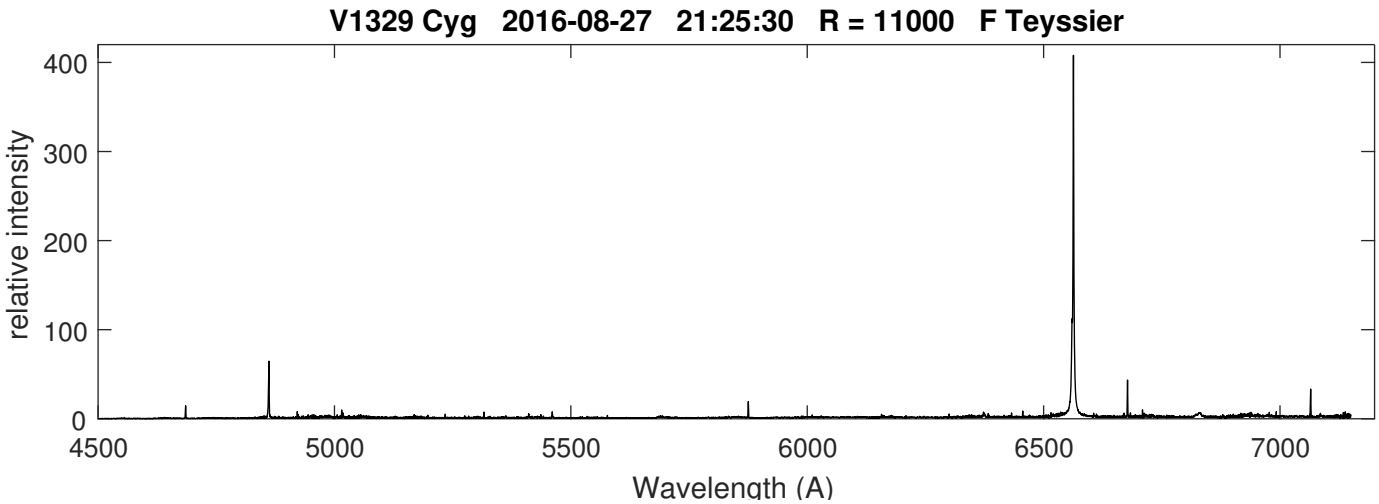
Coordinates (2000.0)	
R.A.	20 51 01.2
Dec	+35 34 54.0
Mag	13.4 (V)

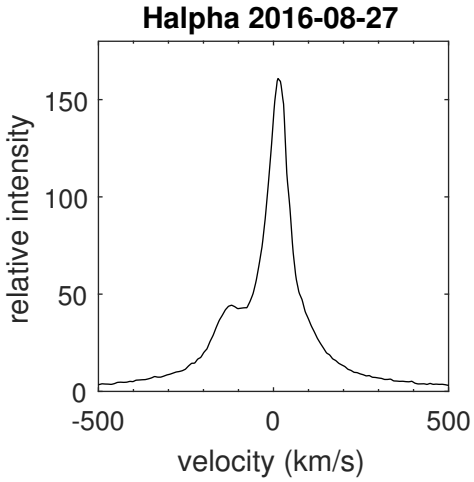
See David Boyd's text page

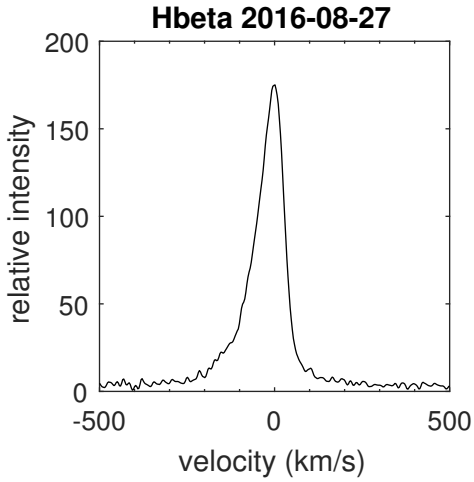


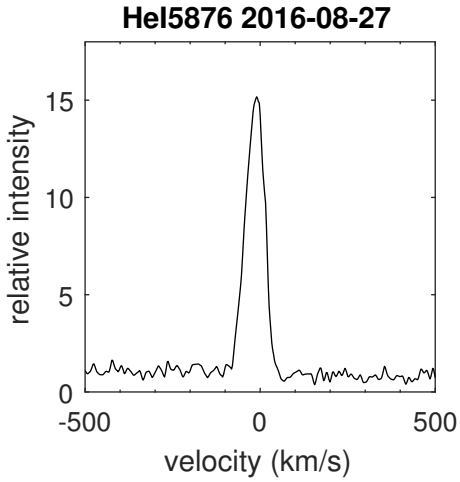


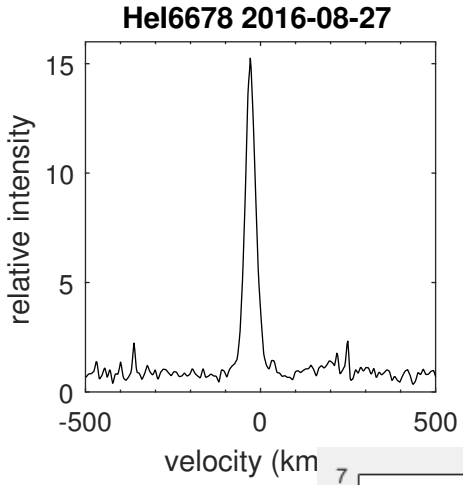
V1329 Cyg

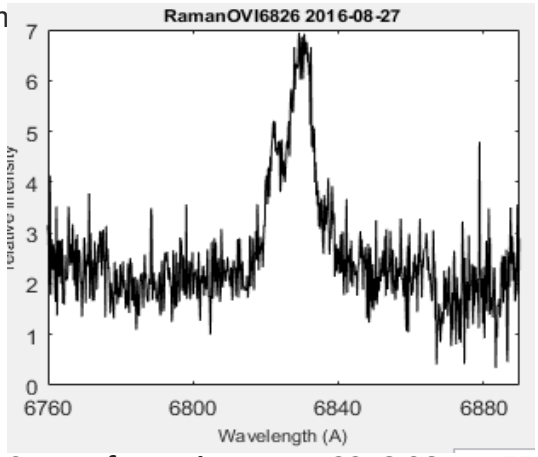

V1329 Cyg 2016-08-27 21:25:30 R = 11000 F Teyssier
relative intensity
Wavelength (A)


Halpha 2016-08-27
relative intensity
velocity (km/s)


Hbeta 2016-08-27
relative intensity
velocity (km/s)

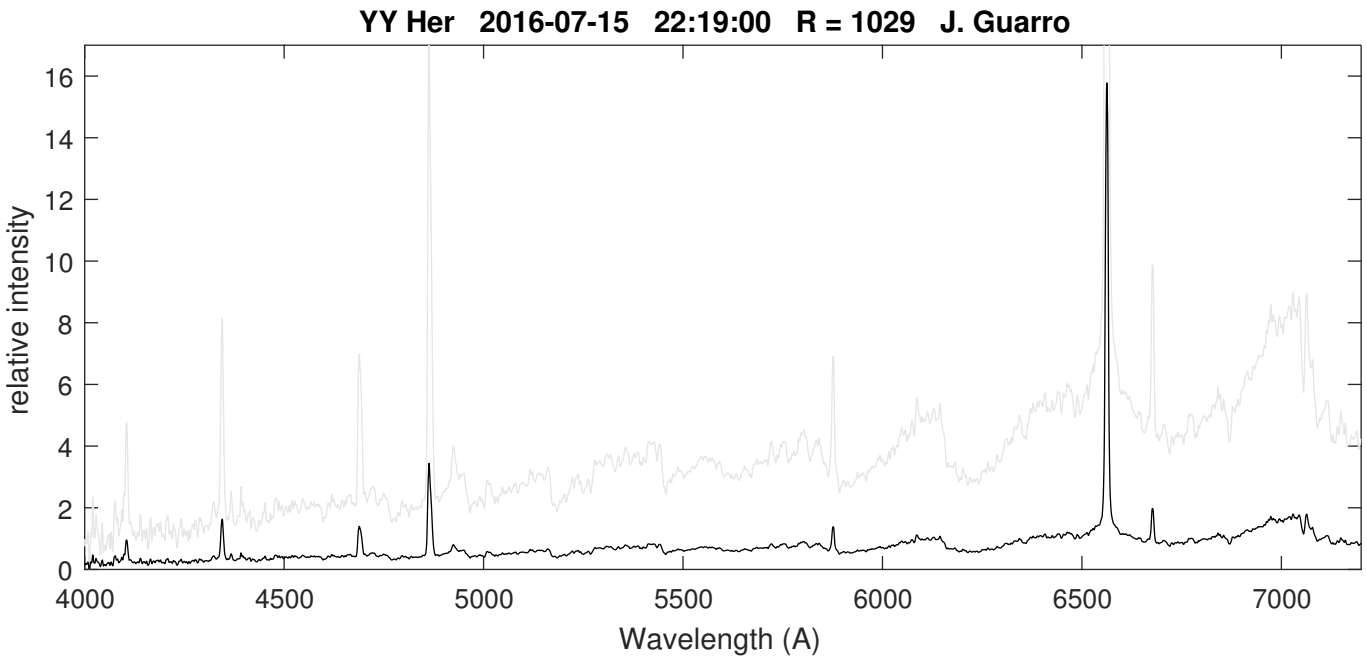

HeI5876 2016-08-27
relative intensity
velocity (km/s)


HeI6678 2016-08-27
relative intensity
velocity (km


RamanOVI6826 2016-08-27
Wavelength (A)

YY Her

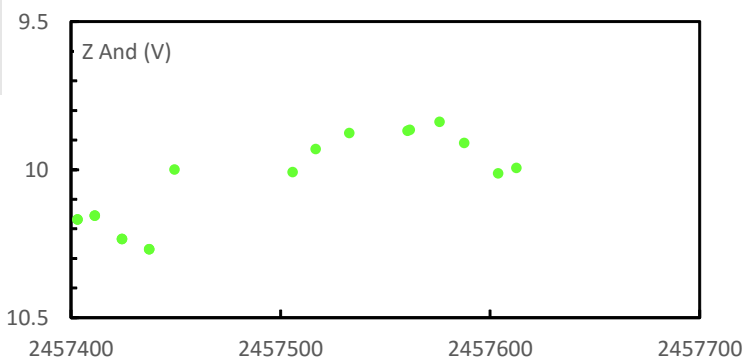
Coordinates (2000.0)	
R.A.	18 14 34.19
Dec	+20 59 21.3
Mag	13.0 (V)

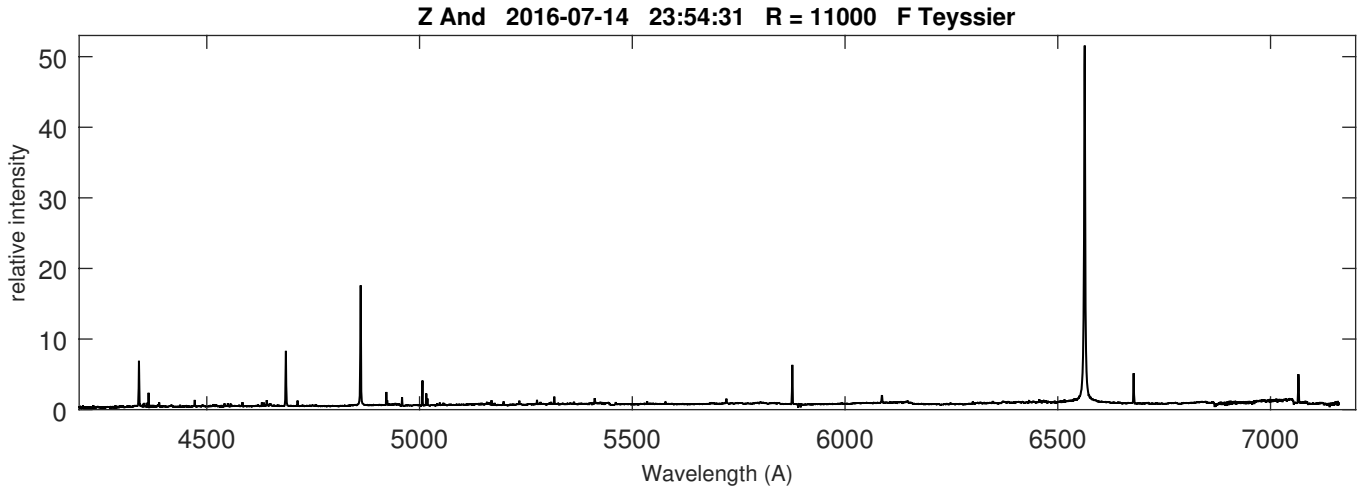


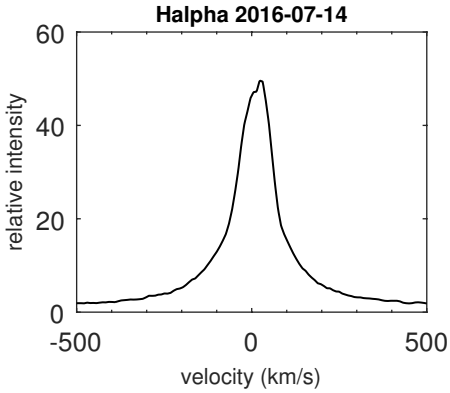
SYMBIOTICS

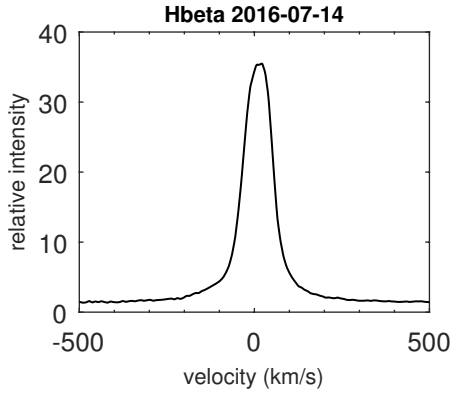
Z And

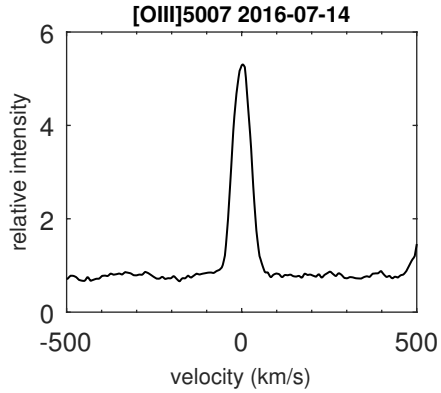
Coordinates (2000.0)	
R.A.	23 33 39.9
Dec	+48 49 06.0
Mag	10.0 (2016-08)

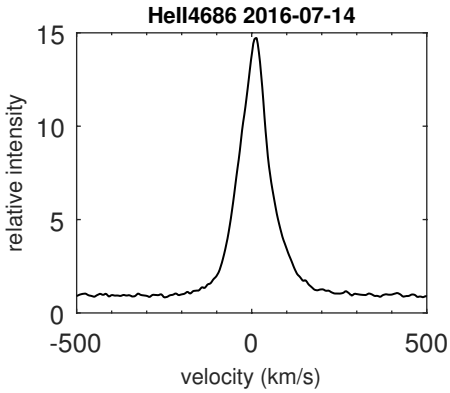


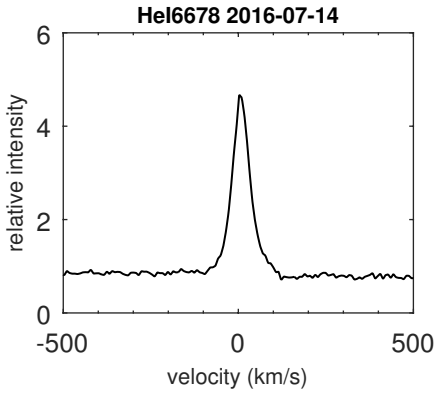


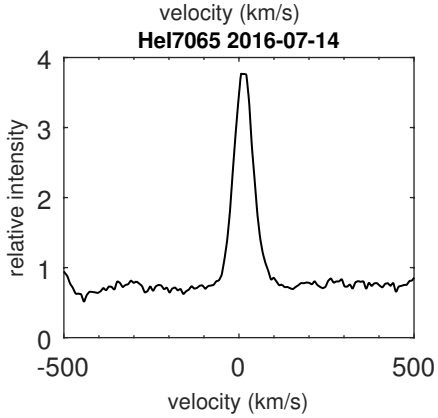


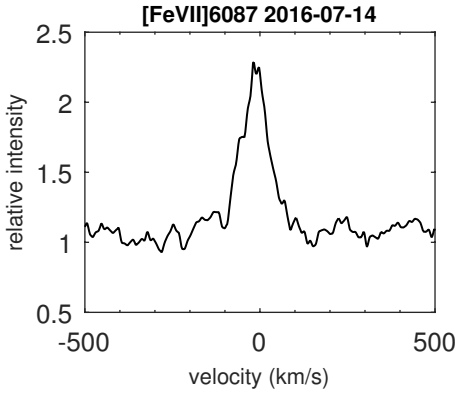


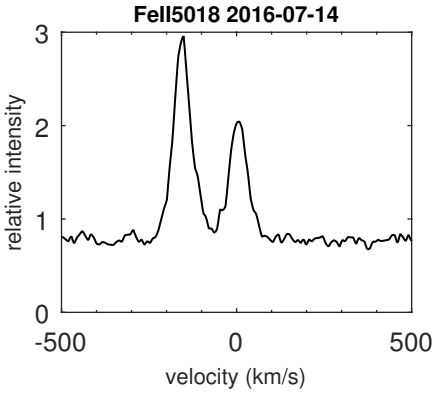












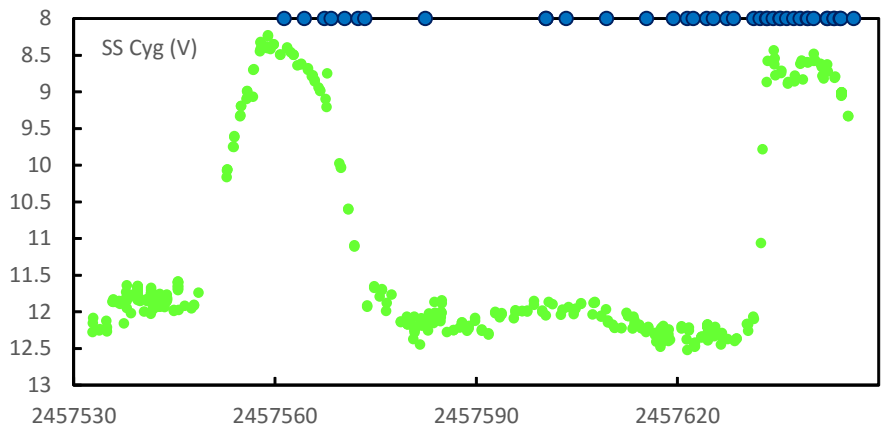
SS Cygni

Coordinates (2000.0)	
R.A.	21 42 42.8
Dec	+43 35 09.9
Mag	

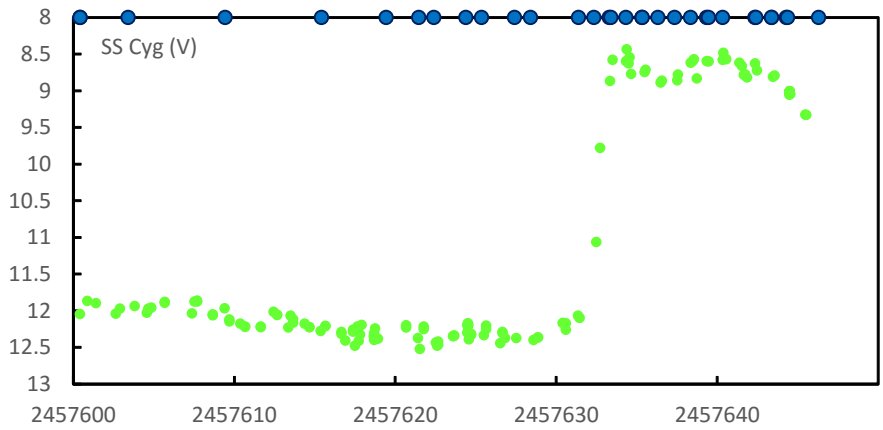
Monitoring of SS Cygni outbursts by Umberto Sollecchia and Joan Guarro

Umberto and Joan detected spectrocopically the second outburst

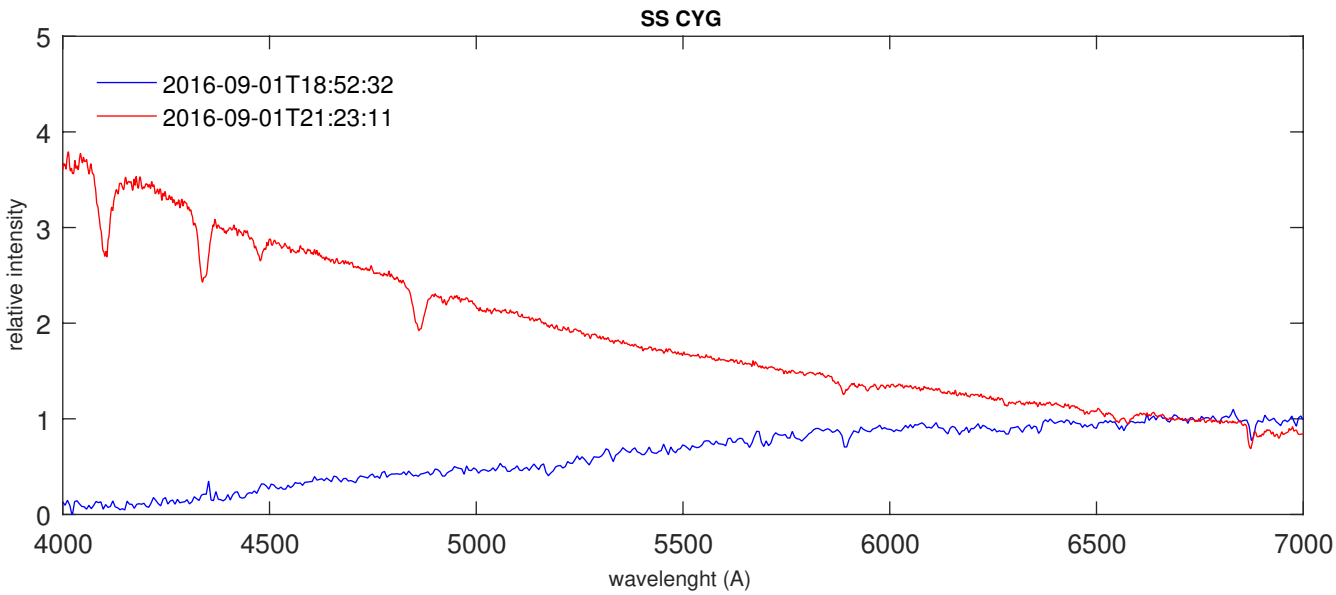
More results in the next letter



AAVSO lightcurve and ARAS spectra (blue dots) from June to now



ARAS spectra (blue dots) obtained by J. Guarro and U. Sollecchia for September outburst



Spectra obtained by U. Sollecchia and J. Guarro the 1st of September

http://www.astrosurf.com/aras/Aras_DataBase/DwarfNovae.htm

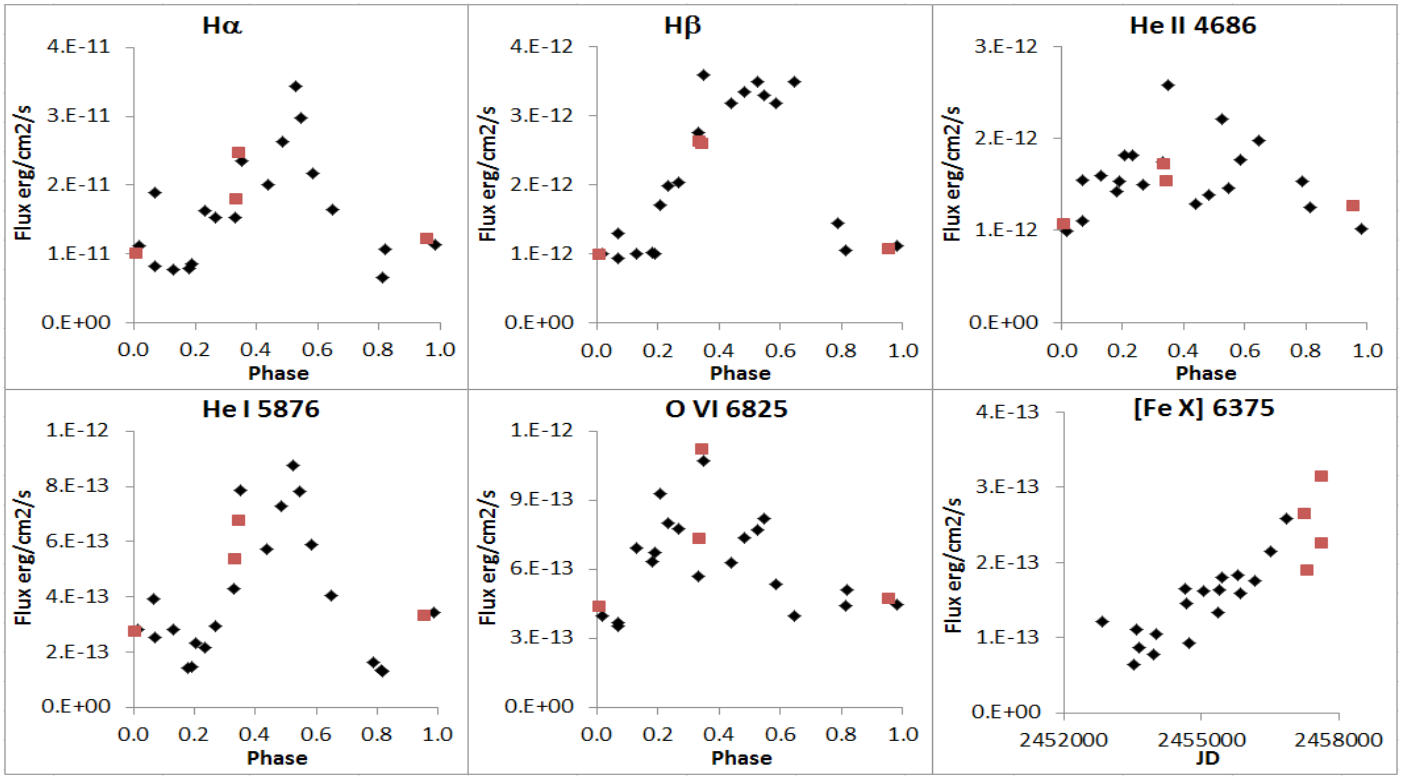
Phase dependence of emission line flux in the spectrum of V1329 Cyg

David Boyd

V1329 Cyg (also known as HBV 475) is classified as a classical S-type symbiotic binary star comprising a hot component, probably a white dwarf, with a cool M4-type giant, although it is also described as a symbiotic nova in which the white dwarf experiences slow nova-like outbursts. Recognition that it was not just an ordinary, rather faint, variable star only came following an outburst in the mid-1960s after which its spectrum was found to display strong emission lines on top of a red giant spectrum – the characteristics of a symbiotic star. Understanding the true nature of these objects is still a work in progress.

The orbital period of V1329 Cyg has been measured by radial velocity as approximately 955 days. The star has been observed spectroscopically by astronomers at the Sternberg Astronomical Institute in Moscow for the past 20 years. They have monitored the variation of its emission lines with orbital phase. There results have been tabulated in conjunction with a 2015 paper by Arkhipova et al. in Astronomy Letters and are available on Vizier at http://vizier.u-strasbg.fr/cats/J.PAZh.htx.

I have recorded four spectra of the star over the past year spanning about one third of its orbital period. These spectra have been flux calibrated using concurrently measured V magnitudes and the fluxes of the main emission lines measured. I thought it would be interesting to see how closely the line fluxes measured from my spectra agree with those reported by Arkhipova et al. This would also be a good test of the accuracy of my flux calibration. The plot shows fluxes for five of the prominent emission lines in the spectrum with values from Arkhipova et al. in black and my four measurements in red. The agreement is good. Arkhipova et al. also noted that the highly ionised [Fe X] 6375 line first appeared in the spectrum in the mid-1990s and has steadily strengthened, in contrast to the other emission lines which have tended to weaken. My measurements of the [Fe X] 6375 line indicate this trend is continuing.



V Sge 2016.07-08
Compiled by Peter Somogyi
from ARAS database
http://www.astrosurf.com/aras/Aras_DataBase/DataBase.htm

V Sge is yet a unique type of star, it's a binary of 0.514 days period. It is mentioned as a WN5-like (ASTRONOMY & ASTROPHYSICS Ser. 118). Spectral lines shape and their location confirming the WN5 theory, drawing the spectral lines from different articles over Vincent Bouttard's low resolution spectrum:

From now, let's locate the phases, using the emphemeris minimum formula.

Mader & Shafter (1997):
T(min) = 2,437,889.913(5) + 0.514195(4) x E

In other words, I was using JD-MID, taking the remnant part of this division: 'JD-MID' - 2437889.914) / 0.514195. I've found that results are consistent – however, a shift is being present, compared to an article from 1998:

The Astronomical Journal, 115:2566-2570, 1998 June
http://iopscience.iop.org/article/10.1086/300384/fulltext

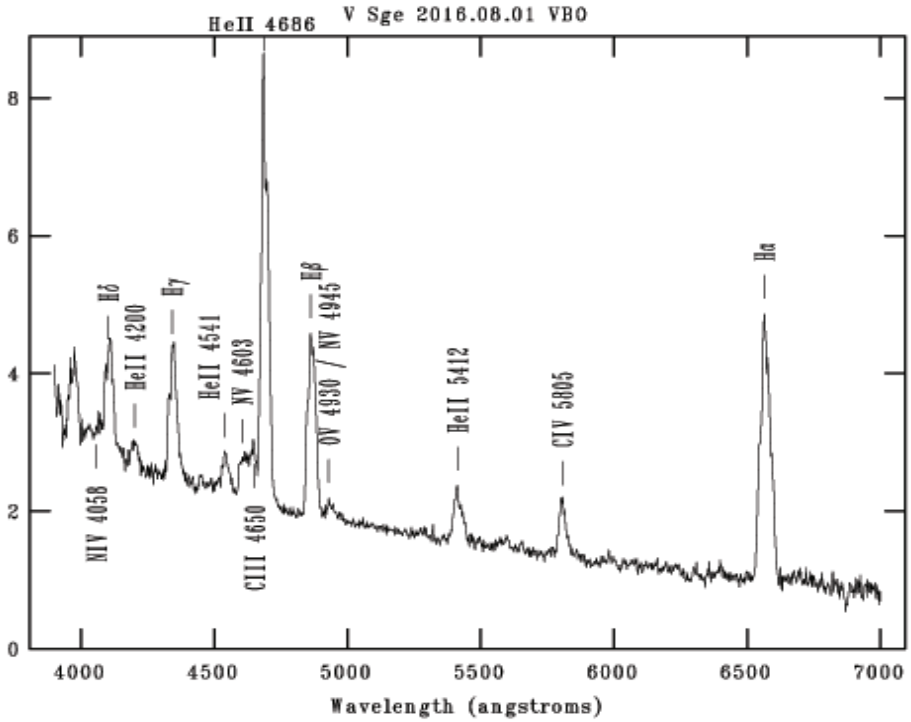


Fig. 1 - Line identification on a spectrum obtained by Vincent Bouttard (with a LISA at R = 1000) 01-08-2016

The next graphs will show the intensity variations over phases at medium resolution (x: velocity in km/sec, y: phase), equalised flux over the continuum to 1 (= substracted continuum then averaged to 1 while had cut above 0). H-alpha have been observed by more of us at different days, still there is a continuity:

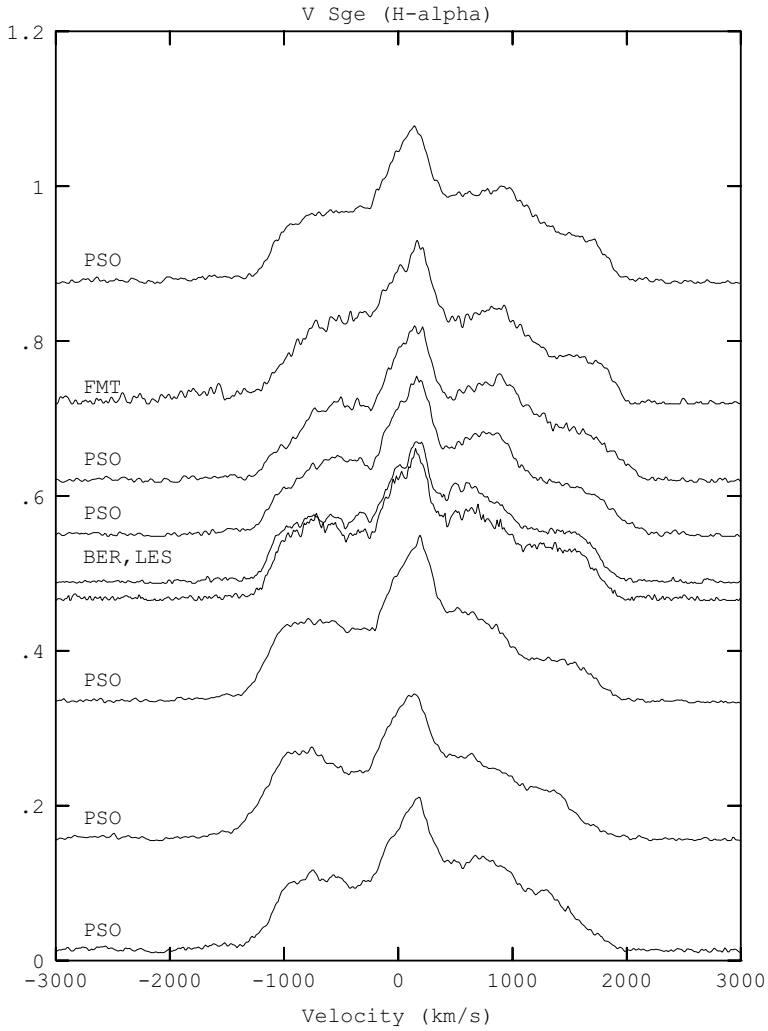


Fig. 2. H alpha line (in velocity unit)

Journal of observations

Phase	JD	OBS	Resolution	Exposure (s)
0.87	2457599.46	PSO	2445	4200
0.72	2457584.47	FMT	11000	2616
0.62	2457608.58	PSO	2497	2400
0.55	2457608.55	PSO	2505	3600
0.49	2457604.4	BER	5727	10711
0.47	2457596.68	LES	9000	7261
0.33	2457608.44	PSO	2537	3600
0.16	2457592.4	PSO	2475	3000
0.14	2457608.33	PSO	2669	3600
0.01	2457593.36	PSO	2525	3000

PSO : Peter Somogyi - FMT : François Teyssier - BER : Paolo Berardi - LES : Tim Lester

Unluckily, Paolo Berardi and Tim Lester has almost the same phase – even if shooting at different day, anyway the velocities look to be similar. It must be noted that 1 hour (~3600 s) covers here 0.08 phase shift.

As for the strongest HeII 4686 and H-beta, I was able to collect a serie of 5 minute exposures resulting in the following 2D picture (both prominent features was fit at the same time, scaled 400% vertically): Phase: 0.368 – 0.676 bottom to up.

Fig. 3

I think the H-alpha chart is just fully in sync with this. (Of course, black lines mean I was not able to collect any data from that time.) The brighter rotating feature should be new, at least when comparing to an earlier observation I've found (same article: 115:2566-2570, 1998 June). These graphs are prepared to be compareable with that article.

Now let's try to search for a unique line, say C IV 5805 (near HeII 5412) looks yet to be reachable with my instument:

I

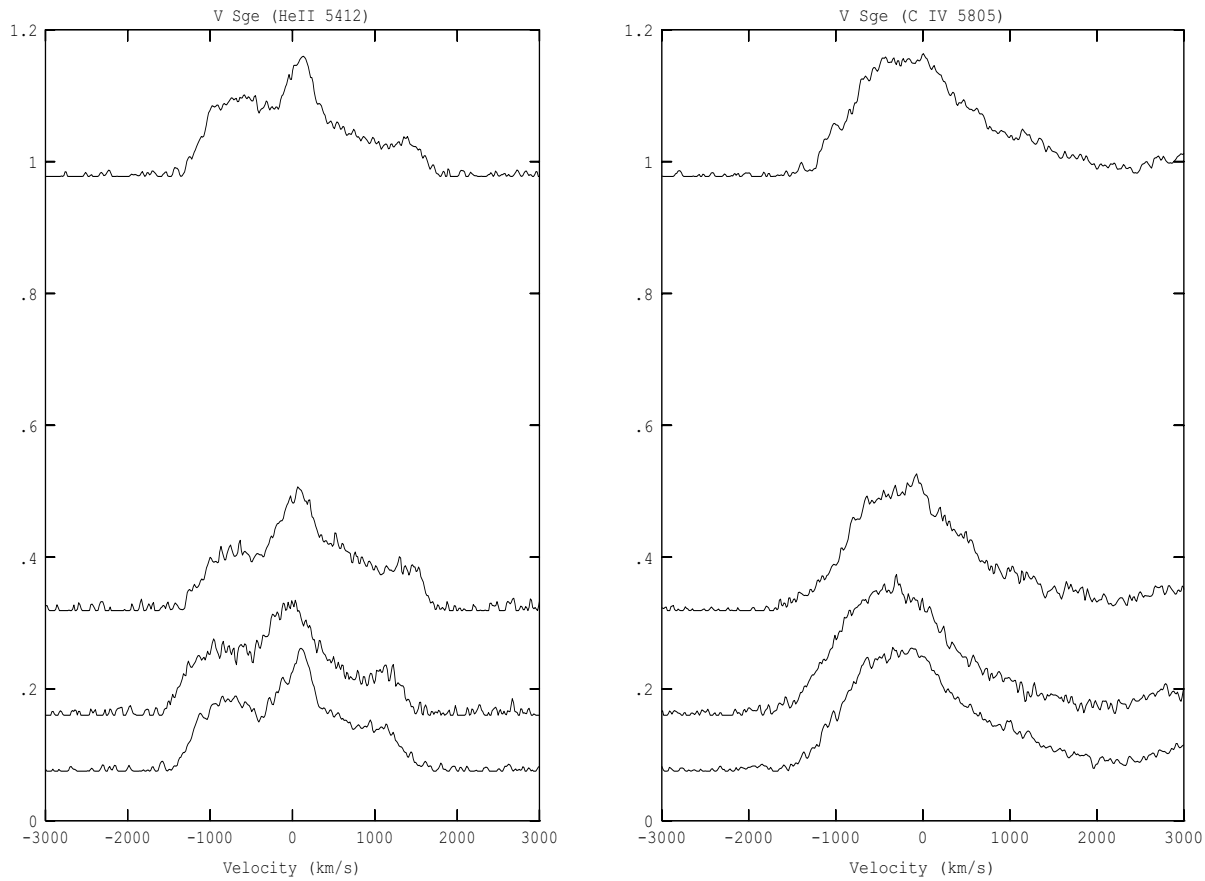


Fig. 4 - He II 5412 and C IV 5805

I was capturing the above 4 observations at R~2000 with the same 600/mm grating in the Lhires III. The strange is, that this feature is much narrower (+/- 1000) and changes very differently – unlike HeII 5412 that does change in sync with the major lines (both having similarly low SNR).

Besides medium resolution data, there was a low resolution absolute flux measurement serie made by Umberto Sollecchia on 2016.08.03. I've extracted absolute flux values of the emission lines, removing the continuum by substraction (NOT division, it's not EW). Did the same integration just for the continuum separately within 4000-7000A. Here are the results, phases calculated and noted in the title:

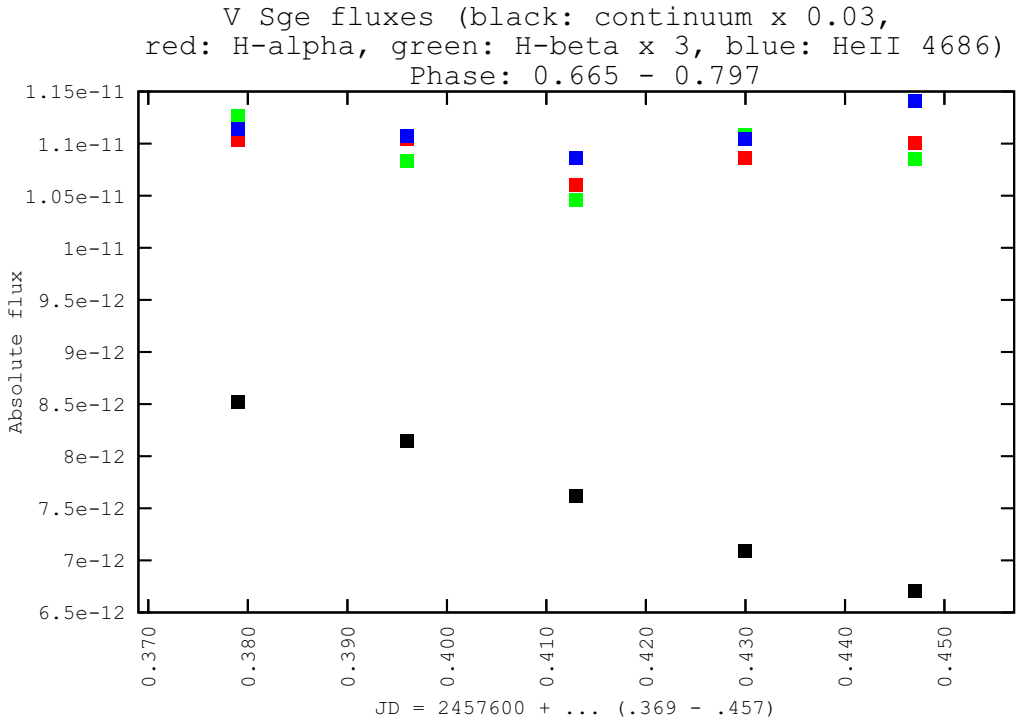


Fig. 5 - Balmer lines and continuum flux in U. Sollechia's series (03-08-2016)

Continuum was multiplied by a well chosen constant for each diagram to be able to show them together. These all suggest there was no direct relation in the emissions and continuum drop.

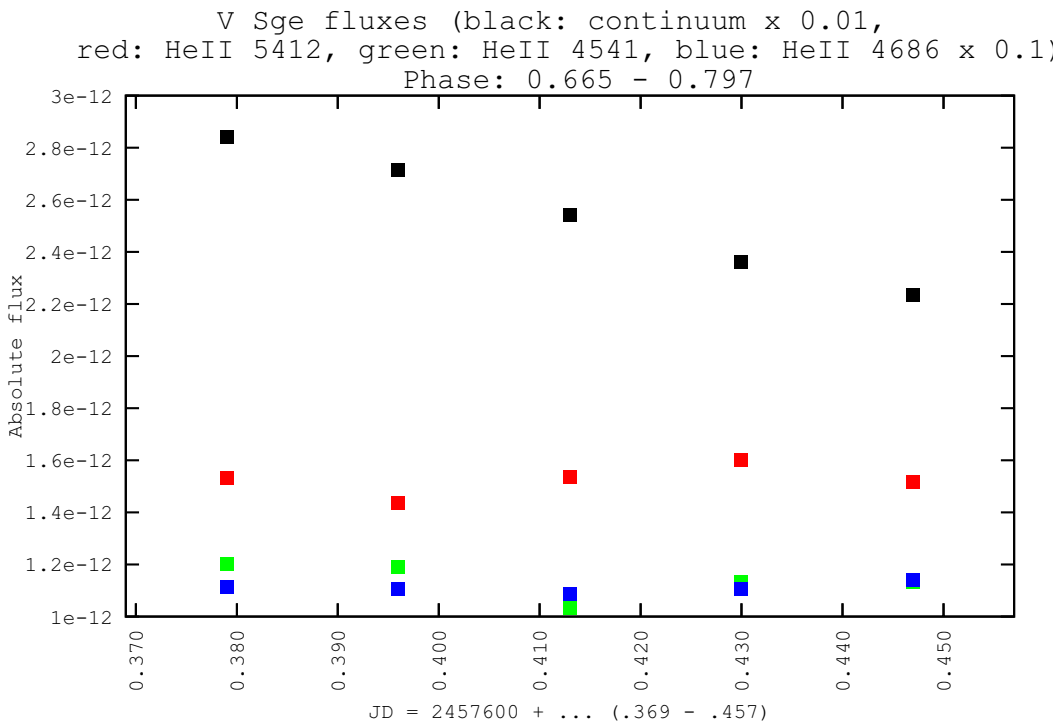


Fig. 6 - He II lines and continuum flux in U. Sollechia's series (03-08-2016)

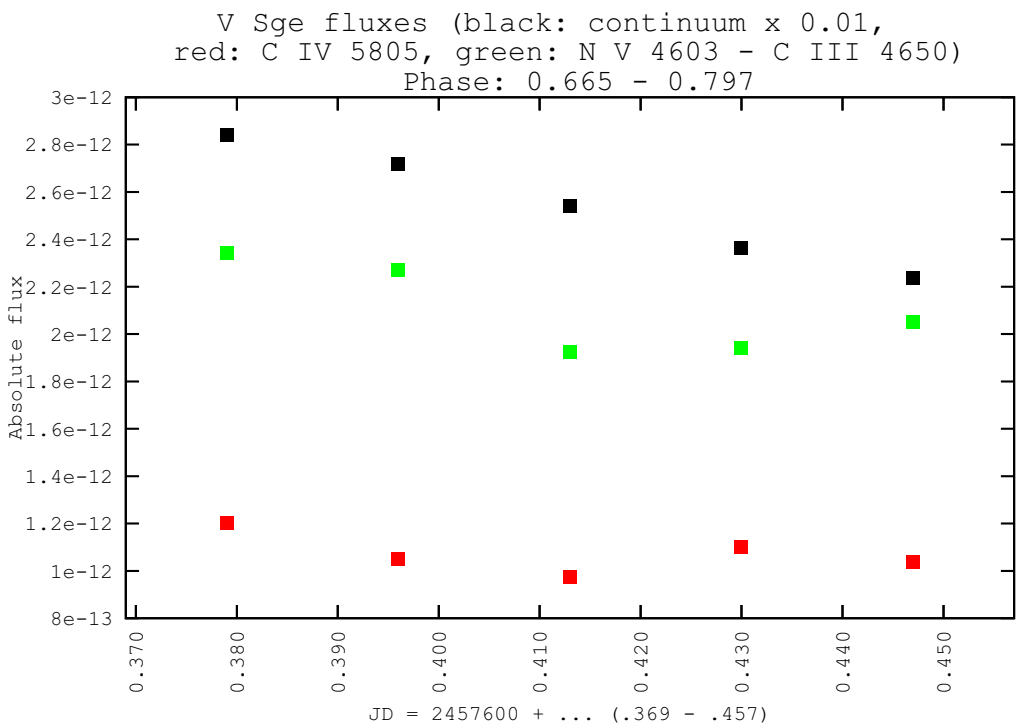


Fig. 7 - Same as Figure 5 for C IV 5805 N V 4603 and C III 4650

The flux units are in erg/cm2/s/A (anyway just showing the integrated values directly from .fit files, no unit conversion happening anywhere during my calculations).

Summary of my notices:

– phases still apply nicely, but there seems to be a visible shift since 1998

– a (new?) bright rotational feature present, see H-beta graph and H-alpha series made by multiple observers

– C IV 5805 has much lower velocities and very different changes in shape

Observations of V Sge in 2016 :

Peter Somogyi, Paolo Berardi, Umberto Sollecchia, Tim Lester, François Teyssier

References:

Time-resolved Spectroscopy of V Sagittae
Marcos P. Diaz
Publications of the Astronomical Society of the Pacific, Vol. 111, No. 755 (January
http://www.jstor.org/stable/10.1086/316289

The peculiar interacting binary V Sagittae: Brightness variations in 1932 – 1994
Simon, V.
Astron. Astrophys. Suppl. Ser. 118, 421-428 (1996)

H-alpha spectroscopy of the unusual binary V Sagittae
Gies, Douglas R.; Shafter, Allen W.; Wiggs, Michael S.
The Astronomical Journal, 115:2566-2570, 1998 June

Binary stars, atmospheric eclipses, absorption line studies, and the ζ Aur stars

Steve Shore

All of the objects we have been discussing in these newsletters have one common property: they are members of binary or multiple systems. Eclipses are a gift of fortune. If your line of sight intersects the orbital plane of a binary, with patience and persistence, you can be sure to catch when the two components align. The basic theory is hardly new, from the dawn of mathematical astronomy it has been a central concern. Ptolemy attempted to model the ephemerides of lunar and solar eclipses, Roemer used transit timings of the Jovian satellites to derive the speed of light, and without solar eclipses there wouldn't have been such overwhelming confidence so early in the correctness of General Relativity. But these are just the tip of the iceberg. As an initial point, as we've discussed in many contexts, stars are inherently fuzzy beasts. Their atmospheres, regardless of the compactness of the bulk of the stellar mass, cannot be ignored when treating interpositions of the system components. For high surface gravities, as for main sequence stars, the atmosphere is comparatively thin. The optically thin portion of the mass Let's go back a few steps to an earlier discussion about the formation of absorption lines. In a normal stellar atmosphere, the vertical pressure and temperature variations are produced by the combined requirements that the outer stellar layers are in mechanical and thermal equilibrium (unless the atmosphere is dynamical, as in RR Lyr stars or Cepheid variables). The gas is compressible so the density decreases with altitude and, becoming progressively more optically transparent, the temperature decreases because of increased radiative losses. A mean thickness, corresponding to the region near the photosphere where the absorption lines are formed, is about one pressure scale height. This is the distance over which the pressure falls by about 30% (to be precise, 1/e). The decreased temperature and density combine with the drop in the pressure to render the layer optically thin in everything but the cores of the strongest absorption lines. Remember, we normally view all this layer from the outside and, for unresolved sources, see a flux distribution that comes from the same geometric depth but different temperatures since we always see to the same optical depth. The result is limb darkening, that the edges of the hemisphere have lower emissivities and the effective angular radius of the star is lower than its geometric radius measured from the stellar center. This effect is evident in eclipses; the ingress and egress i not abrupt and the two components are not billiard balls. While the area covered in each eclipse (primary or secondary) is the same, the stars are viewed through each other's atmospheres an this leaves a spectroscopic signature. The problem is that the eclipse of two main sequence or even subgiant stars will show only a small effect o this extended thin region because if its thinness relative to the stellar radii. Despite the difference between the line of sight at primary and secondary, for compact atmospheres there is little spectroscopic evidence of the transit. If, however, we have a system with a main sequence star and a companion white dwarf, – like VV471 Tau (hot white dwarf plus main sequence or subgiant K companion, or FF Aqr where the "normal" star has a strong enough magentic field that the corona is structured) – the degenerate star is so compact that it's light is like a pencil a beam passing through the main sequence star's atmosphere. The atmosphere of the main sequence star, no matter how thin, is thicker than the WD radius and it leaves a spectroscopic signature at ingress and egress (and perhaps even at mid-eclipse if this is not total). You know that such systems are quite rare and unusual. When the WD is close enough it is surrounded by an accretion disk produced by mass transferred from the companion and, consequently, has an effective photosphere that is larger than the star by a lot. But in these rare cases, the line of sight may pass through the chromosphere or coronal loops of the K star and these are seen in absorption projected against the WD. The ζ Aur systems, so named for their prototype (which, for once, really is a good general example) are unusual systems among the crop of Galactic binaries. First, they have very long periods, which isn't so remarkable, but we know what those periods are. Unlike the symbiotic stars, for which the periods are years, these are decades. They're known because they eclipse, the timescales for which are also years. The spectroscopic signature of an atmospheric eclipse is not that different from a sunset. Visible region absorption lines are different from those in the UV, coming generally from ex-

cited states, so the both collisions and pumping from the UV govern the level populations and whether you see emission lines. VV Cep is particularly messy because, like Aur, it isn't a pair of otherwise isolated stars that happen to orbit each other. There's active mass transfer, although the mechanism is not the same in the two cases. The large orbital separation means the Rche surface is also very extended so any captured material can form a very extended disk, unlike the Algol systems for which the separation is only a few stellar radii. Circulation velocities in the disks are also relatively low compared to those we've discussed for cataclysmics: instead of thousands of km s−1 it's more like tens to hundreds. This makes a very substantial difference. In compact systems, the orbital motion and turbulence in the disks combine to heat the material and the disks are visible in XRs and the UV. The same holds for the inner disks of symbiotic systems, in both cases the central WD is so compact that the inner disk reaches temperatures of a few million degrees. In the ζ Aur systems, the mass gainer (less evolved member) is still a normal (well, maybe) main sequence (or nearly) star whose radius is a few hundred times that of a white dwarf so for the same mass, the velocities are a factor of at least 30 less at any relative radius. Even if the gainer is more massive (B stars are more massive than WDs) it's only by a few and the velocity scales with the square root of the mass, really a negligible difference relative to the compactness. So the disks in these wide systems are more or less passive, they are heated and ionized by the central star without substantial internal energy generation. Everything we've discussed about disks in the compact systems, other than energy generation, applies here. The ionization of the disk, and collisions, produce the emission in Hα and the other Balmer lines. The matter is dense enough and hot enough from this illumination that the Lyman series absorption in the UV produces emission at the optical lines, and the densities are low enough that there isn't strong collisional damping. So in the special cases of Aur and VV Cep, the disks are separately varying emitting regions that are also probed by the eclipses. One quick plea here. The emission is always lovely, but atmospheric eclipses are more important for the rich absorption line contributors and these require observing as much of the spectrum as possible and with the highest possible S/N ratio. The atmospheres of cool giants are more than merely inflated photospheres. The chromosphere is more intense than main sequence stars of the same surface temperature because of the stronger convection and more intense heating of the outer atmosphere. This is one of the central motivations for observing these stars. The chromosphere, in this spectral range, is usually only evident in those emission lines that coincide with strong photospheric absorption. For instance, the Ca II H and K lines have emission cores because of the temperature inversion and the equivalent width of the emission core correlates positively with the stellar luminosity (this is called the Wilson-Bappu calibration). Stellar activity, the generation of strong surface and envelope magnetic fields, alters the calibration because the magnetic activity increases the energy input by flares and loops and just about anything you can do to a field (as in the RS CVn stars and dMe dwarfs, but that's for another column). But for the normal chromospheres (if any giant is normal) the calibration is a pretty tight emiprical result and is used for distance estimates. The otehr, more important feature of the temperature increase is the appearance of other lines than absorption, again from Ca II. The infrared triplet, Ca II 8498, 8542, 8662˚A, is pumped by the upper state of the Ca II H and K resonance lines, and the emission doublet at 7291,7323˚Aresults from the deexcitation chain. You may have trouble reaching the first but the second is just within the range of the spectrographs. These are the main indicators of chromospheres although the IRT is just now being exploited (there was a brief interest in active stars in these transitions but that waned for a while because of photographic plate limitations, now with CCDs it's trivial!). I dwell on these because during the upcoming eclipse, it would be very interesting to get the correlation in the variation of these transitions. You see, they're coming from related levels so their relative variations become density indicators and also possible checks

of dynamics of the chromosphere. The spectrum of a chromosphere has a lot in common with the optically thick stage of a nova except for one important feature: the velocity is essentially zero (although, for the giants, this zone is the base of the wind so the velocity can already be slightly supersonic). Like a nova, the illumination is from the central star – in this case, from the photosphere of the hot component – but unlike the ejecta, the light has no effect on the local state of the gas. So you're really seeing a beam passing through lline of sight through a density and temperature gradient. The densities are high, between 1010 and about 1012 cm−3, which means the gas is almost in collisional equilibrium. The temperature of a chromosphere is higher than the underlying layers so there's a region in which you see emission lines because of the ow optical depth of the zone as a whole. On the other hand, remember that a fundamental law of radiative transfer is that when seen against a continuum, the spectrum consists of absorption lines. So the importance of the eclipse is that when you're seeing the B star through the wind, the lines are in absorption and you know precisely where they form because of the tangent line through the limb. When the eclipse is total, the same layers won't be projected against anything so you see emission. This is mainly in the ultraviolet because the emission is mainly from the lowest energy levels of the ions, in these chromospheres that means the first ionization stage of the metals. For an illustration, the figure shows the view through a chromosphere with sight lines varying from about 1018 to 1020 cm−2, so for a pathlength of about 1 R this covers the range of the densities I just noted. The models include all contributing metal lines from spectra I- IV for an assumed chromospheric temperature of about 6000K. The increased opacity, unlike the nova case, doesn't result in flux redistribution, the light is simply extinguished. This brings up another interesting point. When you see a star through the Earth's atmosphere, it twinkles. OK, you know this is because the medium is turbulent and the temperature fluctuations in the gas produce zones of different densities, hence refractive index, so the light paths are randomly deviated. This will also happen in the upper atmosphere (below the chromosphere) of the giants. Not because there's active convection there, as you might have in a planetary atmosphere, but from the waves that are generated by that deeper turbulent motion. The atmosphere passes all density variations outward, in waves, and these are cut by the line toward the B star as it slips behind the giant. Seeing the line variations on shorter timescales tells you about the convection and other heating contributors to the generation of the chromosphere. One more note. This month marks the release of the first Gaia results. This will be for about 2 million stars (OK, say WOW!) but only parallaxes. The next releases will include the IRT region and that will be an important supplement to anything related to the giants, these data should provide the final effective calibration of the luminosity indicators. Some references: For the IRT and discussion of chromospheres:

http://adsabs.harvard.edu/abs/2005A%26A...430..669A
http://adsabs.harvard.edu/abs/2007A%26A...466.1089B
http://adsabs.harvard.edu/abs/2016arXiv160802288L
http://adsabs.harvard.edu/abs/2011A%26A...535A..59B

Now to tie all this together. There is no essential, physical difference between a transit of an exoplanet and what we're talking about here except that the upper atmospheric temperature inversion results from the companion's light. The same treatment of spectrum formation holds. OK¡ it's more complicated because the solid angle of the hotter object is enormous relative to the planet and you can't make the same pencil beam inferences, but in principle it's the same. It is the same for a planetary occultation of a star. And one more thing. For you all, being symbiotic appassionati, the orbital modulation of the emission lines of the gainer in the wind accreting systems allows you to use them in precisely the same way through the wind of the giant. In those systems that eclipse, like EG And, or any binary with a more evolved, extended wind, the same time variations are possible from structures that cross the line of sight or vice versa.

Steve Shore, 17-09-2016

Peter gives a lovely analysis of the short timescale variations of this star. I'll just add a few points to help put this in context. The source is a well known enigma, and it's been elevated (as with all such chimera) to the status of a "type". So the V Sge stars, if such a class really exists, is defined by Steiner and Diaz as "*They show high-ionization species like O VI and N V; the emission of He II 4686 is stronger than twice the strength of Hβ. The orbital periods vary from 5 to 12 hr, and the orbital light curve can have shapes of either double eclipse or sine wave.*" In other words, they show neither strong hump structure, interpreted as a hot spot in an accretion disk produced by the stream impact, nor strong variability outside eclipse (or eclipses). There is some weak XR emission, and they are clearly accreting systems, but the line profiles (as Peter showed) are complex and show changes in structure on short timescales, comparable to the orbital period. Let me put it in perspective. Far UV observations of cataclysmics systems is quite rare, especially in the extreme UV because of their distance and the absorption of the interstellar medium, but V Sge was observable by one of the few EUV spectrometers ever flown – the UVS on Voyager 1 and 2 (yes, that Voyager!):

http://adsabs.harvard.edu/abs/1987Ap%26SS.130..235P http://adsabs.harvard.edu/cgi-bin/bibquery?bibcode = 1999MNRAS.310..963L

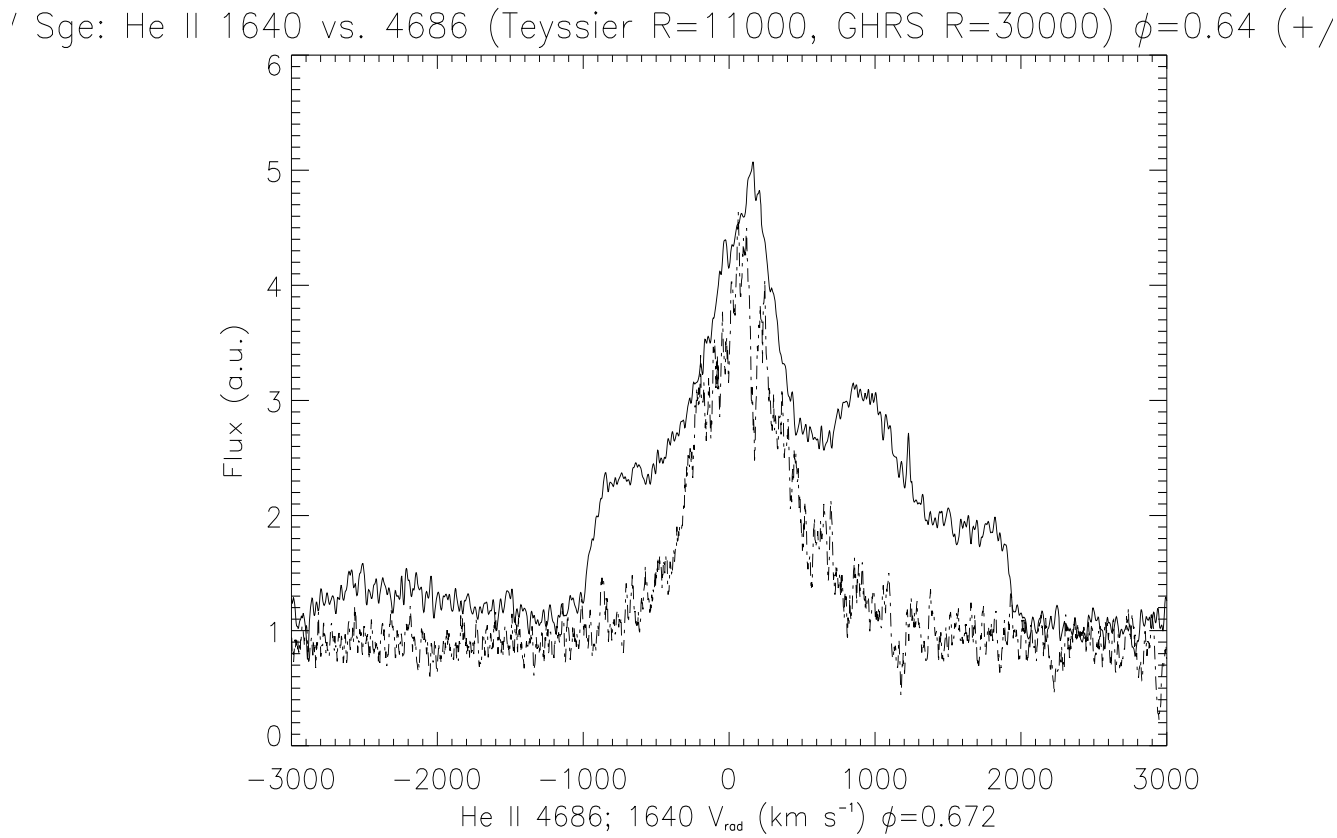
These systems, when they can be detected, show a tail in the EUV, below 900˚A(that is, below the ionization edge of neutral hydrogen) and UV lines that show variable P Cyg absorption on species like N V 1238,1242˚A and C IV 1548,1558 Å. Again, these change on single orbital timescales. The P Cyg indicates that there has to be an outflow, the strength of the absorption argues that the flow has to have a wide opening angle since the eclipses show that the system is seen nearly edge on. The ephemeris is fromL Lockley et al. 1999, MNRAS, 310, 963 (http://adsabs.harvard.edu/abs/1999MNRAS.310..963L) which gives a period slightly different from that used in Peter's summary, 0.514197 and a final combined ephemeris (with small period change):

TDB = 2437889.9154(2) + 0.514197(4)E −1.5(4)×10−10E2 (1)

This has the effect of shifting the phase earlier by about 0.1. That's what happens with these very short period beasts (well, not so short for a cataclysmic but for those used to periods of symbiotic stars, well, this is a blink of the eye). As a note, for this and all other cataclysmic variables, the standard catalog is found here: https://archive.stsci.edu/prepds/cvcat/Forms/varcatquery.html In the ARAS spectra the recombination lines of He II and the Balmer lines show identical structures and there is weak C III/N III 4620-4640 Å emission with what may be a complex profile. The Gies et al. study of the Hα variations led to a colliding wind model in which the two components, each endowed with a strong wind, produce a standing shock between them. They also argued that one of the stars is filling its Roche surface. This is a problematic interpretation since the wind from so distorted a star will be dominated by the stream. The optical profiles are, however, also consistent with a strong disk emission component. In the accompanying figures I've included two spectra around secondary minimum from the GHRS (from a single year's program in 1996) and a comparison, at the same phase, between the optical and UV He II profile. You see they're very different, the UV He II line is much more opaque (usually) but it shows nothing of the extended wings in the emission characteristic of all the optical profiles. The UV line is the analog of Hα, while the optical line is analogous to one of the higher hydrogen series (remember He+ is a single-atom species) and you'd expect the UV line to be stronger. The UV at the same phase shows the C IV 1550 Å doublet with a moderately strong P Cyg profile, although it's not simultaneous. All of your spectra agree with the sequence for Hα published by Gies et al. so there's something more going on here. Th main line width, the narrow core, is about what you'd expect from an accretion disk or wind, the velocity typical of a moderately luminous star. The wings could, on the other hand, indicate a nonspherical outflow from the plane of the system, I'll have some more ma-

terial on this in the next newsletter. Substantial changes because of epoch are ruled out by the similarity of your spectra with those in earlier papers, in particular the Hα studies. If this is a colliding wind case, there is something odd going on with the UV tracers that's not completely consistent with the optical and it is possible that it's because only one star, the hotter component, is contributing. If so, this would mean the core of the profile is one component and the other is giving the peaks whose symmetry is not centered on the main line (in other words, an accretion disk whose center of mass velocity is shifted). This, like R Ara and a very few other nova-like variables, shows hydrogen deficiency (this star is noted for the strength of its carbon lines).

Steve Shore, 17-09-2016



Comparison of He II 4686 (F. Teyssier, eshel R = 11000, 14-07-2016) and He II 1640 (HST/GHRS, R = 30000) at the same phase (Resp. 0.64 and 0.67)

Recent publications

Symbiotics

AG Pegasi - now a classical symbiotic star in outburst?

T.V. Tomov, K.A. Stoyanov, R.K. Zamanov

Optical spectroscopy study of the recent AG Peg outburst observed during the second half of 2015 is presented. Considerable variations of the intensity and the shapeof the spectral features as well as the changes of the hot component parameters, causedby the outburst, are discussed and certain similarities between the outburst of AG Pegand the outburst of a classical symbiotic stars are shown. It seems that after the endof the symbiotic nova phase, AG Peg became a member of the classical symbiotic starsgroup.

http://arxiv.org/abs/1608.02980

Historical light curve and the 2016 outburst of the symbiotic star StHalpha 169

Munari, Ulisse; Graziani, Mauro; Jurdana-Sepic, Rajka

Information Bulletin on Variable Stars, No. 6176, #1

http://arxiv.org/abs/1607.06312

Active phases and flickering of a symbiotic recurrent nova T CrB

Ilkiewicz, Krystian; Mikolajewska, Joanna; Stoyanov, Kiril; Manousakis, Antonios; Miszalski, Brent

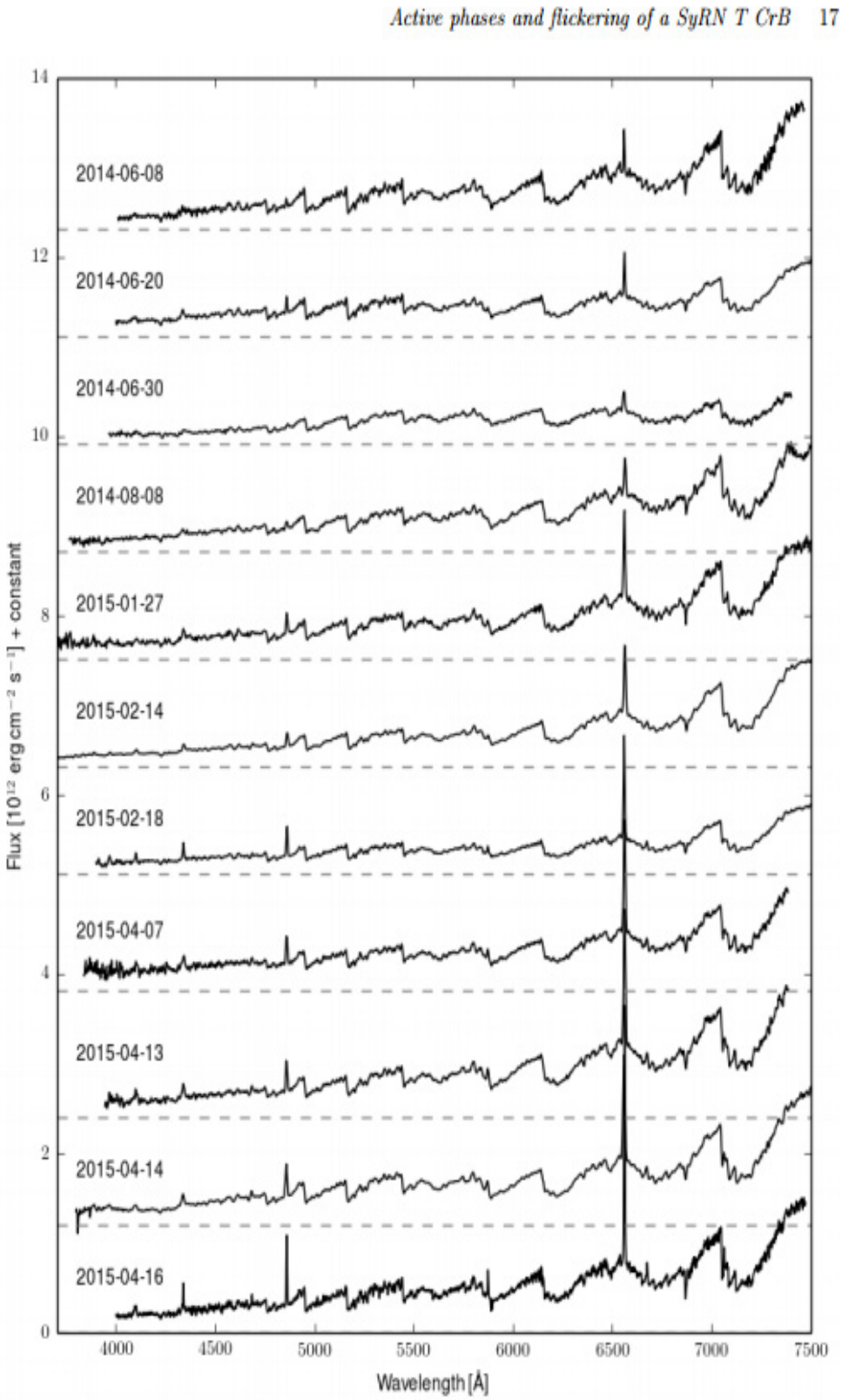
T CrB is a symbiotic recurrent nova known to exhibit active phases, characterised by apparent increases in the hot component temperature and the appearance of flickering, i.e. changes in the observed flux on the time-scale of minutes. Historical UV observations have ruled out orbital variability as an explanation for flickering and instead suggest flickering is caused by variable mass transfer. We have analysed optical and X-ray observations to investigate the nature of the flickering as well as the active phases in T CrB. The spectroscopic and photometric observations confirm that the active phases follow two periods of ~1000d and ~5000d. Flickering in the X-rays is detected and follows an amplitude-flux relationship similar to that observed in the optical. The flickering is most prominent at harder X-ray energies, suggesting that it originates in the boundary layer between the accretion disc and the white dwarf. The X-ray radiation from the boundary layer is then reprocessed by a thick accretion disc or a nebula into UV radiation. A more detailed understanding of flickering would benefit from long-term simultaneous X-ray and optical monitoring of the phenomena in symbiotic recurrent novae and related systems such as Z And type symbiotic stars.

http://arxiv.org/abs/1607.06804

Spectroscopic observations were obtained from the Astronomical Ring for Access to Spectroscopy database(ARAS). A log of observations is presented in Table A1. The data include mainly low resolution spectra covering a wide spectral range

We are grateful to all of the amateur astronomers that contributed their observations to this paper. In particular, we are thankful to members of the ARAS group for their wonderful work.

Recent publications



A page of the results used for Active phases and flickering of a symbiotic recurrent nova T CrB (Ilkiewicz, Krystian & al., 2016)

Spectra from ARAS DataBase : http://www.astrosurf.com/aras/Aras_DataBase/Symbiotics/TCrB.htm obtained by : S. Charbonnel, F. Teyssier, C. Buil, T. Lester, C. Revol, J.P. Masviel, J. Montier, D. Boyd, J. Guarro, P. Somogyi, K. Graham, Dong Li, V. Bouttard

About ARAS initiative

Astronomical Ring for Access to Spectroscopy (ARAS) is an informal group of volunteers who aim to promote cooperation between professional and amateur astronomers in the field of spectroscopy.

To this end, ARAS has prepared the following roadmap:

• Identify centers of interest for spectroscopic observation which could lead to useful, effective and motivating cooperation between professional and amateur astronomers.
• Help develop the tools required to transform this cooperation into action (i.e. by publishing spectrograph building plans, organizing group purchasing to reduce costs, developing and validating observation protocols, managing a data base, identifying available resources in professional observatories (hardware, observation time), etc.
•Develop an awareness and education policy for amateur astronomers through training sessions, the organization of pro/am seminars, by publishing documents (web pages), managing a forum, etc.
• Encourage observers to use the spectrographs available in mission observatories and promote collaboration between experts, particularly variable star experts.
• Create a global observation network.

By decoding what light says to us, spectroscopy is the most productive field in astronomy. It is now entering the amateur world, enabling amateurs to open the doors of astrophysics. Why not join us and be one of the pioneers!

Be Monthly report

Previous issues :
http://www.astrosurf.com/aras/surveys/beactu/index.htm

VV Cep campaign

http://www.spectro-aras.com/forum/viewforum.php?f=19

Submit your spectra

Please :
- respect the procedure
- check your spectra BEFORE sending them
Resolution should be at least R = 500
For new transcients, supernovae and
poorly observed objects,
SA spectra at R = 100 are welcome

1/ reduce your data into BeSS file format
2/ name your file with:
_ObjectName_yyyymmdd_hhh_Observer

Exemple: _chcyg_20130802_886_toto.fit

3/ send you spectra to
Novae, Symbiotics, Cataclysmics : François Teyssier
Supernovae, Mira : Christian Buil
VV Cep Stars, P Cyg, Microquasars : Olivier Thizy