Eruptive stars spectroscopy

Cataclysmics, Symbiotics, Novae

Eruptive Stars
Information Letter n° 47 #2020-03 28-12-2020
Observations of Jul. - Sep. 2020

Contents

Editors:

F. Teyssier, D. Boyd, F. Sims

Authors :

F. Teyssier, D. Boyd, F. Sims, S. Shore, J. Merc, J. Guarro, T. Lester, P. Dubovsky, T. Medulka, T. Bohlsen, K. Shank, C. Boussin, U. Sollecchia, C. Buil, , P. Somogyi, J. Martin, P. Velez, K. Shank,C. Eldridge, I. Diabassoura, P. Cazzato, S. Curry, F. Campos, K. Gurney, R. Leadbeater, J. Coffin, L. Franco , O. Garde, S. Charbonnel, T. Bohlsen, T. Ventura, H. Boussier, V. Lecocq, J. Michelet, P. Dubreuil, K. Shank, J., Michelet, M. Rodriguez, V. Marik

"We acknowledge with thanks the variable star observations from the AAVSO International Database contributed by observers worldwide and used in this letter."
Kafka, S., 2020, Observations from the AAVSO International Database, http://www.aavso.org

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Information Letter n° 47 #2020-03 28-12-2020
Observations of Jul. - Sep. 2020

Spectroscopic observations of novae in 2020-Q3

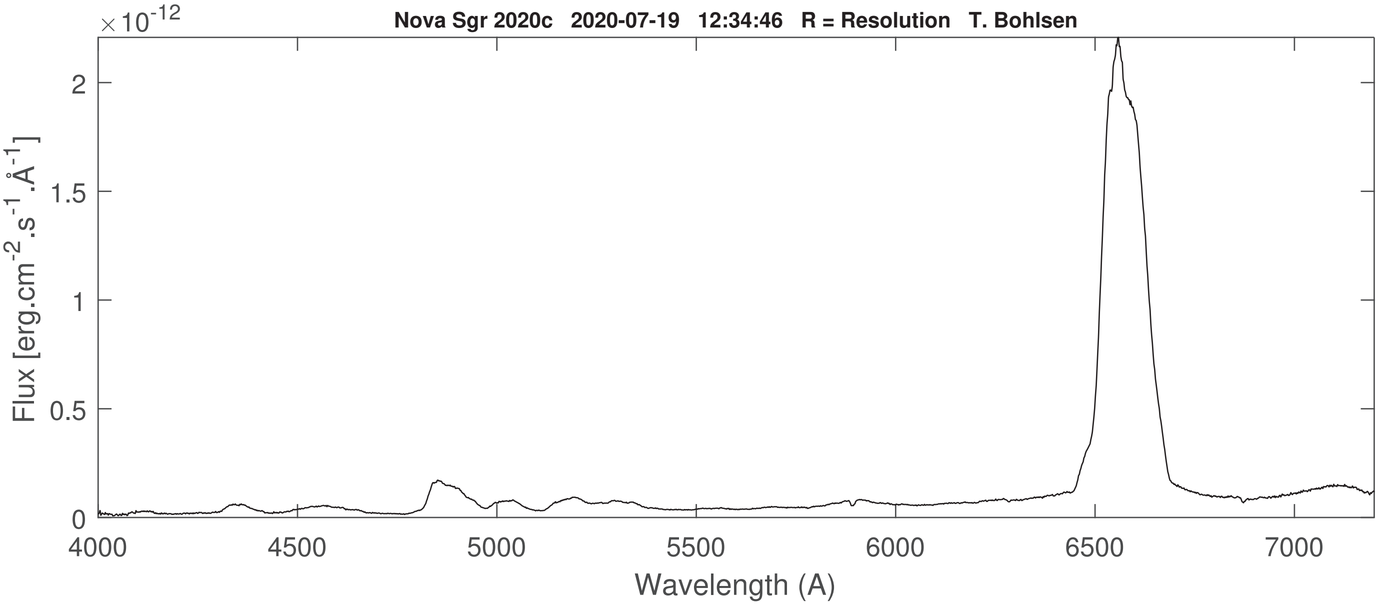
Authors: F. Teyssier, D. Boyd, F. Sims, P. Somogyi, P. Dubovsky, C. Boussin, C. Buil, T. Bohlsen, V. Lecocq, K. Gurney, J. Coffin, T. Lester, J. Guarro, J. Michelet, P. Dubreuil, T. Medulka, P. Cazzato, F. Campos, K. Shank,O. Garde, S. Charbonnel, R. Leadbeater

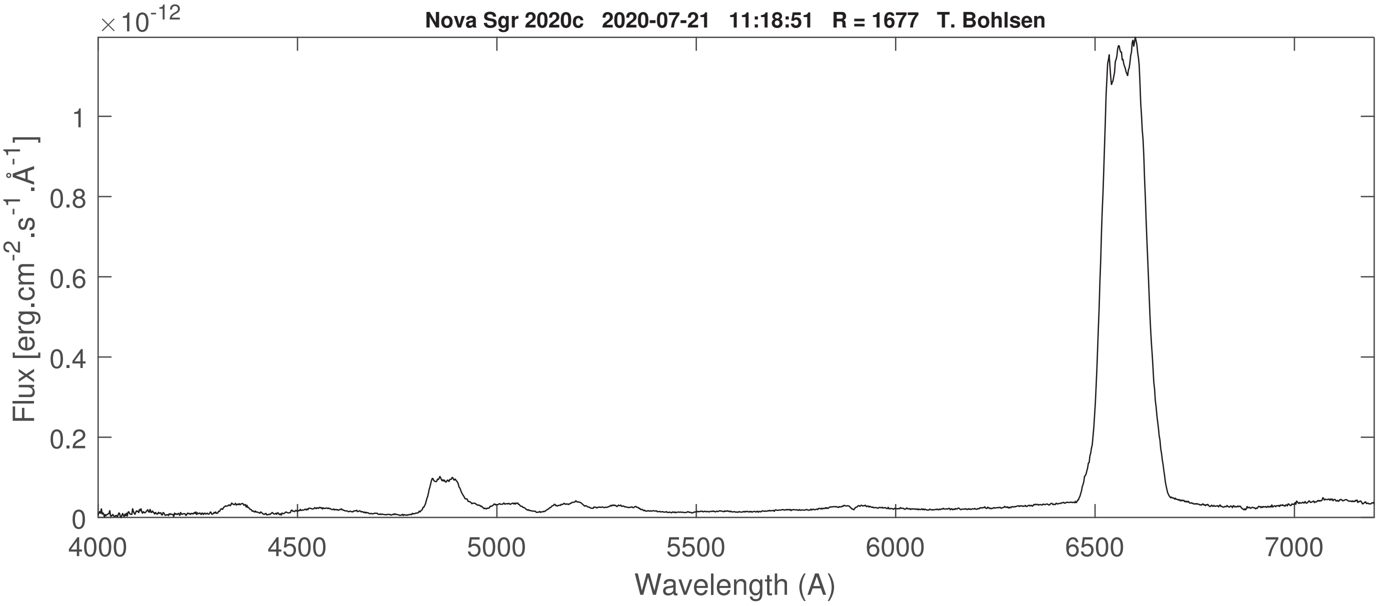
Abstract: Spectra were obtained of two novae during Q3:
Nova Sgr 2020 No.3 = Nova Sgr 2020c (V6568 Sgr) and Nova Cas 2020 (V1391 Cas).

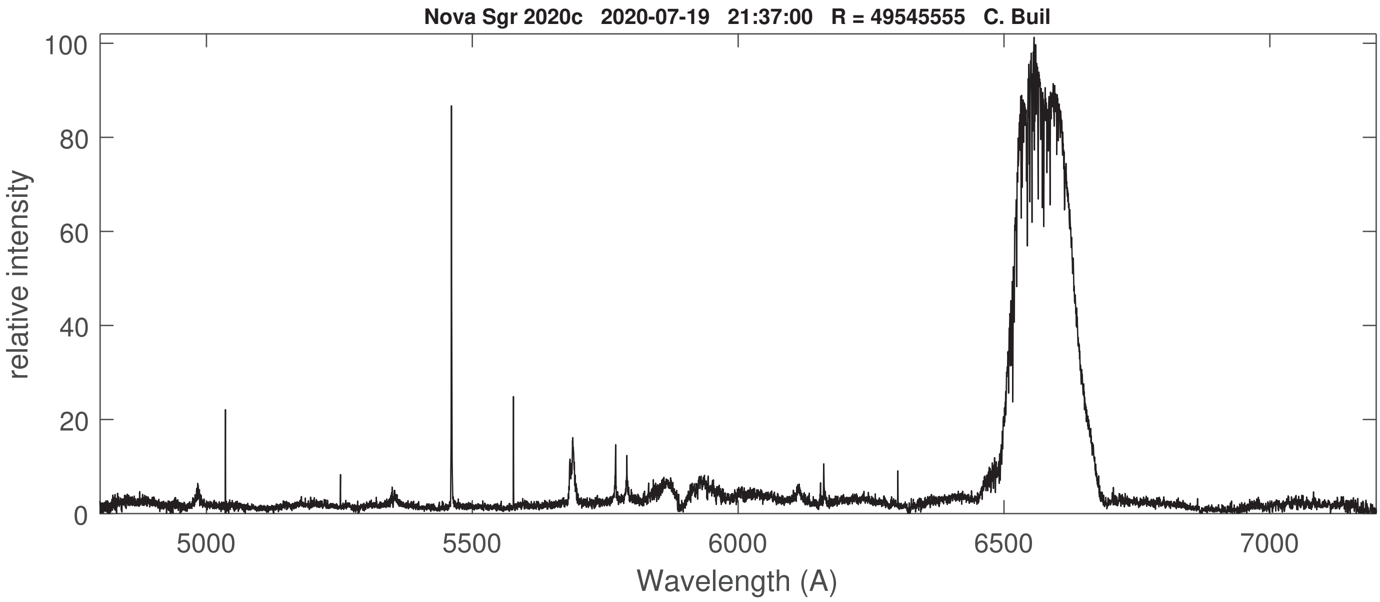
Stars: Nova Sgr 2020 No.3, Nova Cas 2020, V6568 Sgr, V1391 Cas

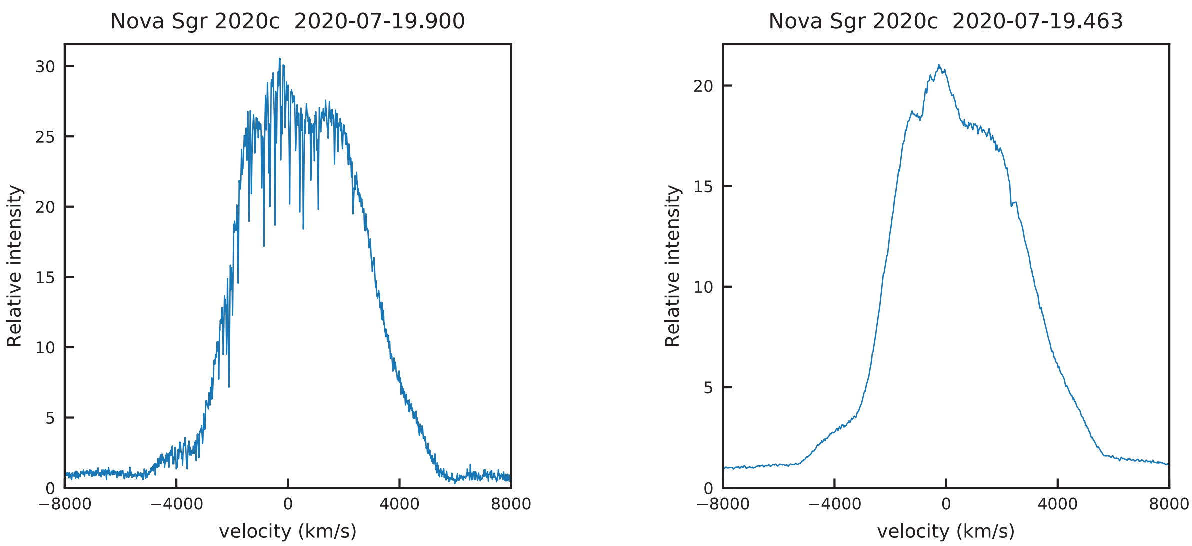
Nova Sgr 2020c

Coordinates (2000.0)	
R.A.	17 58 08.48
Dec	-30 05 37.6
Mag Max	xxx

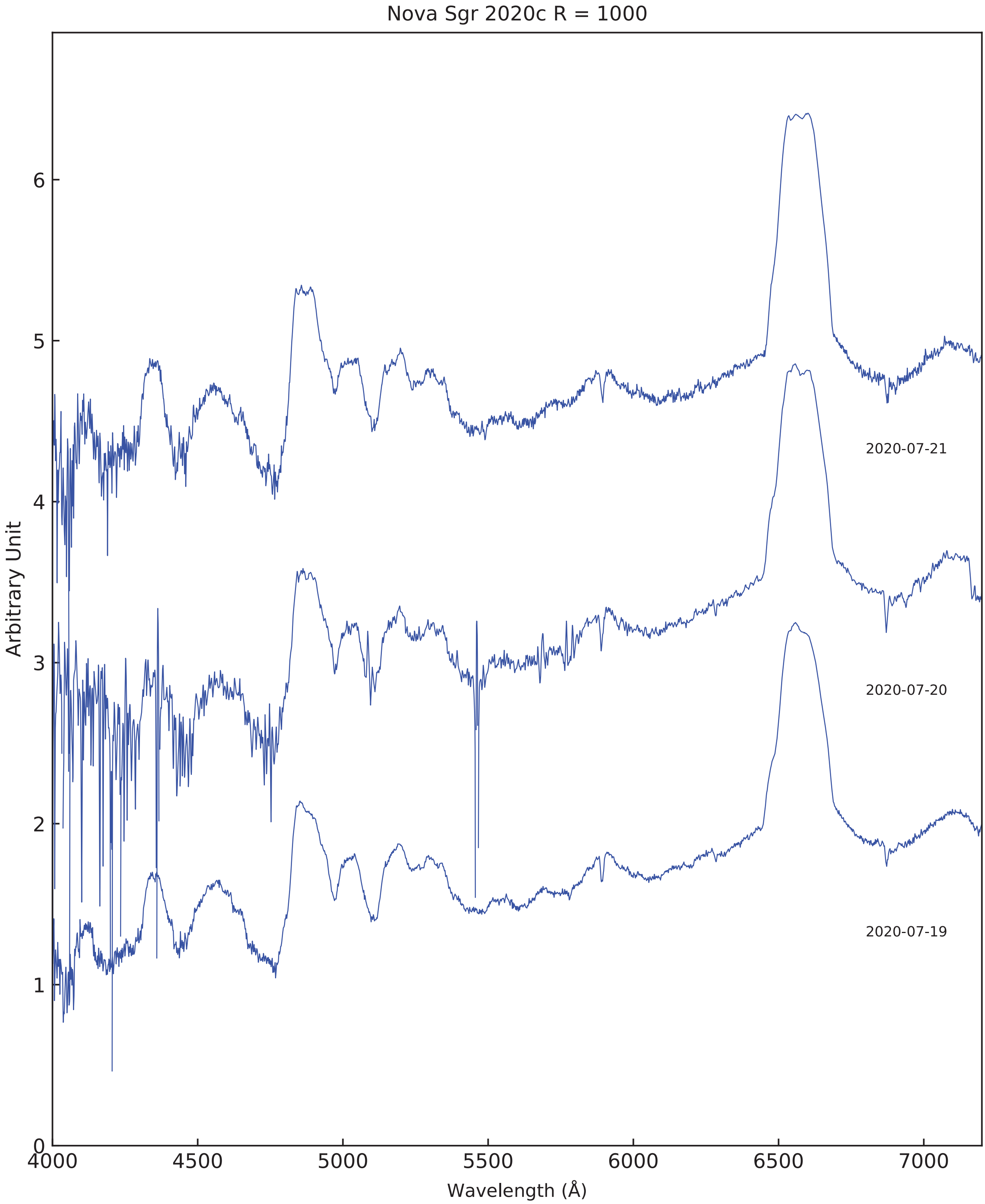








Ha profile.
Left: from Chistian Buil's spectrum
Right: Terry Bohlsen using a LOWRES spectroscope (R = 3800)

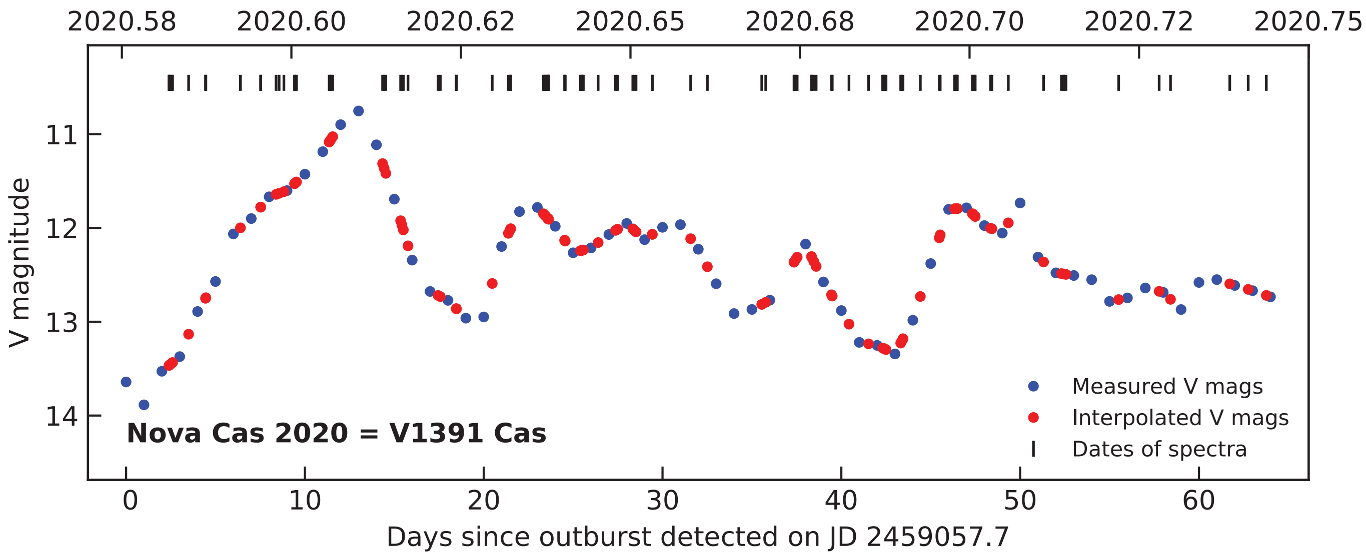


Evolution of the nova Sgr 2020c at R = 1000 (LISA spectroscope). Spectra are logarithmic scaled.
07-19 and 07-21: Terry Bohlsen
07-20: Keith Shank

Nova Cas 2020 = V1391 Cas

Coordinates (2000.0)	
R.A.	00 11 42.97
Dec	+66 11 19.0
Mag Max	10.75

Nova Cas 2020 (V1391 Cas; TCP J00114297+6611190), was discovered on 2020-07-27.9302 UT by S. Korotkiy (ATel #13903).
It reached its maximum luminosity on JD 24590752 at mag V =10.6 .
After a classical first decline (ΔV ~2.4) to mag V 13.0 on JD 245078 (t2 ~ 4 days),
it showed a series of flares during 113 days until JD 2459206 (Mag V = 13.9) before dimming steeply to mag V = 20.5 on JD 2459206 (ΔV = 0.44 mag/day).
198 spectra were secured by ARAS observers during the event
A few results are shown in this issue. The full coverage will be presented in the issue 2020-Q4

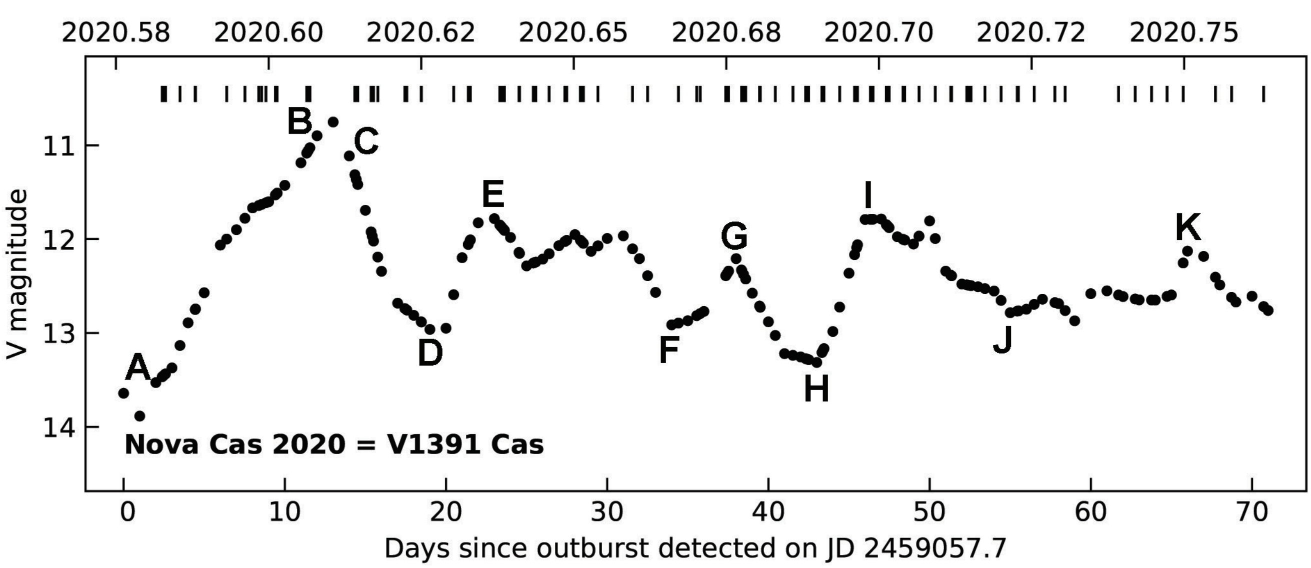


AAVSO lightcurve (selected and interpolated for the time of spectra)and ARAS spectra (2020)

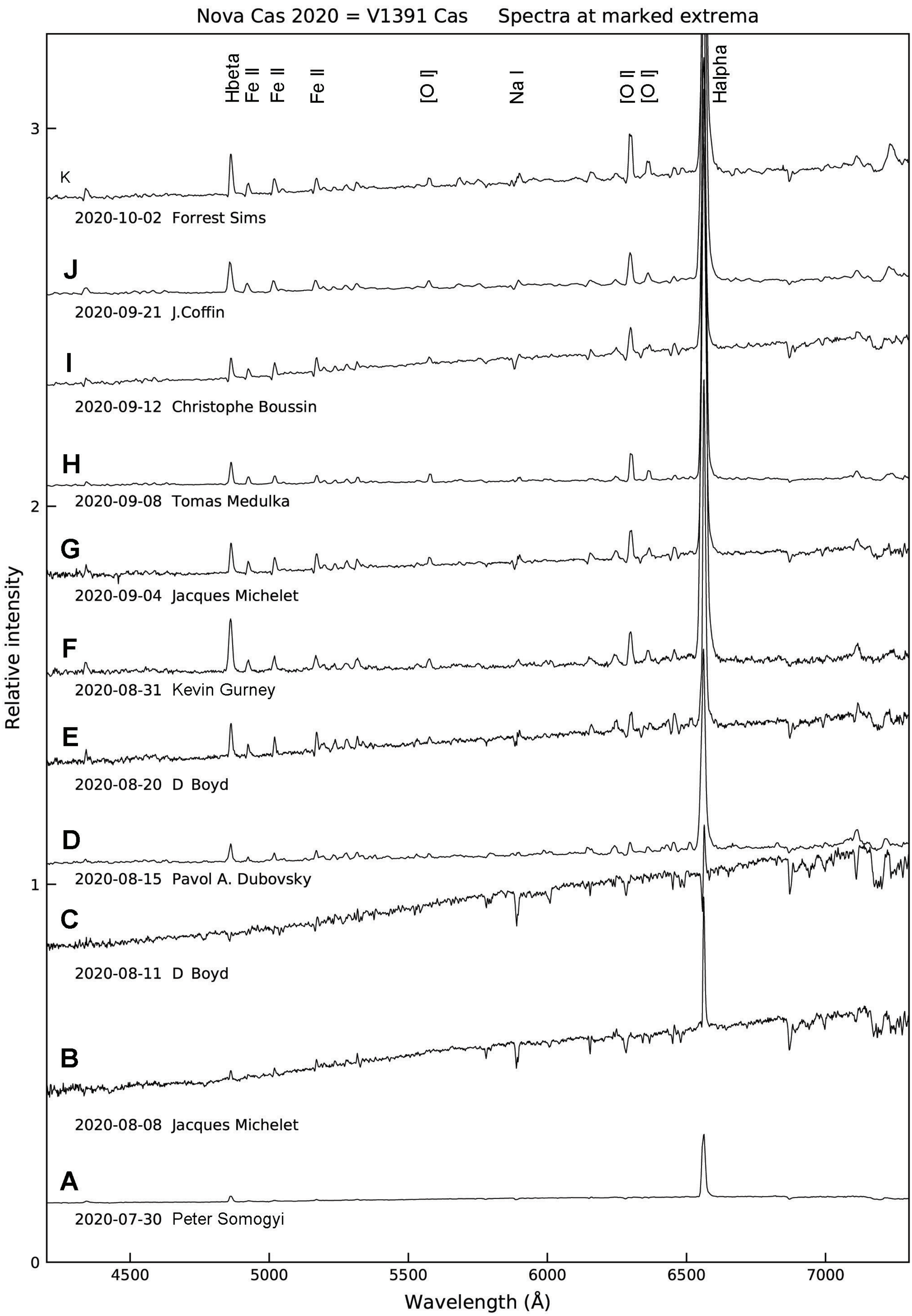
Log of observations during 2020-Q3

Observer	Date	JD	Res.	Range
P. Somogyi	30/07/2020	9061.333	3801.1	3801 - 7878
P. Dubreuil	30/07/2020	9061.405	4500.1	4500 - 6950
D. Boyd	30/07/2020	9061.405	4100.8	4100 - 7350
C. Buil	30/07/2020	9061.486	4300.1	4300 - 7100
R. Leadbeater	31/07/2020	9061.578	4765.4	4765 - 5494
P. Somogyi	31/07/2020	9062.434	3688.9	3688 - 7883
P. Somogyi	01/08/2020	9063.379	3685.8	3685 - 7883
D. Boyd	01/08/2020	9063.419	3900.2	3900 - 7380
D. Boyd	03/08/2020	9065.383	4050.3	4050 - 7380
C. Buil	04/08/2020	9066.466	3940.1	3940 - 7580
C. Boussin	05/08/2020	9066.501	3750.5	3750 - 7565
J. Michelet	05/08/2020	9066.501	4000.1	4000 - 7500
C. Boussin	06/08/2020	9067.522	3750.5	3750 - 7565
T. Lester	06/08/2020	9067.776	4030.6	4030 - 7955
D. Boyd	06/08/2020	9068.386	3900.9	3900 - 7380
P. Somogyi	06/08/2020	9068.441	4710.1	4710 - 5426
C. Boussin	07/08/2020	9068.502	3750.5	3750 - 7565
P. Somogyi	08/08/2020	9070.326	7459.4	7459 - 8162
J. Michelet	08/08/2020	9070.326	3999.9	3999 - 7699
P. Somogyi	08/08/2020	9070.414	7995.5	7995 - 8694
P. Somogyi	09/08/2020	9070.524	4784.4	4784 - 5499
J. Coffin	11/08/2020	9073.500	4000.5	4000 - 7000
P. Dubreuil	11/08/2020	9073.336	3800.3	3800 - 6929
D. Boyd	11/08/2020	9073.397	3900.7	3900 - 7380
P. Somogyi	12/08/2020	9074.312	7259	7259 - 7961
C. Buil	12/08/2020	9074.346	3996.1	3996 - 7580
P. Somogyi	12/08/2020	9074.421	8245.9	8245 - 8941
T. Lester	13/08/2020	9074.688	4030.6	4030 - 7955
P. Dubovsky	14/08/2020	9076.406	3850.3	3850 - 7590
V. Lecocq	15/08/2020		3699.7	3699 - 7377
P. Dubovsky	15/08/2020	9077.419	3900.3	3900 - 7590
C. Boussin	15/08/2020	9077.450	3750.5	3750 - 7565
C. Boussin	17/08/2020	9079.448	3750.5	3750 - 7565
P. Dubreuil	18/08/2020	9080.347	3799.3	3799 - 7501
K. Gurney	18/08/2020	9080.478	3821.1	3821 - 7368
V. Lecocq	18/08/2020	9080.478	3699.7	3699 - 7378
P. Somogyi	20/08/2020	9082.297	7256.4	7256 - 7960
D. Boyd	20/08/2020	9082.374	3900	3900 - 7380
P. Somogyi	20/08/2020	9082.407	8094.3	8094 - 8791
P. Somogyi	21/08/2020	9082.527	6461.3	6461 - 7171
P. Dubovsky	21/08/2020	9082.563	3900.3	3900 - 7590
O. Garde, S. Charl	21/08/2020	9082.591	3710.3	3710 - 7734
C. Buil	21/08/2020	9082.605	3845.9	3845 - 7498
P. Somogyi	21/08/2020	9083.487	4786.9	4786 - 5500
P. Dubovsky	22/08/2020	9083.510	4000.2	4000 - 7586
C. Buil	22/08/2020	9083.533	6099.2	6099 - 7162
P. Dubovsky	22/08/2020	9084.379	3800.3	3800 - 7590
C. Buil	22/08/2020	9084.453	6388.3	6388 - 8611
V. Lecocq	23/08/2020		3700	3699 - 7377
P. Cazzato	23/08/2020	9084.543	3803	3802 - 7299
V. Lecocq	23/08/2020	9084.543	3700	3699 - 7378
F. Campos	24/08/2020	9086.357	3826	3826 - 7364
C. Boussin	24/08/2020	9086.452	3751	3750 - 7565
P. Somogyi	25/08/2020	9087.286	8088	8087 - 8785
P. Somogyi	25/08/2020	9087.400	7260	7259 - 7963
C. Boussin	25/08/2020	9087.499	3751	3750 - 7565
K. Gurney	26/08/2020	9088.400	3820	3819 - 7381
P. Cazzato	26/08/2020	9088.404	3802	3801 - 7300
P. Dubovsky	29/08/2020	9090.546	3900	3900 - 7590
P. Dubovsky	29/08/2020	9091.473	3900	3900 - 7590
K. Gurney	31/08/2020	9093.406	3904	3903 - 7363
P. Somogyi	31/08/2020	9062.434	3633	3632 - 7883

Observer	Date	JD	Res.	Range
J. Coffin	02/09/2020	9094.532	4001	4000 - 7349
F. Sims	02/09/2020	9094.741	3718	3718 - 7297
P. Somogyi	03/09/2020	9096.332	3676	3675 - 7880
K. Gurney	03/09/2020	9096.356	3909	3909 - 7359
J. Guarro	03/09/2020	9096.404	4480	4479 - 8582
P. Dubovsky	03/09/2020	9096.475	3900	3900 - 7590
P. Somogyi	04/09/2020	9097.299	7261	7261 - 7966
J. Michelet	04/09/2020	9097.299	4000	4000 - 7500
P. Somogyi	04/09/2020	9097.375	8093	8093 - 8790
P. Somogyi	05/09/2020	9097.570	4748	4747 - 5463
J. Coffin	05/09/2020	9098.420	3801	3800 - 7200
C. Buil	05/09/2020	9098.450	3899	3899 - 7588
C. Boussin	06/09/2020	9099.402	3751	3750 - 7565
T. Medulka	07/09/2020	9100.495	3900	3900 - 7590
P. Somogyi	08/09/2020	9101.280	7257	7256 - 7960
J. Michelet	08/09/2020	9101.280	4000	4000 - 7499
D. Boyd	08/09/2020	9101.388	3901	3900 - 7380
P. Somogyi	08/09/2020	9101.406	8092	8092 - 8790
T. Medulka	08/09/2020	9101.446	3900	3900 - 7590
P. Somogyi	09/09/2020	9102.279	6547	6547 - 7255
K. Gurney	09/09/2020	9102.353	3909	3909 - 7384
T. Medulka	09/09/2020	9102.398	3900	3900 - 7590
P. Somogyi	09/09/2020	9102.418	5766	5766 - 6477
C. Boussin	10/09/2020	9103.390	3751	3750 - 7565
P. Dubovsky	11/09/2020	9104.310	3850	3850 - 7590
C. Boussin	11/09/2020	9104.446	3751	3750 - 7565
P. Somogyi	11/09/2020	9104.467	8081	8080 - 8780
P. Somogyi	12/09/2020	9105.300	7254	7254 - 7959
V. Lecocq	12/09/2020	9105.300	3700	3700 - 7377
P. Somogyi	12/09/2020	9105.379	8092	8092 - 8790
P. Dubovsky	12/09/2020	9105.406	3850	3850 - 7590
C. Buil	12/09/2020	9105.435	4637	4636 - 6839
C. Boussin	12/09/2020	9105.454	3751	3750 - 7565
P. Dubovsky	13/09/2020	9106.273	3900	3900 - 7590
V. Lecocq	13/09/2020	9106.273	3700	3699 - 7378
D. Boyd	13/09/2020	9106.328	3901	3900 - 7380
K. Gurney	13/09/2020	9106.409	3879	3879 - 7372
C. Boussin	13/09/2020	9106.437	3751	3750 - 7565
J. Coffin	13/09/2020	9106.455	3925	3924 - 7299
K. Gurney	14/09/2020	9107.318	3902	3901 - 7354
C. Buil	14/09/2020	9107.364	7390	7390 - 9555
P. Dubovsky	14/09/2020	9107.422	3900	3900 - 7590
P. Dubovsky	15/09/2020	9108.302	3850	3850 - 7590
V. Lecocq	15/09/2020	9108.302	3700	3700 - 7377
P. Dubovsky	16/09/2020	9109.316	3900	3900 - 7590
V. Lecocq	17/09/2020	9109.316	3700	3700 - 7377
P. Dubovsky	17/09/2020	9110.329	3900	3900 - 7590
P. Somogyi	18/09/2020	9111.265	7580	7579 - 8282
P. Dubovsky	18/09/2020	9111.323	3850	3850 - 7590
P. Somogyi	18/09/2020	9111.366	8243	8242 - 8939
J. Coffin	18/09/2020	9111.410	3899	3899 - 7370
P. Somogyi	19/09/2020	9111.512	4742	4741 - 5456
P. Dubovsky	19/09/2020	9112.397	3850	3850 - 7590
P. Dubovsky	20/09/2020	9113.384	3900	3900 - 7590
P. Dubovsky	21/09/2020	9114.402	3900	3900 - 7590
J. Coffin	21/09/2020	9114.478	3893	3892 - 7379
P. Dubovsky	22/09/2020	9115.450	3900	3900 - 7590
F. Sims	24/09/2020	9116.743	3710	3710 - 7296
D. Boyd	24/09/2020	9117.379	3901	3900 - 7380
F. Sims	28/09/2020	9120.691	3710	3710 - 7296
F. Sims	29/09/2020	9121.723	3709	3709 - 7297
F. Sims	30/09/2020	9122.735	3710	3710 - 7296



Letters in the above light curve mark the times at which the spectra in the following composite plot were recorded. The slope of the continuum increases when the nova brightens


Nova Cas 2020 = V1391 Cas Spectra at marked extrema
Hbeta
Fe II
Fe II
Fe II
[O I]
Na I
[O I]
[O I]
Halpha
K
2020-10-02 Forrest Sims
J
2020-09-21 J.Coffin
I
2020-09-12 Christophe Boussin
H
2020-09-08 Tomas Medulka
G
2020-09-04 Jacques Michelet
F
2020-08-31 Kevin Gurney
E
2020-08-20 D Boyd
D
2020-08-15 Pavol A. Dubovsky
C
2020-08-11 D Boyd
B
2020-08-08 Jacques Michelet
A
2020-07-30 Peter Somogyi
Relative intensity
0
1
2
3
4500
5000
5500
6000
6500
7000
Wavelength (Å)

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Cataclysmics, Symbiotics, Novae

Eruptive Stars
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Spectroscopic observations of symbiotic stars in 2020-Q3

Authors:
F. Teyssier, D. Boyd, F. Sims, J. Merc, J. Guarro, T. Lester, P. Dubovsky, T. Medulka, K. Shank, F. Campos, C. Boussin, C. Buil, J. Martin, C. Eldridge, L. Franco, I. Diabassoura, J. Michelet, P. Cazzato, S. Curry, T. Ventura, H. Boussier, P. Somogyi, P. Velez, K. Gurney, U. Sollecchia, V. Marik, M. Rodriguez, O. Garde, S. Charbonnel

Stars:
AG Dra, AG Peg, AX Per, BD Cam, BF Cyg, CH Cyg, CI Cyg, CM Aql, EG And, ER Del, FG Ser, HbHa 1704-05, HM Sge, IV Vir, LT Del, omi Cet, PU Vul, R Aqr, RR Tel, RS Oph, RT Cru, StHA 169, StHA 190, SU Lyn, T CrB, V1016 Cyg, V1329 Cyg, V1413 Aql, V443 Her, V471 Per, V694 Mon, YY Her, Z And,

Abstract: 33 stars, 276 spectra, 28 observers. CM Aql and V1413 Aql in ourburst. Monitoring of T CrB, RS Oph before nova outburst. RT Cru: detection of emission lines. Misclassified symbiotics: support to the New Online Database of Symbiotic Variables

List of observations during 2020-Q3

AG Peg	36
CH Cyg	34
RS Oph	32
V1413 Aql	26
Z And	21
T CrB	18
AX Per	13
AG Dra	11
BF Cyg	10
CI Cyg	10
R Aqr	9

V443 Her	8
CM Aql	7
EG And	7
HbHa 1704-05	5
RT Cru	3
StHa 190	3
ER Del	2
PU Vul	2
RR Tel	2
V1329 Cyg	2
V694 Mon	2

YY Her	2
BD Cam	1
FG Ser	1
HM Sge	1
IV Vir	1
LT Del	1
omi Cet	1
StHa 169	1
SU Lyn	1
V1016 Cyg	1
V471 Per	1

Requests for collaborative observations

Target	Request	Objective	Notes	Status
CH Cyg	Independently A. Skopal M. Karovska	Long term monitoring of a complex and highly variable object	The most spectra as possible especially at R = 5000 to 15000	Ongoing
AG Dra	R. Gàlis J. Merc L. Leedjarv	Study of outbursts and orbital variability	He II / Hβ Raman OVI	One spectrum a month
AX Per	R. Gàlis J. Merc	Ongoing outburst, declining	One spectrum per week (low and high resolution)	Ongoing
SU Lyn	K. Ilkiewitz	Study of the orbital variations of a newly discovered symbiotic	One spectrum per week Res: 5000 to 15000 Hα and [O III] 5007	
V694 Mon	A. Lucy J. Sokolovski M. Karovska	Detection of active phases	Balmer and Fe II lines	
R Aqr	M. Karovska	Studying ongoing eclipse	Hα [O III]	Ongoing
RS Oph	N. Shagatova A. Skopal	See Information letter 2019-Q2	More spectra needed in 2020	Continuing until nova event (2026 ?)
T CrB	B. Schaefer	Monitoring before expected nova outburst	One spectrum per week (low and high resolution)	Continuing until nova event (2023 ?)
Suspected	A. Lucy J. Solovski	Spectroscopic identification of new symbiotics in Southern sky	2 new symbiotics already identified by ARAS observers	Ongoing
Classification	J. Merc R. Gàlis	Classification of stars in the context of the new on line symbiotics database http://astronomy.science.upjs.sk/symbiotics/	http://spectro-aras.com/forum/viewtopic.php?f=37&t=2572	Ongoing

Symbiotics ARAS Database Update: 22-12-2020

67 stars
5896 spectra

#	Name	AD (2000)	DE (2000)	Nb	First	Last
1	EG And	0 44 37.1	40 40 45.7	166	12/08/2010	16/12/2020
2	AX Per	1 36 22.7	54 15 2.5	369	04/10/2011	14/12/2020
3	V471 Per	1 58 49.7	52 53 48.4	42	06/08/2013	25/11/2020
4	Omi Cet	2 19 20.7	-2 58 39.5	40	28/11/2015	09/11/2020
5	BD Cam	03 42 9.3	63 13 0.5	54	08/11/2011	22/11/2020
6	StHa 32	04 37 45.6	-01 19 11.8	8	02/03/2018	13/01/2020
7	UV Aur	05 21 48.8	32 30 43.1	90	24/02/2011	18/12/2020
8	V1261 Ori	05 22 18.6	-8 39 58	25	22/10/2011	17/12/2020
9	StHA 55	05 46 42	6 43 48	13	17/01/2016	05/12/2020
10	SU Lyn	06 42 55.1	+55 28 27.2	197	02/05/2016	18/12/2020
11	ZZ CMi	07 24 13.9	8 53 51.7	65	29/09/2011	13/04/2020
12	BX Mon	07 25 24	-3 36 0	68	04/04/2011	16/03/2020
13	V694 Mon	07 25 51.2	-7 44 8	429	03/03/2011	02/12/2020
14	NQ Gem	07 31 54.5	24 30 12.5	87	01/04/2013	18/12/2020
15	GH Gem	07 4 4.9	12 2 12	9	10/03/2016	15/02/2019
16	CN Cha	10 59 57	-79 57 01	1	08/12/2020	08/12/2020
17	SY Mus	11 32 10.0	-65 25 11.4	1	14/05/2020	14/05/2020
18	CQ Dra	12 30 06	69 12 04	45	11/06/2015	02/12/2020
19	RT Cru	12 34 53.7	-64 33 56.0	4	28/07/2019	09/08/2020
20	TX CVn	12 44 42	36 45 50.6	73	10/04/2011	02/12/2020
21	RW Hya	13 34 18	- 25 22 48.9	22	28/06/2017	22/05/2020
22	IV Vir	14 16 34.3	-21 45 50	15	28/02/2015	19/05/2020
23	T CrB	15 59 30.1	25 55 12.6	436	01/04/2012	05/10/2020
24	AG Dra	16 01 40.5	66 48 9.5	705	03/04/2013	15/12/2020
25	AS 210	16 51 20.4	-26 00 26.7	4	14/06/2018	06/07/2019
26	V503 Her	17 36 46	23 18 18	7	05/06/2013	06/07/2019
27	RS Oph	17 50 13.2	-6 42 28.4	133	23/03/2011	01/10/2020
28	V934 Her	17 06 34.5	+23 58 18.5	32	09/08/2013	01/06/2020
29	Hen 3-1341	17 08 36.5	-17 26 30.4	2	04/07/2019	07/07/2019
30	Hen 3-1342	17 08 55.0	-23 23 26.5	1	07/07/2019	07/07/2019
31	RT Ser	17 39 52.0	-11 56 38.8	3	26/06/2012	03/07/2019
32	AS 245	17 51 00.9	-22 19 35.1	1	15/07/2018	15/07/2018
33	AS 270	18 05 33.7	-20 20 38	7	01/08/2013	13/07/2019
34	AS 289	18 12 22.1	-11 40 07	3	26/06/2012	15/06/2018
35	YY Her	18 14 34.3	20 59 20	38	25/05/2011	12/08/2020
36	FG Ser	18 15 06.2	0 18 57.6	11	26/06/2012	12/07/2019
37	StHa 149	18 18 55.9	27 26 12	8	05/08/2013	31/08/2019
38	V443 Her	18 22 08.4	23 27 20	82	18/05/2011	01/06/2020
39	MWC 960	18 47 55.8	-20 09 12.4	2	03/08/2019	10/08/2019
40	AS 323	18 48 35.7	-06 41 10.4	2	02/07/2019	13/07/2019
41	FN Sgr	18 53 52.9	-18 59 42	8	10/08/2013	15/07/2018
42	CM Aql	19 03 35.1	-03 03 15.4	15	08/05/2020	04/12/2020
43	V919 Sgr	19 03 46.0	-16 59 53.9	9	10/08/2013	11/07/2019
44	V1413 Aql	19 03 51.6	16 28 31.7	59	10/08/2013	12/12/2020
45	V335 Vul	19 23 14	+24 27 39.7	12	14/08/2016	25/07/2019
46	BF Cyg	19 23 53.4	29 40 25.1	191	01/05/2011	25/10/2020
47	CH Cyg	19 24 33	50 14 29.1	852	21/04/2011	02/12/2020
48	HM Sge	19 41 57.1	16 44 39.9	15	20/07/2013	26/10/2019
49	QW Sge	19 45 49.6	18 36 50	12	14/08/2016	25/07/2019
50	Hen 3-1768	19 49 48.4	-82 52 37.5	2	16/05/2018	27/05/2018
51	CI Cyg	19 50 11.8	35 41 3.2	247	25/08/2010	23/11/2020
52	StHa 169	19 51 28.9	46 23 6	8	12/05/2016	01/07/2020
53	EF Aql	19 51 51.7	-05 48 16.7	1	11/11/2018	11/11/2018
54	HbHa 1704-05	19 54 42.9	+17 22 12.7	88	09/08/2018	26/10/2020
55	V1016 Cyg	19 57 4.9	39 49 33.9	27	15/04/2015	27/10/2020
56	RR Tel	20 04 18.5	-55 43 33.2	8	08/09/2017	19/11/2020
57	PU Vul	20 21 12	21 34 41.9	28	20/07/2013	01/11/2019
58	LT Del	20 35 57.3	20 11 34	23	28/11/2015	26/10/2019
59	StHa 180	20 39 20.6	-05 17 16.3	2	03/07/2019	06/07/2019
60	Hen 2-468	20 41 19.0	34 44 52.3	2	01/07/2019	11/07/2019
61	ER Del	20 42 46.4	8 40 56.4	17	02/09/2011	30/08/2019
62	V1329 Cyg	20 51 1.1	35 34 51.2	30	08/08/2015	03/11/2020
63	V407 Cyg	21 2 13	45 46 30	12	14/03/2010	18/04/2010
64	StHa 190	21 41 44.8	2 43 54.4	28	31/08/2011	08/06/2020
65	AG Peg	21 51 1.9	12 37 29.4	340	06/12/2009	12/12/2020
66	V627 Cas	22 57 41.2	58 49 14.9	38	06/08/2013	18/11/2019
67	Z And	23 33 39.5	48 49 5.4	252	30/10/2010	15/12/2020
68	R Aqr	23 43 49.4	-15 17 4.2	258	20/11/2010	01/12/2020

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

Symbiotics observed in 2020-Q3 (1/3)

Target	Observer	Date	λ min-max		Res
AG Dra	T. Medulka	05/07/2020	3900	7590	1067
AG Dra	C. Boussin	08/07/2020	3701	7566	501
AG Dra	D. Boyd	25/07/2020	3901	7381	1058
AG Dra	F. Campos	31/07/2020	3726	7215	905
AG Dra	J. Guarro	01/08/2020	4143	7747	10000
AG Dra	P. Dubovsky	11/08/2020	3800	7590	952
AG Dra	J. Guarro	15/08/2020	4065	7745	9500
AG Dra	T. Lester	16/08/2020	4031	7955	14000
AG Dra	P. Dubovsky	28/08/2020	3900	7590	921
AG Dra	D. Boyd	09/09/2020	3901	7380	1087
AG Dra	T. Lester	18/09/2020	4031	7955	14000
AG Peg	T. Medulka	10/07/2020	3900	7590	1053
AG Peg	D. Boyd	17/07/2020	3900	7380	1053
AG Peg	F. Teyssier	20/07/2020	3901	7369	11000
AG Peg	U. Sollecchia	22/07/2020	6493	6686	10223
AG Peg	T. Lester	25/07/2020	4031	7955	14000
AG Peg	F. Campos	25/07/2020	3740	7273	887
AG Peg	S. Curry	26/07/2020	3701	7790	573
AG Peg	F. Sims	28/07/2020	3720	7306	1046
AG Peg	I. Diarrassouba	29/07/2020	3259	6049	685
AG Peg	T. Ventura	01/08/2020	4109	7014	699
AG Peg	F. Teyssier	01/08/2020	3965	7300	11000
AG Peg	K. Shank	02/08/2020	3801	7298	1000
AG Peg	J. Guarro	02/08/2020	4128	7763	10000
AG Peg	K. Shank	03/08/2020	3900	7298	1000
AG Peg	J. Martin	05/08/2020	6482	6643	1
AG Peg	D. Boyd	06/08/2020	3900	7381	1055
AG Peg	K. Shank	10/08/2020	3900	7200	1000
AG Peg	K. Shank	12/08/2020	3900	7200	1000
AG Peg	P. Dubovsky	12/08/2020	3750	7590	948
AG Peg	L. Franco	13/08/2020	3830	7236	538
AG Peg	J. Martin	20/08/2020	6480	6630	5
AG Peg	H. Boussier	20/08/2020	3871	7370	816
AG Peg	K. Shank	23/08/2020	3900	7200	1000
AG Peg	J. Martin	23/08/2020	6479	6639	1
AG Peg	T. Ventura	28/08/2020	4092	6997	844
AG Peg	J. Guarro	03/09/2020	4059	7749	9500
AG Peg	J. Martin	09/09/2020	6479	6632	9
AG Peg	F. Teyssier	13/09/2020	4000	7250	11000
AG Peg	F. Teyssier	14/09/2020	4000	7120	11000
AG Peg	D. Boyd	14/09/2020	3900	7381	1102
AG Peg	F. Sims	15/09/2020	3716	7303	974
AG Peg	J. Guarro	15/09/2020	4065	7742	9500
AG Peg	J. Martin	21/09/2020	6484	6500	9
AG Peg	U. Sollecchia	24/09/2020	6490	6687	6092
AG Peg	F. Sims	29/09/2020	3709	7297	1065
AG Peg	F. Sims	30/09/2020	3710	7297	1068

Target	Observer	Date	λ min-max		Res
AX Per	T. Medulka	12/07/2020	4000	7590	872
AX Per	D. Boyd	12/07/2020	3901	7381	1083
AX Per	T. Medulka	28/07/2020	4000	7590	982
AX Per	D. Boyd	28/07/2020	3901	7380	1141
AX Per	T. Lester	01/08/2020	4031	7955	14000
AX Per	P. Dubovsky	12/08/2020	3750	7590	943
AX Per	T. Lester	16/08/2020	4031	7955	14000
AX Per	P. Dubovsky	22/08/2020	3800	7590	1032
AX Per	F. Campos	24/08/2020	3826	7365	1135
AX Per	K. Gurney	10/09/2020	3745	7377	579
AX Per	D. Boyd	12/09/2020	3900	7381	1007
AX Per	D. Boyd	13/09/2020	3900	7381	1016
AX Per	T. Lester	18/09/2020	4031	7955	14000
BD Cam	T. Medulka	08/07/2020	3900	7590	866
BF Cyg	F. Teyssier	10/07/2020	4200	7200	11000
BF Cyg	D. Boyd	19/07/2020	3900	7381	1129
BF Cyg	D. Boyd	19/07/2020	3900	7381	1129
BF Cyg	J. Michelet	26/07/2020	3850	7500	1000
BF Cyg	F. Campos	31/07/2020	3693	7231	940
BF Cyg	L. Franco	13/08/2020	3830	7236	540
BF Cyg	P. Dubovsky	14/08/2020	3800	7590	1046
BF Cyg	P. Dubovsky	20/08/2020	3850	7590	1029
BF Cyg	D. Boyd	17/09/2020	3901	7380	1148
BF Cyg	J. Guarro	22/09/2020	4053	7761	9500
CH Cyg	F. Sims	01/07/2020	3719	7307	1036
CH Cyg	C. Boussin	03/07/2020	3701	7566	508
CH Cyg	F. Teyssier	07/07/2020	4049	7369	11000
CH Cyg	S. Curry	09/07/2020	3701	7500	1
CH Cyg	J. Guarro	11/07/2020	4153	7739	10000
CH Cyg	D. Boyd	12/07/2020	3901	7380	1115
CH Cyg	T. Medulka	13/07/2020	3900	7400	882
CH Cyg	J. Martin	17/07/2020	6479	6640	0
CH Cyg	K. Shank	19/07/2020	4400	7326	1000
CH Cyg	K. Shank	19/07/2020	4400	7326	1000
CH Cyg	K. Shank	20/07/2020	4400	7300	1000
CH Cyg	F. Teyssier	20/07/2020	3901	7369	11000
CH Cyg	F. Teyssier	29/07/2020	3901	7369	11000
CH Cyg	T. Lester	01/08/2020	4031	7955	14000
CH Cyg	F. Teyssier	01/08/2020	3963	7369	11000
CH Cyg	F. Teyssier	03/08/2020	3963	7369	11000
CH Cyg	F. Teyssier	03/08/2020	3963	7369	11000
CH Cyg	F. Teyssier	06/08/2020	3964	7369	11000
CH Cyg	K. Shank	09/08/2020	3900	7200	1000
CH Cyg	K. Shank	10/08/2020	3900	7200	1000
CH Cyg	K. Shank	12/08/2020	3900	7200	1000
CH Cyg	L. Franco	12/08/2020	3830	7236	540
CH Cyg	P. Dubovsky	12/08/2020	3800	7590	881

Symbiotics observed in 2020-Q3 (2/3)

Target	Observer	Date	λ min-max		Res
CH Cyg	J. Guarro	13/08/2020	3937	8950	9500
CH Cyg	P. Dubovsky	21/08/2020	3800	7590	953
CH Cyg	K. Shank	23/08/2020	3900	7200	1000
CH Cyg	J. Guarro	30/08/2020	4053	7762	9500
CH Cyg	J. Guarro	04/09/2020	4053	7761	9500
CH Cyg	T. Lester	05/09/2020	4031	7955	14000
CH Cyg	P. Dubovsky	05/09/2020	3700	7590	970
CH Cyg	J. Guarro	05/09/2020	4053	7761	9500
CH Cyg	C. Buil	12/09/2020	4637	6840	1752
CH Cyg	F. Teyssier	13/09/2020	4000	7200	11000
CH Cyg	F. Teyssier	21/09/2020	4000	7200	11000
CI Cyg	C. Buil	07/07/2020	3275	6841	476
CI Cyg	T. Medulka	13/07/2020	3900	7590	869
CI Cyg	D. Boyd	22/07/2020	3901	7380	1008
CI Cyg	T. Medulka	29/07/2020	4000	7590	1025
CI Cyg	F. Sims	30/07/2020	3718	7306	1035
CI Cyg	F. Campos	31/07/2020	3701	7236	871
CI Cyg	T. Lester	08/08/2020	4031	7960	14000
CI Cyg	L. Franco	13/08/2020	3830	7236	540
CI Cyg	P. Dubovsky	20/08/2020	3800	7590	1018
CI Cyg	D. Boyd	17/09/2020	3900	7380	1163
CM Aql	C. Eldridge	01/07/2020	3700	7400	1
CM Aql	C. Boussin	07/07/2020	3701	7566	505
CM Aql	F. Sims	08/07/2020	3720	7306	1053
CM Aql	C. Boussin	18/07/2020	3751	7396	507
CM Aql	P. Cazzato	24/07/2020	3802	7300	527
CM Aql	C. Boussin	05/08/2020	3751	7396	503
CM Aql	P. Cazzato	16/08/2020	3802	7300	522
EG And	T. Medulka	05/07/2020	3900	7590	1043
EG And	T. Medulka	10/07/2020	3900	7590	1076
EG And	I. Diarrassouba	21/07/2020	3274	6040	662
EG And	T. Medulka	29/07/2020	3800	7590	1046
EG And	V. Marik	15/08/2020	3554	7340	589
EG And	T. Medulka	08/09/2020	3900	7590	878
EG And	F. Teyssier	18/09/2020	4000	7200	11000
ER Del	T. Medulka	07/07/2020	3900	7590	900
ER Del	P. Dubovsky	21/08/2020	3800	7590	1046
FG Ser	T. Medulka	27/07/2020	4000	7590	986
HbHa 1704-05	C. Boussin	22/07/2020	3701	7566	501
HbHa 1704-05	C. Buil	24/07/2020	4000	7585	11000
HbHa 1704-05	H. Boussier	27/07/2020	3865	7442	801
HbHa 1704-05	D. Boyd	05/09/2020	3901	7380	1056
HbHa 1704-05	D. Boyd	27/09/2020	3900	7381	1067
HM Sge	F. Campos	31/07/2020	3693	7230	946
IV Vir	C. Eldridge	02/07/2020	3700	7406	1
LT Del	F. Campos	13/08/2020	3750	7288	939
omi Cet	T. Lester	21/09/2020	4031	7955	14000

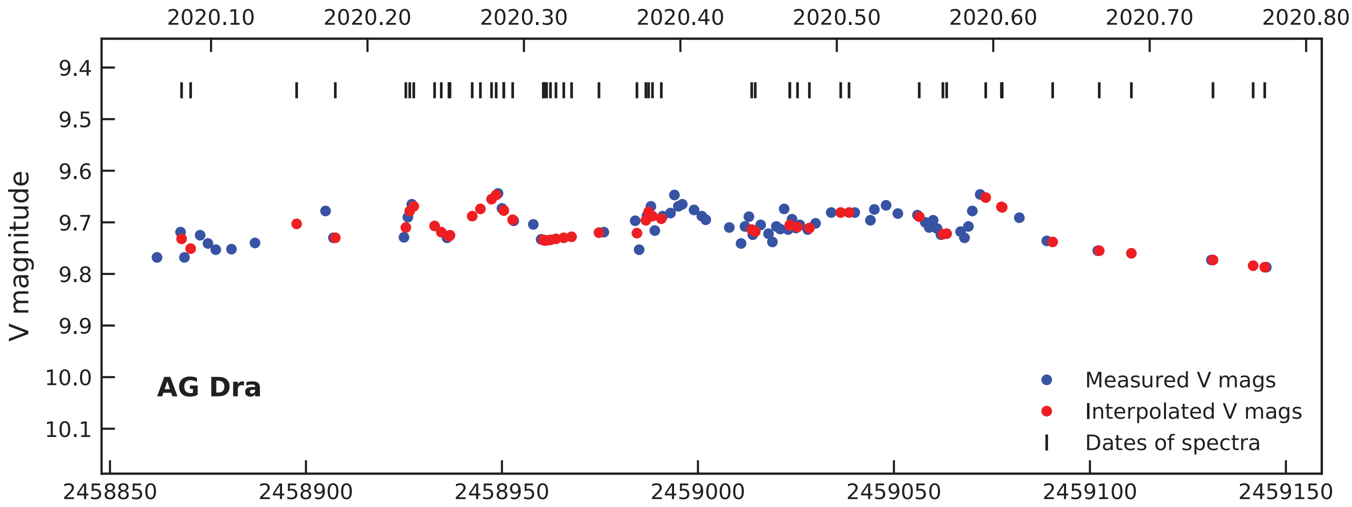
Target	Observer	Date	λ min-max		Res
PU Vul	T. Medulka	01/07/2020	3850	7590	1081
PU Vul	T. Medulka	12/07/2020	3900	7590	888
R Aqr	P. Cazzato	23/07/2020	3802	7300	536
R Aqr	P. Cazzato	25/07/2020	3803	7301	522
R Aqr	F. Sims	30/07/2020	3719	7305	1066
R Aqr	T. Lester	08/08/2020	4031	7955	14000
R Aqr	V. Marik	14/08/2020	3560	7334	456
R Aqr	F. Campos	24/08/2020	3826	7363	907
R Aqr	T. Lester	05/09/2020	4031	7955	14000
R Aqr	T. Lester	19/09/2020	4031	7955	14000
R Aqr	C. Eldridge	23/09/2020	4301	7406	10000
RR Tel	C. Eldridge	02/07/2020	3700	7406	1
RR Tel	C. Eldridge	02/07/2020	3700	7406	0
RS Oph	F. Sims	04/07/2020	3721	7306	1059
RS Oph	F. Sims	08/07/2020	3717	7305	1029
RS Oph	C. Boussin	10/07/2020	3701	7566	502
RS Oph	T. Medulka	10/07/2020	4000	7590	1076
RS Oph	T. Ventura	11/07/2020	4085	6990	811
RS Oph	T. Medulka	12/07/2020	3900	7590	927
RS Oph	F. Sims	16/07/2020	3719	7305	1029
RS Oph	J. Guarro	20/07/2020	4128	7761	10000
RS Oph	J. Guarro	21/07/2020	4128	7762	10000
RS Oph	C. Boussin	21/07/2020	3701	7561	506
RS Oph	J. Guarro	24/07/2020	4128	7762	10000
RS Oph	T. Lester	25/07/2020	4031	7955	14000
RS Oph	J. Guarro	25/07/2020	4128	7762	10000
RS Oph	F. Sims	27/07/2020	3719	7306	1056
RS Oph	J. Guarro	28/07/2020	4128	7762	10000
RS Oph	J. Guarro	31/07/2020	4128	7762	10000
RS Oph	T. Lester	01/08/2020	4031	7955	14000
RS Oph	J. Guarro	03/08/2020	4053	7762	10000
RS Oph	T. Lester	06/08/2020	4031	7955	14000
RS Oph	F. Campos	06/08/2020	3709	7250	769
RS Oph	J. Michelet	07/08/2020	3850	7500	1000
RS Oph	K. Shank	09/08/2020	3900	7200	1000
RS Oph	P. Dubovsky	10/08/2020	4000	7590	1001
RS Oph	K. Shank	12/08/2020	3900	7200	1000
RS Oph	L. Franco	12/08/2020	3830	7236	538
RS Oph	T. Lester	13/08/2020	4031	7955	12000
RS Oph	J. Guarro	13/08/2020	4053	7762	10000
RS Oph	K. Shank	23/08/2020	3900	7200	1000
RS Oph	J. Guarro	26/08/2020	4053	7761	9500
RS Oph	C. Eldridge	08/09/2020	4301	7406	10000
RS Oph	J. Guarro	15/09/2020	4053	7761	9500
RS Oph	J. Guarro	24/09/2020	4053	7762	9500
RT Cru	P. Velez	07/09/2020	3801	7500	925
RT Cru	P. Velez	08/09/2020	3800	7500	984
RT Cru	P. Velez	23/09/2020	3801	7401	1120

Target	Observer	Date	λ min-max		Res
StHa 169	F. Sims	01/07/2020	3718	7306	1072
StHa 190	T. Lester	06/08/2020	4031	7955	14000
StHa 190	T. Ventura	04/09/2020	4095	6999	859
StHa 190	T. Lester	21/09/2020	4031	7955	14000
SU Lyn	T. Lester	19/09/2020	4031	7955	14000
T CrB	F. Sims	01/07/2020	3720	7306	1073
T CrB	J. Guarro	11/07/2020	4318	7733	10000
T CrB	T. Medulka	14/07/2020	4000	7590	879
T CrB	I. Diarrassouba	20/07/2020	3257	6046	662
T CrB	F. Campos	25/07/2020	3743	7285	884
T CrB	M. Rodriguez	26/07/2020	3848	7381	502
T CrB	T. Medulka	29/07/2020	4000	7590	1062
T CrB	I. Diarrassouba	04/08/2020	3332	6042	627
T CrB	D. Boyd	08/08/2020	3900	7380	959
T CrB	L. Franco	10/08/2020	3830	7236	537
T CrB	P. Dubovsky	11/08/2020	3800	7590	1014
T CrB	F. Campos	21/08/2020	3747	7282	890
T CrB	D. Boyd	01/09/2020	3900	7380	1045
T CrB	J. Guarro	03/09/2020	4059	7749	9500
T CrB	J. Guarro	13/09/2020	4053	7761	9500
T CrB	T. Lester	18/09/2020	4031	7955	14000
T CrB	D. Boyd	21/09/2020	3901	7380	1101
T CrB	F. Sims	29/09/2020	3709	7297	1068
V1016 Cyg	O. Garde	18/07/2020	3620	4720	2770
V1329 Cyg	D. Boyd	01/07/2020	3900	7381	1129
V1329 Cyg	D. Boyd	11/09/2020	3900	7380	1024
V1413 Aql	H. Boussier	19/08/2020	3871	7379	746
V1413 Aql	P. Dubovsky	20/08/2020	3800	7590	1021
V1413 Aql	J. Guarro	20/08/2020	4053	7761	9500
V1413 Aql	C. Buil	20/08/2020	3680	7500	756
V1413 Aql	O. garde, S. charbo	20/08/2020	3603	7693	539
V1413 Aql	S. Curry	21/08/2020	3901	7490	566
V1413 Aql	J. Guarro	21/08/2020	4053	7761	9500
V1413 Aql	P. Dubovsky	21/08/2020	3900	7590	987
V1413 Aql	C. Buil	21/08/2020	6099	7163	3589
V1413 Aql	P. Dubovsky	22/08/2020	3800	7590	1046
V1413 Aql	J. Guarro	22/08/2020	4053	7761	9500
V1413 Aql	C. Buil	22/08/2020	6388	8611	2043
V1413 Aql	P. Cazzato	22/08/2020	3803	7301	567
V1413 Aql	P. Dubovsky	25/08/2020	3800	7590	910
V1413 Aql	J. Guarro	25/08/2020	4053	7761	9500
V1413 Aql	P. Dubovsky	28/08/2020	3900	7590	879
V1413 Aql	P. Dubovsky	29/08/2020	3800	7590	1127
V1413 Aql	F. Sims	01/09/2020	3718	7306	1057
V1413 Aql	P. Dubovsky	03/09/2020	3900	7590	887
V1413 Aql	P. Somogyi	03/09/2020	3646	7884	665
V1413 Aql	P. Dubovsky	05/09/2020	3800	7590	993
V1413 Aql	J. Michelet	05/09/2020	3920	7405	1000
V1413 Aql	K. Gurney	09/09/2020	3892	7375	577
V1413 Aql	D. Boyd	12/09/2020	3900	7381	1020
V1413 Aql	J. Guarro	13/09/2020	4053	7761	9500
V1413 Aql	T. Lester	20/09/2020	4031	7955	14000
V443 Her	T. Medulka	13/07/2020	4000	7400	871
V443 Her	D. Boyd	19/07/2020	3901	7380	1138
V443 Her	D. Boyd	19/07/2020	3901	7380	1138
V443 Her	T. Lester	24/07/2020	4031	7955	14000
V443 Her	J. Michelet	27/07/2020	3850	7500	1000
V443 Her	F. Sims	28/07/2020	3720	7307	1027
V443 Her	F. Campos	22/08/2020	3836	7370	1083
V443 Her	D. Boyd	19/09/2020	3900	7381	1133
V471 Per	D. Boyd	14/09/2020	3901	7380	1129
V694 Mon	P. Somogyi	05/09/2020	4616	5334	1919
V694 Mon	P. Somogyi	19/09/2020	6200	6910	2356
YY Her	P. Dubovsky	12/08/2020	3900	7590	920
YY Her	F. Campos	21/08/2020	3747	7282	1040
Z And	T. Medulka	07/07/2020	3900	7590	931
Z And	I. Diarrassouba	07/07/2020	3229	5543	736
Z And	C. Buil	08/07/2020	3250	6840	478
Z And	T. Lester	24/07/2020	4031	7955	14000
Z And	D. Boyd	28/07/2020	3900	7381	1149
Z And	F. Sims	30/07/2020	3726	7275	1052
Z And	J. Michelet	31/07/2020	3850	7440	1000
Z And	P. Dubovsky	14/08/2020	3800	7590	949
Z And	S. Curry	21/08/2020	3901	7490	585
Z And	K. Shank	23/08/2020	3900	7200	1000
Z And	F. Sims	01/09/2020	3719	7305	1061
Z And	D. Boyd	01/09/2020	3901	7380	1103
Z And	T. Lester	05/09/2020	4031	7955	14000
Z And	T. Medulka	08/09/2020	3900	7590	903
Z And	J. Martin	11/09/2020	6483	6636	9
Z And	C. Buil	16/09/2020	3725	5941	0
Z And	F. Sims	16/09/2020	3710	7297	1071
Z And	F. Teyssier	17/09/2020	4000	7120	11000
Z And	J. Martin	18/09/2020	6484	6644	1
Z And	D. Boyd	21/09/2020	3900	7381	1123
Z And	F. Sims	24/09/2020	3711	7297	1059

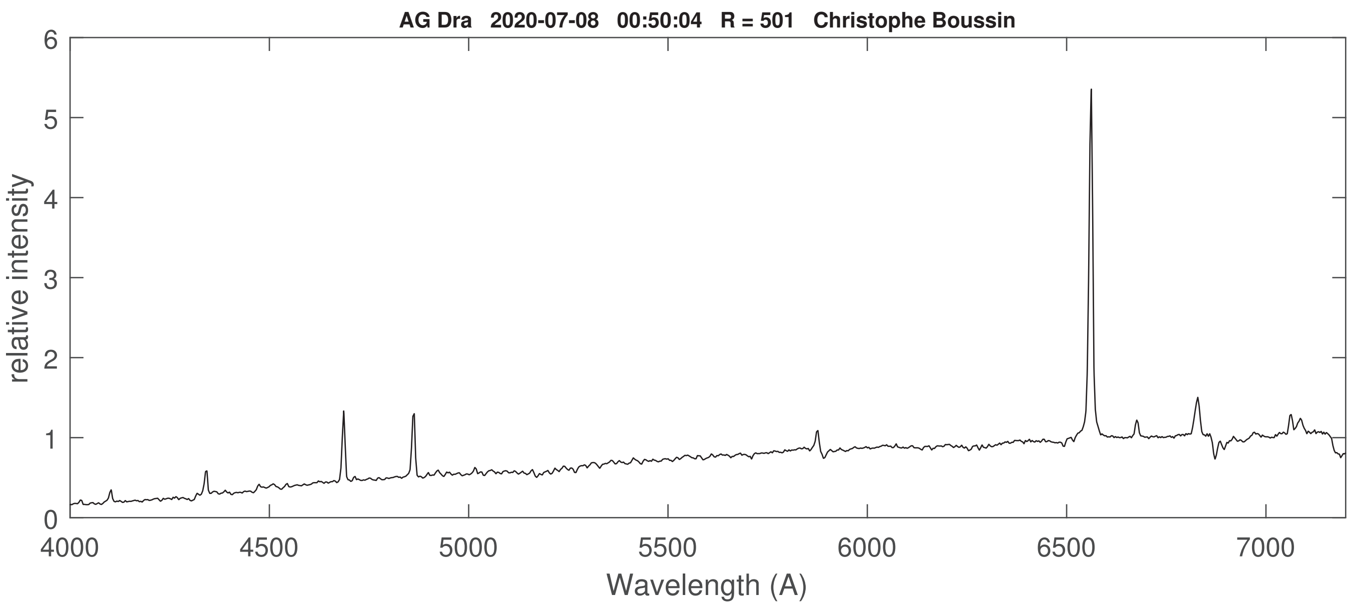
AG Dra

Coordinates (2000.0)	
R.A.	16 01 41.0
Dec	+66 48 10.1
Mag V	9.6

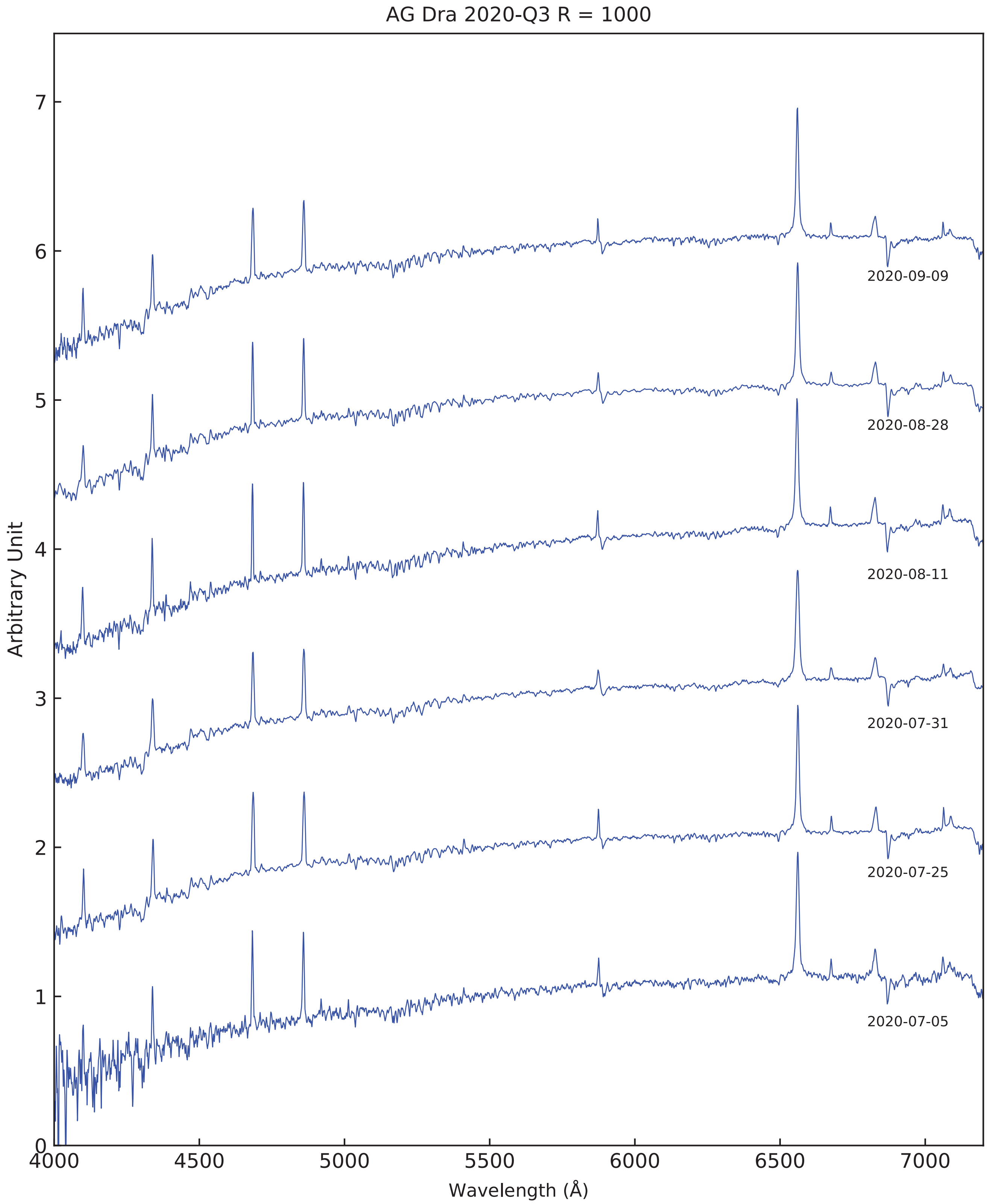
Continuous observations of AG Dra upon the request of J. Merc, R. Gàlis, L. Leedjarv. (see Information Letter n° 33 #2017-03). Monitoring continues in order to acquire reference spectra according to the orbital phase in low activity.
01/07/2020: orbital phase = 0.048
01/10/2020: orbital phase = 0.216
(Fekel & al., 2000)



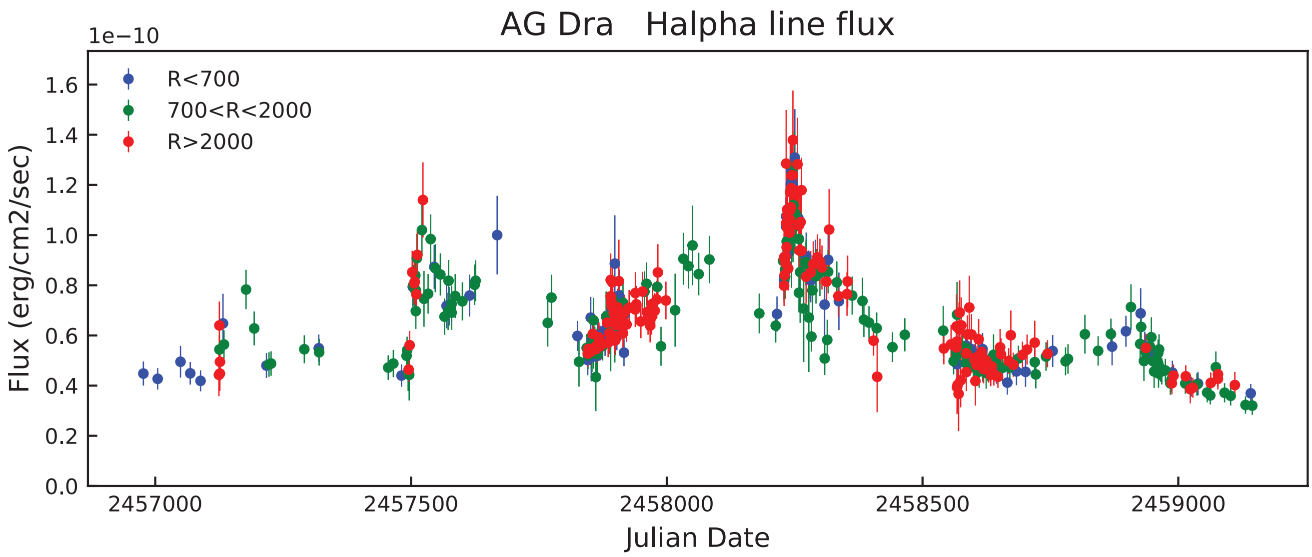
AAVSO lightcurve (selected and interpolated for the time of spectra)and ARAS spectra (2020)

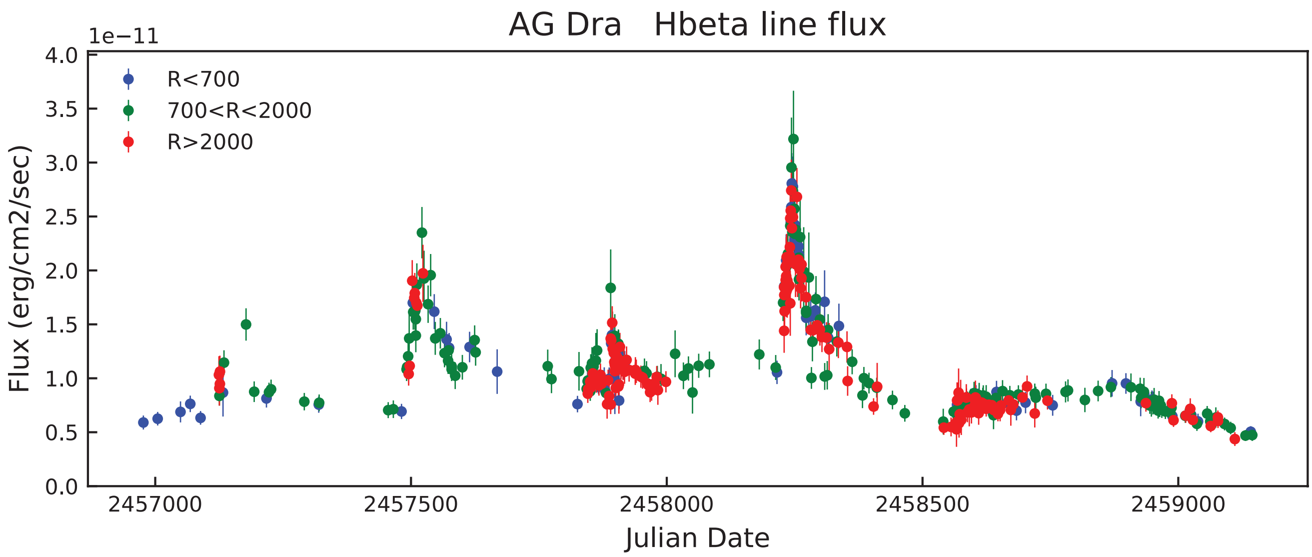


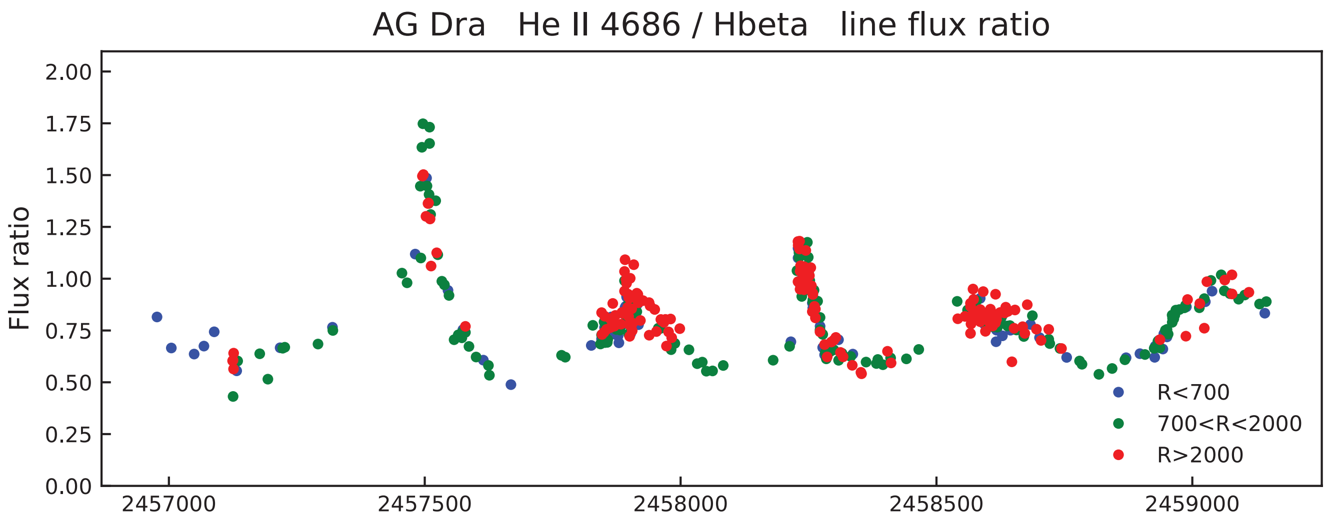
Spectrum acquired by Christophe Boussin with an Alpy (R = 600)



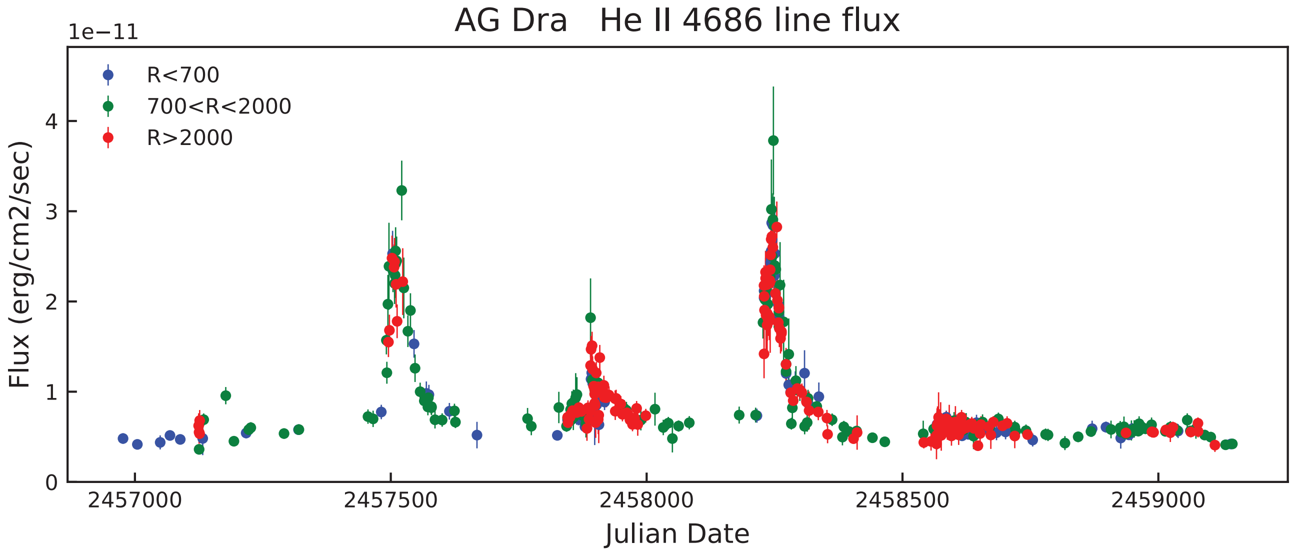
AG Dra during 2020-Q3 at R ~ 1000. The spectra were normalized and log scaled.
Acquisition:
Tomas medulka and Pavol Dubovsky (LISA R = 1000): 05-07-2020, 11-08-2020, 28-08-2020
David Boyd (LISA R = 1000): 25/04/2020, 09-09-2020
Fran Campos (DADOS-200 R = 800): 31-07-2020

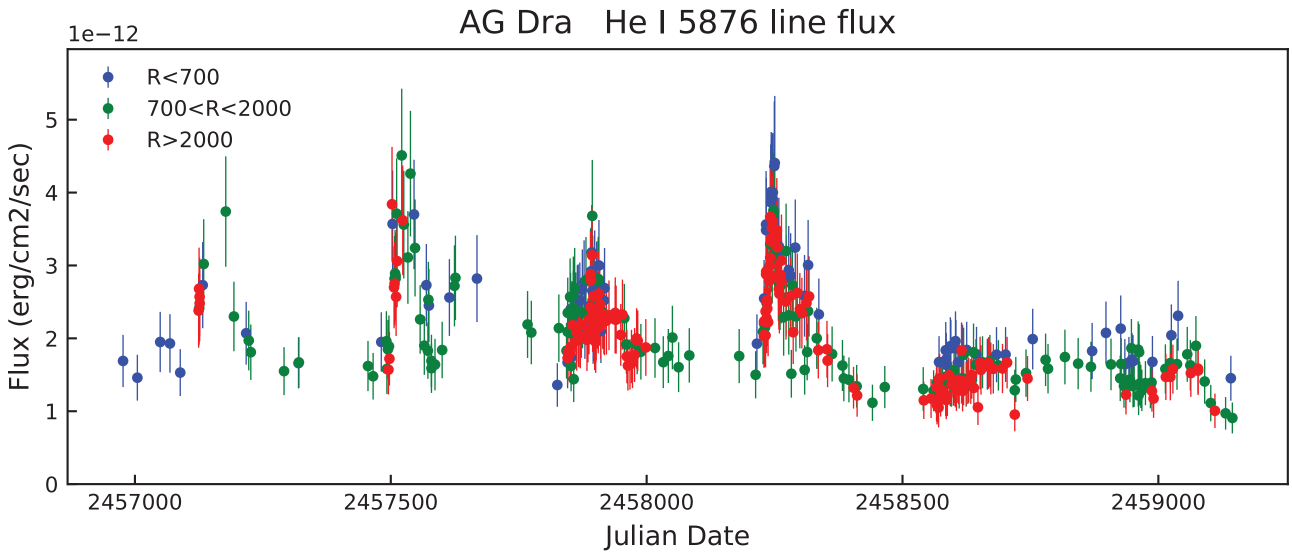


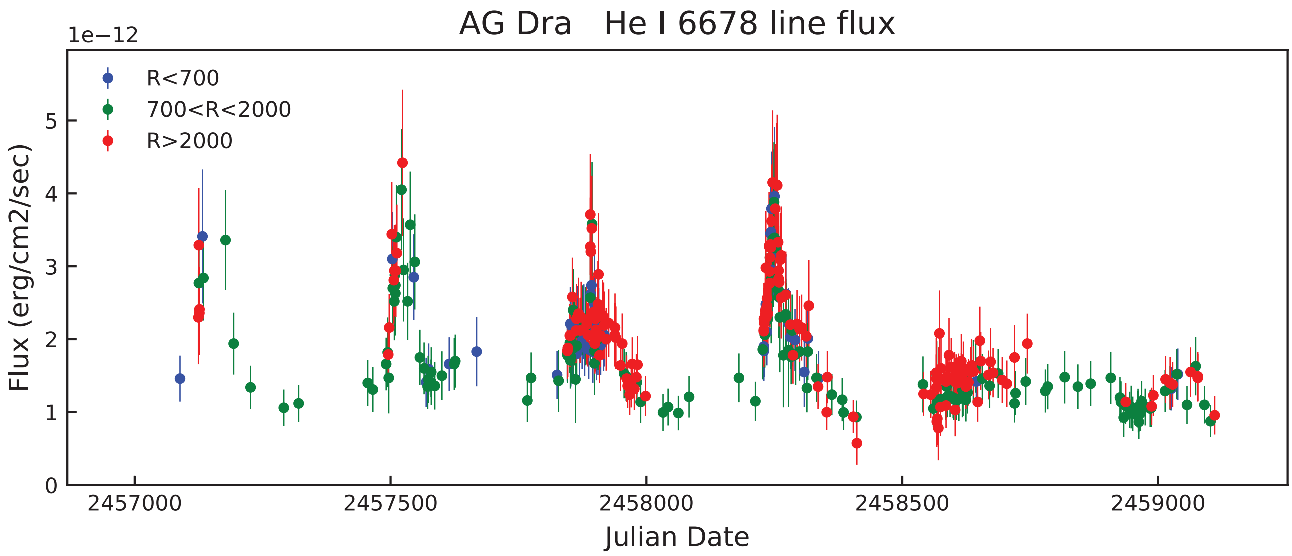


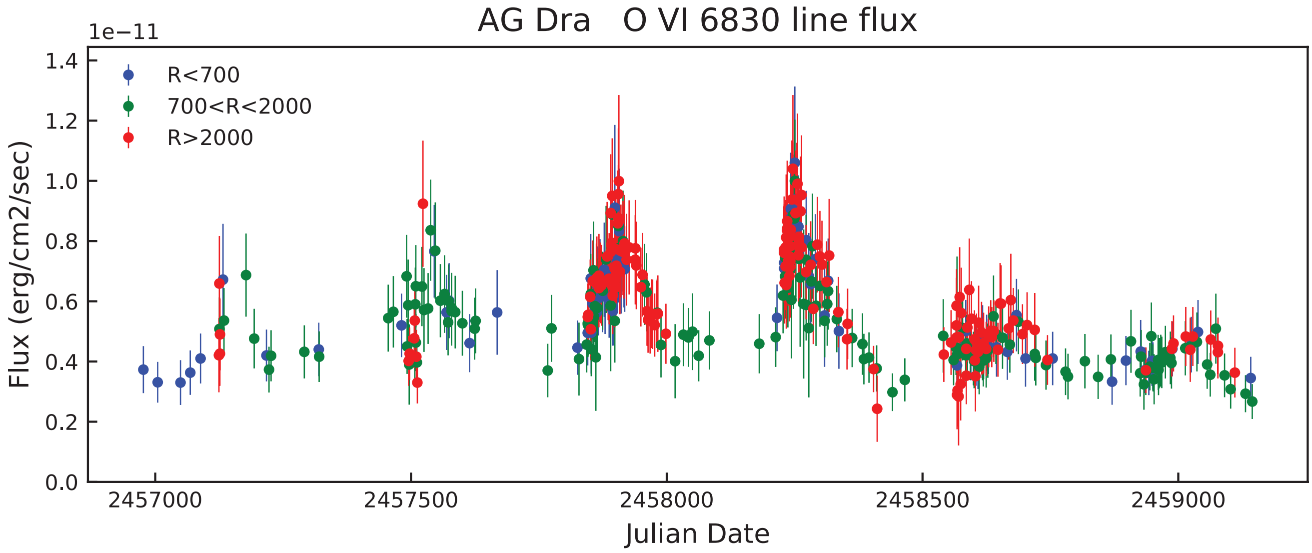


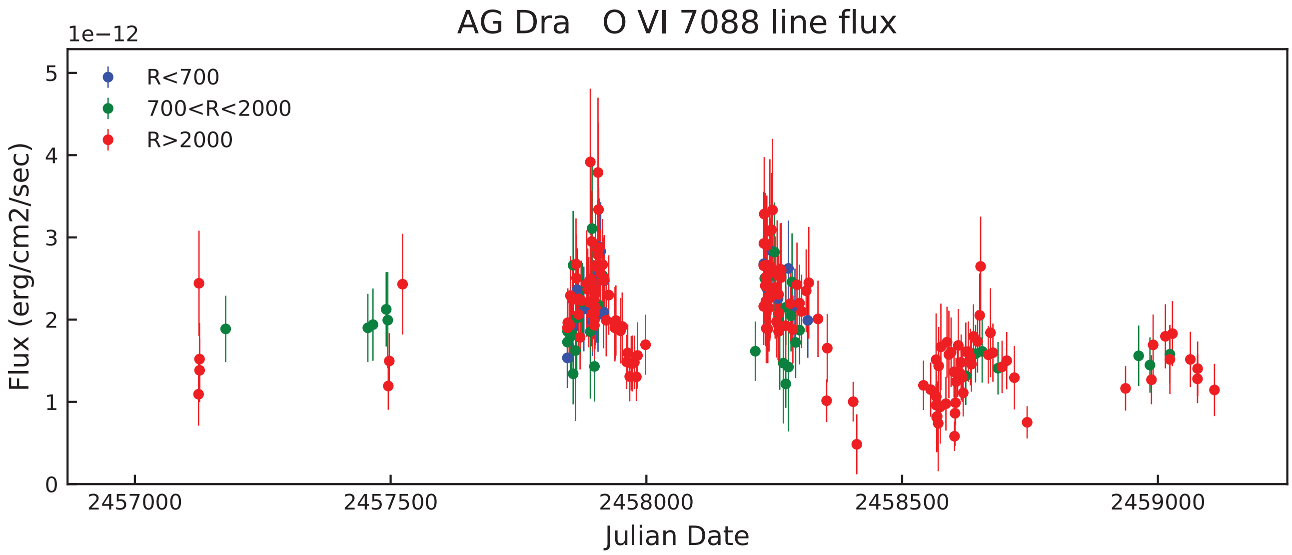
The graphs of emission line flux are produced by first calculating the absolute flux of ARAS spectra which cover the V-band using daily averaged AAVSO V magnitudes interpolated to the times of the spectra. Emission line profiles above an interpolated continuum level under the lines are numerically integrated to give the line flux in erg/cm2/sec. Uncertainties in line flux are estimated from uncertainties in determining continuum levels and in calculating the line flux and are found to be ~10% for strong lines and ~20% for weaker lines. Data in the graphs are colour-coded to show whether these were obtained using (typically) ALPY (R<700), LISA (700<R<2000) or echelle (R>2000) spectroscopes. There is good consistency between the data obtained at all resolutions.


AG Dra He II 4686 line flux
1e−11
Flux (erg/cm2/sec)
Julian Date
R<700
700<R<2000
R>2000
0
1
2
3
4
2457000
2457500
2458000
2458500
2459000

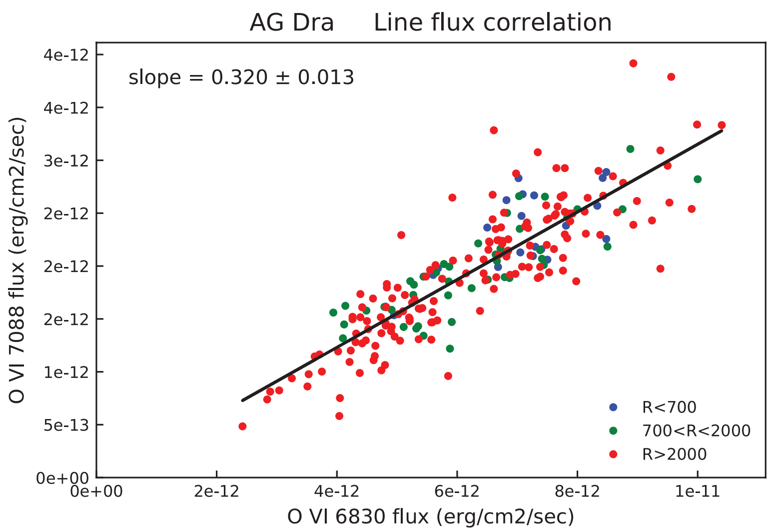

AG Dra He I 5876 line flux
1e−12
Flux (erg/cm2/sec)
Julian Date
R<700
700<R<2000
R>2000
0
1
2
3
4
5
2457000
2457500
2458000
2458500
2459000


AG Dra He I 6678 line flux
1e−12
Flux (erg/cm2/sec)
Julian Date
R<700
700<R<2000
R>2000
0
1
2
3
4
5
2457000
2457500
2458000
2458500
2459000



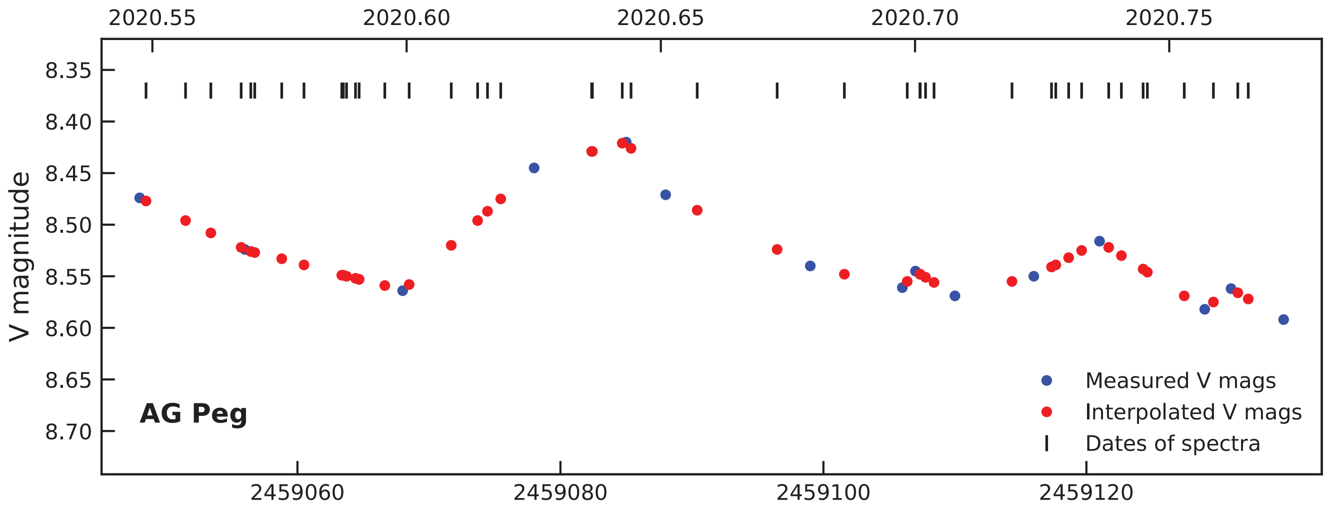


The correlation between OVI 6830 and 7088 gives a mean value of the ratio I(λ 6830)/I(λ 7088) = 0.32 +/- (0.013)

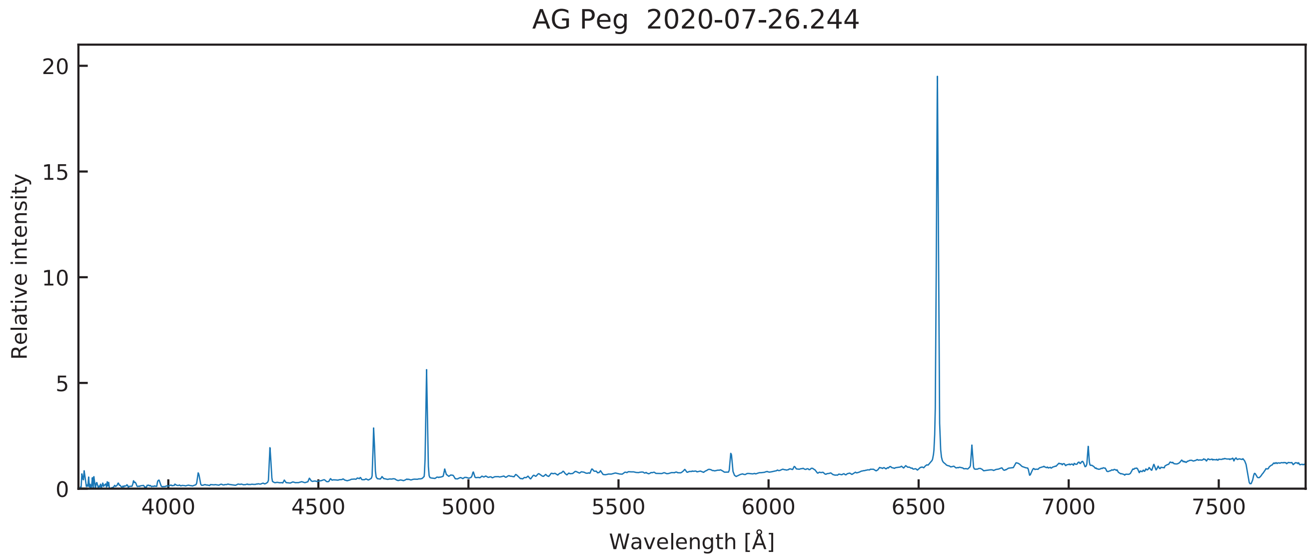


AG Peg

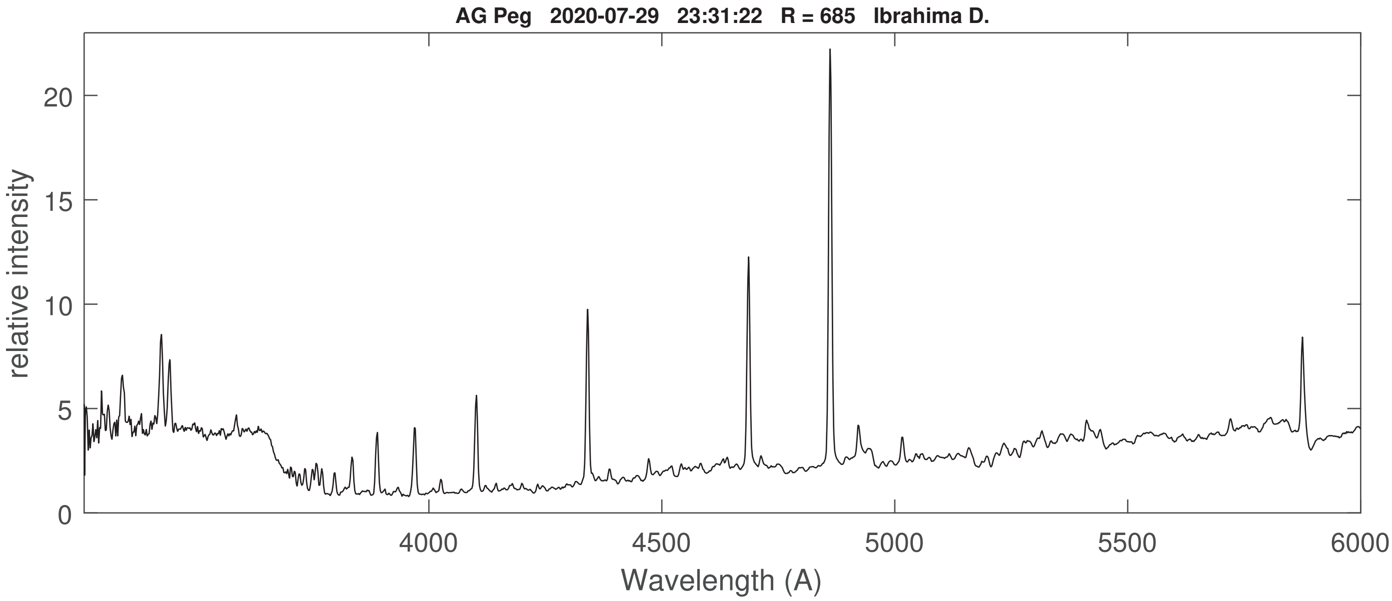
Coordinates (2000.0)	
R.A.	21 51 02.0
Dec	+12 37 32.1
Mag	~ 8.5

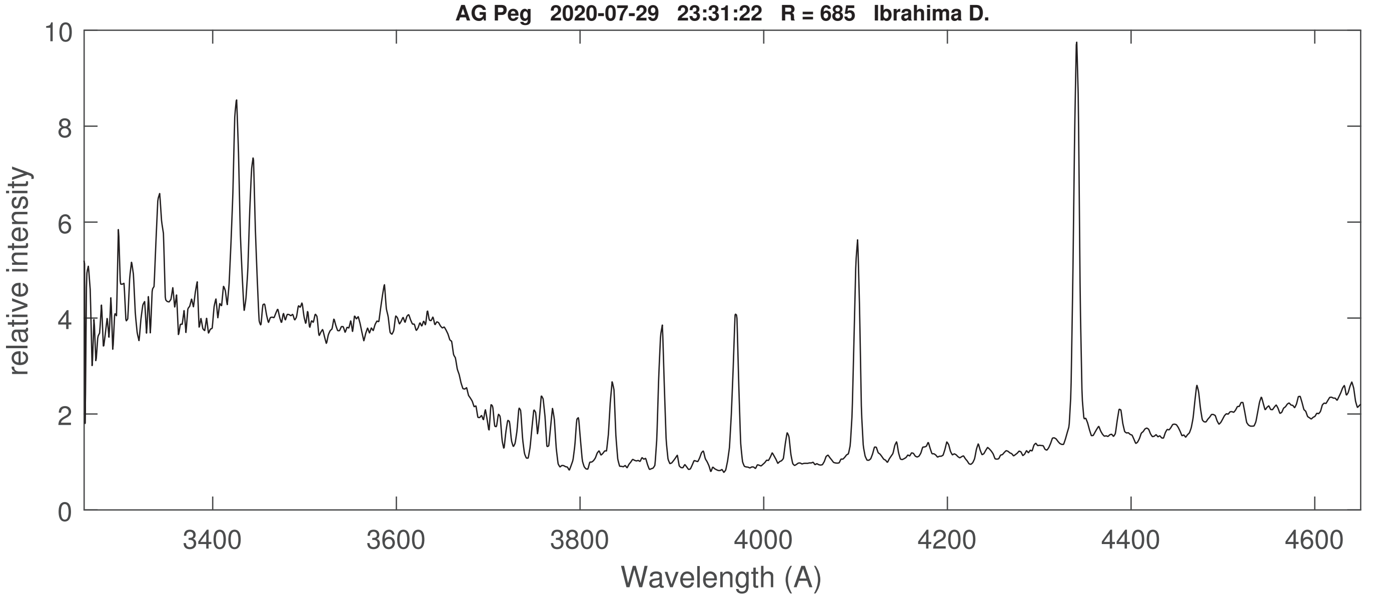


Measured AAVSO V-band magnitudes averaged and interpolated to the dates of ARAS spectra.

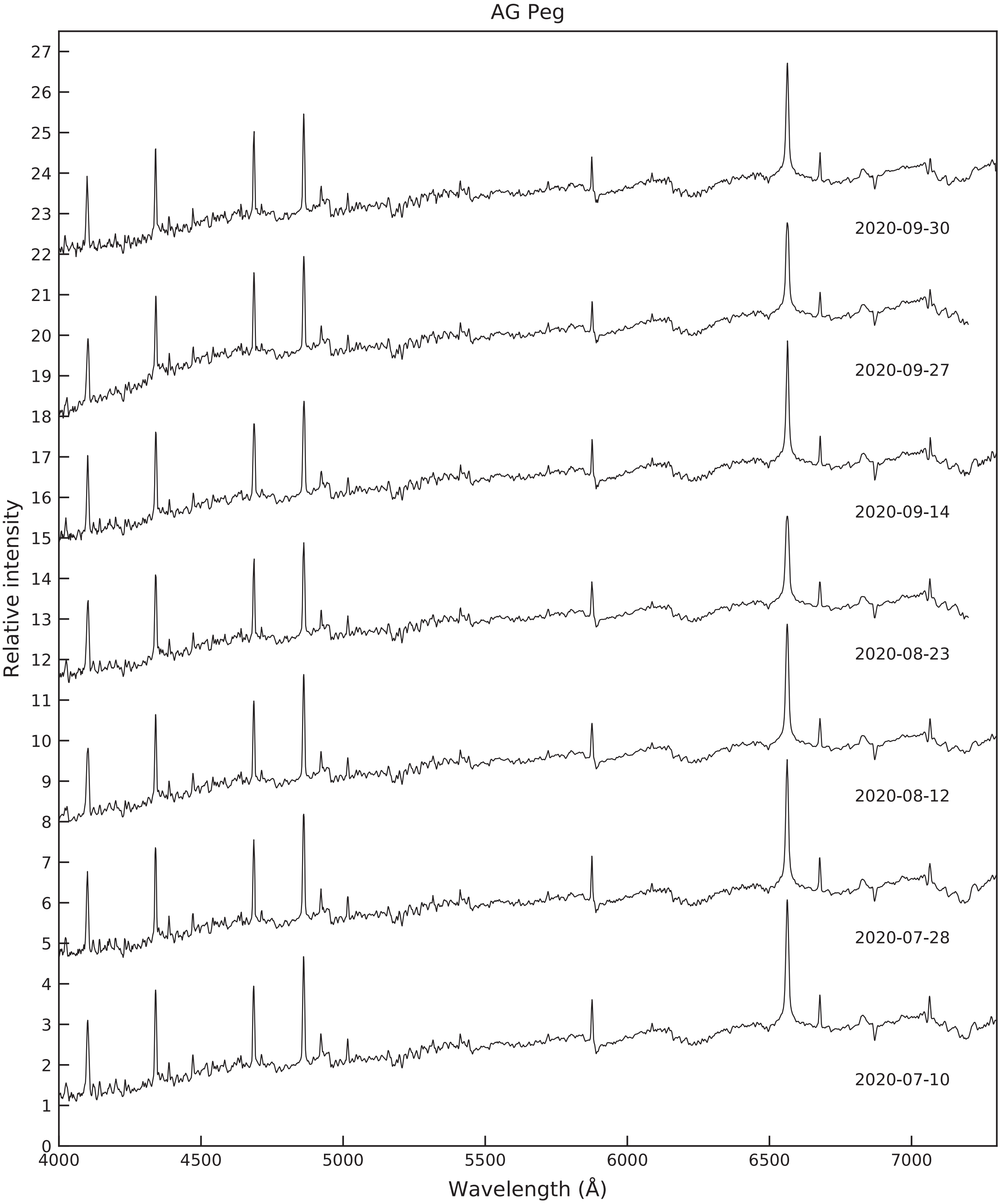


AG Peg LISA (R = 1000) spectrum acquired by Keith Shank

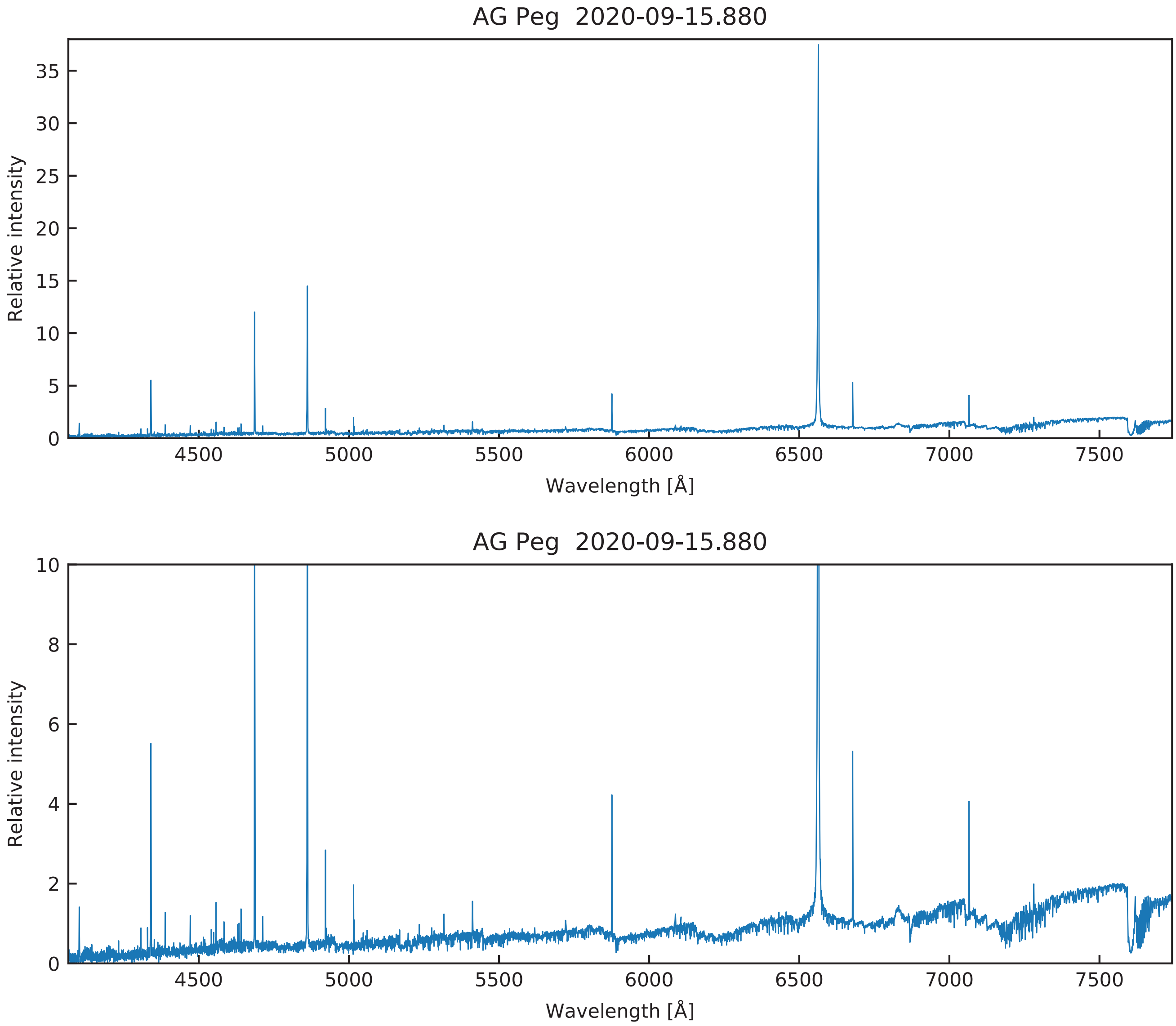




Add lines identification

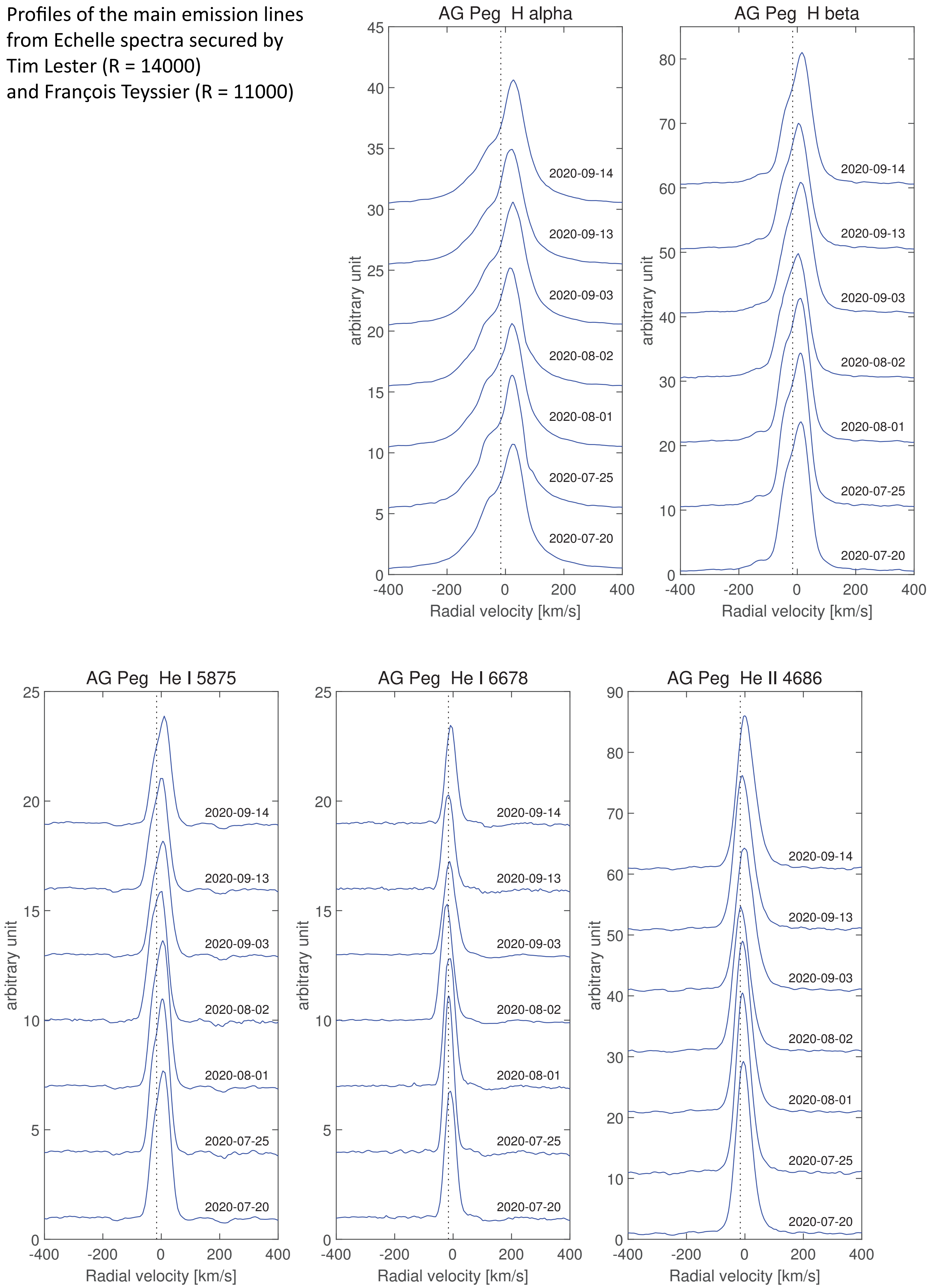


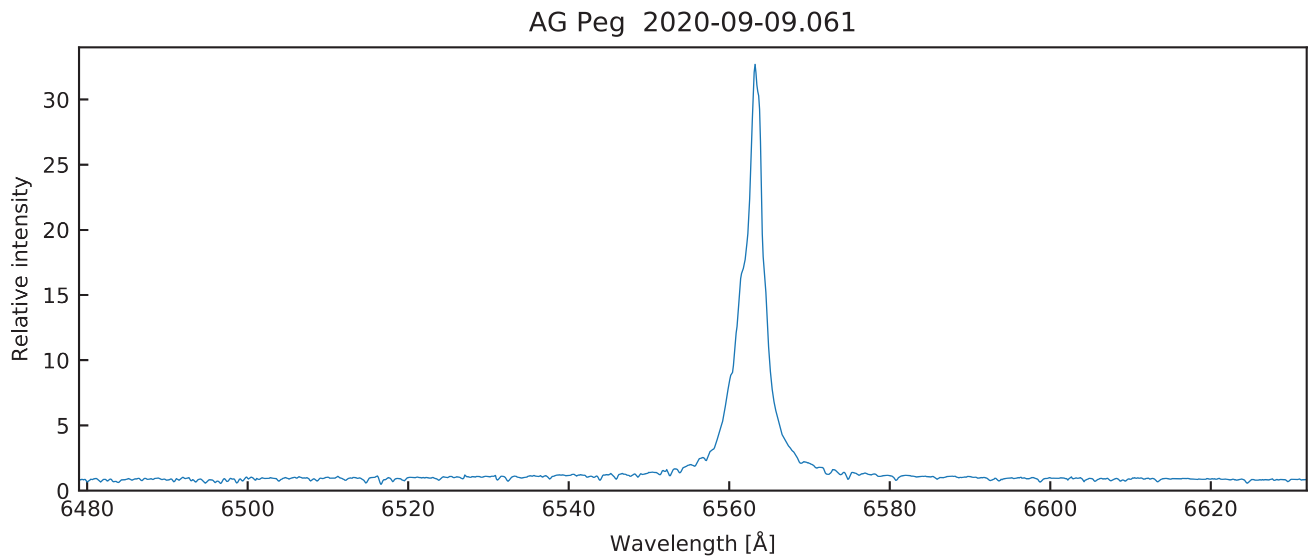
AG Peg during 2020-Q3 - Selected LISA Spectra (R = 1000) - Log scaled
2020-07-10: Tomàs Medulka Pavol Dubovsky
2020-07-28 / 2020-09-30: Woody Sims
2020-08-23 / 2020-09-27: Keith Shank
2020-09-14: David Boyd



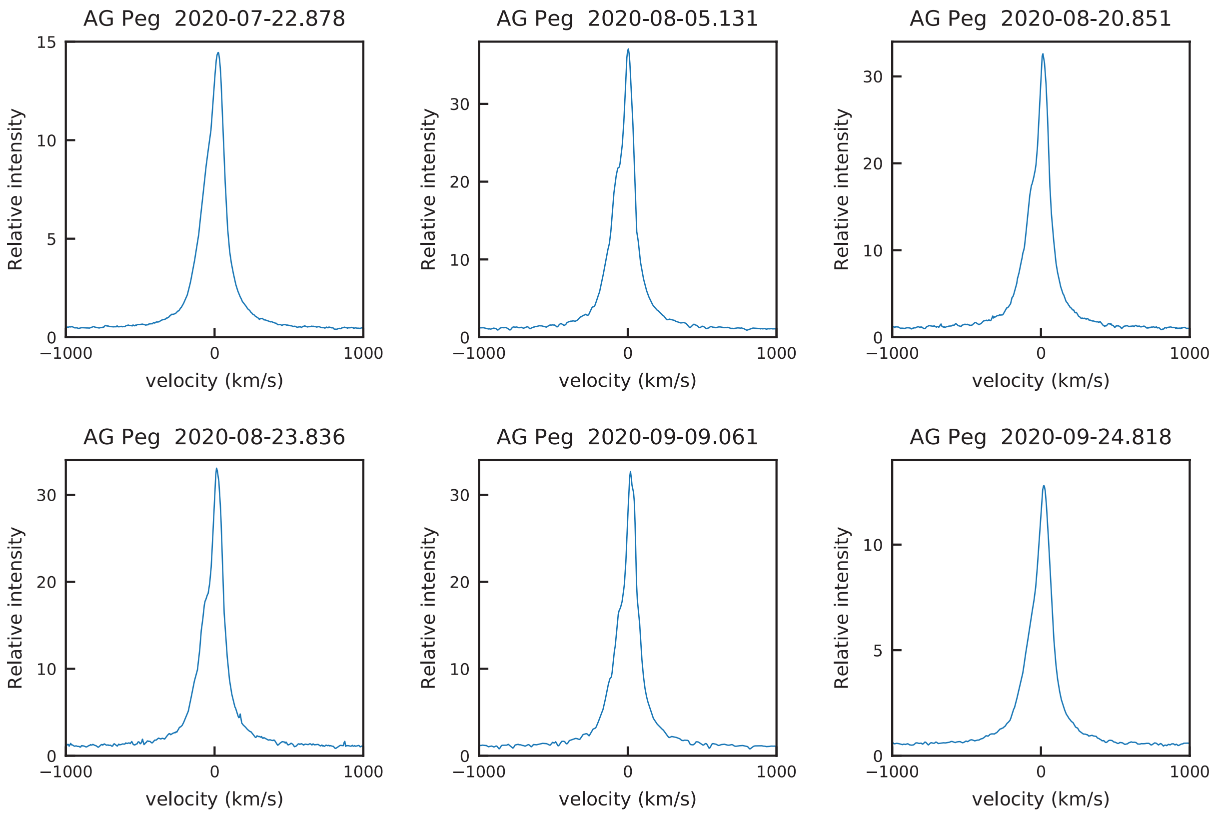
Echelle spectrum obtained by Joan Guarro with his prototype NOU-T

Profiles of the main emission lines from Echelle spectra secured by Tim Lester (R = 14000) and François Teyssier (R = 11000)





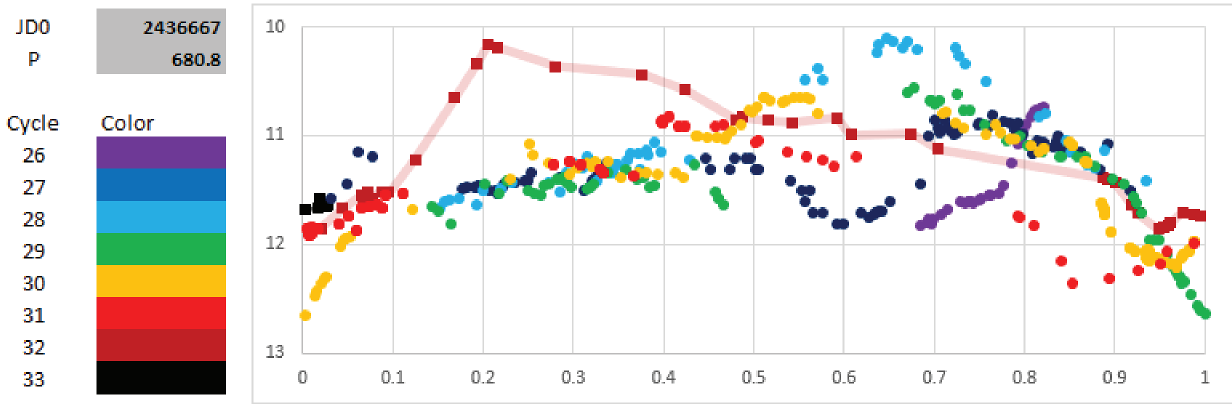
AG Peg - H alpha range acquired by Jack Martin with a Lhires III 2400 l/mm (R = 14000)
Heliocentric velocity and radial velocity of the system not corrected.



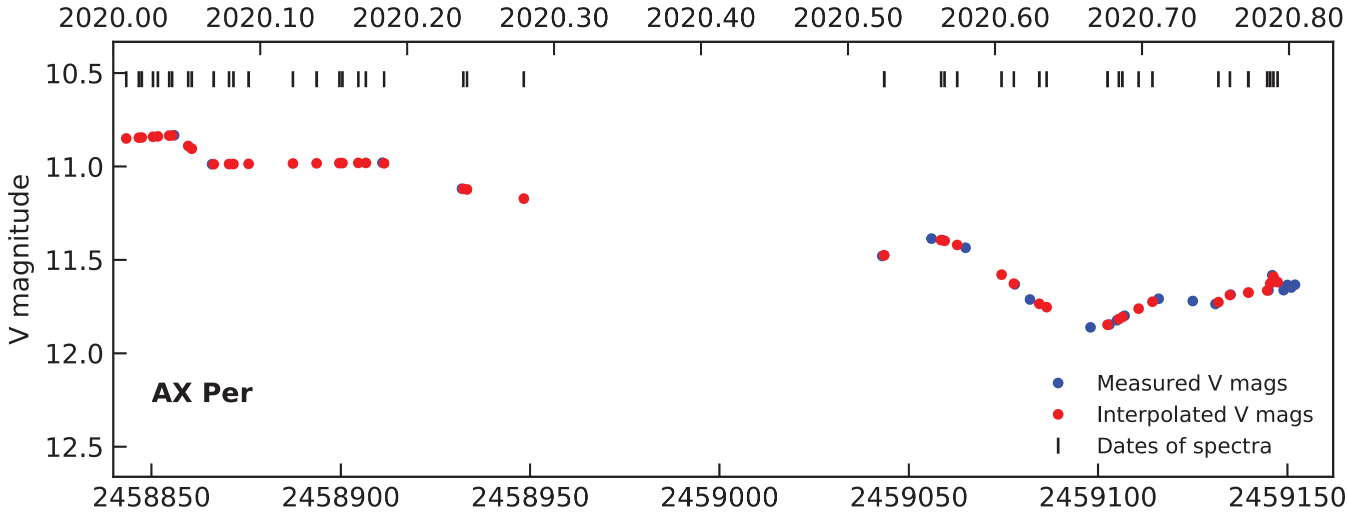
AG Peg - H alpha profiles from spectra acquired by Umberto Sollechia (R = 10000) and Jack Martin (R = 14000)
Heliocentric velocity and radial velocity of the system are not corrected.

AX Per

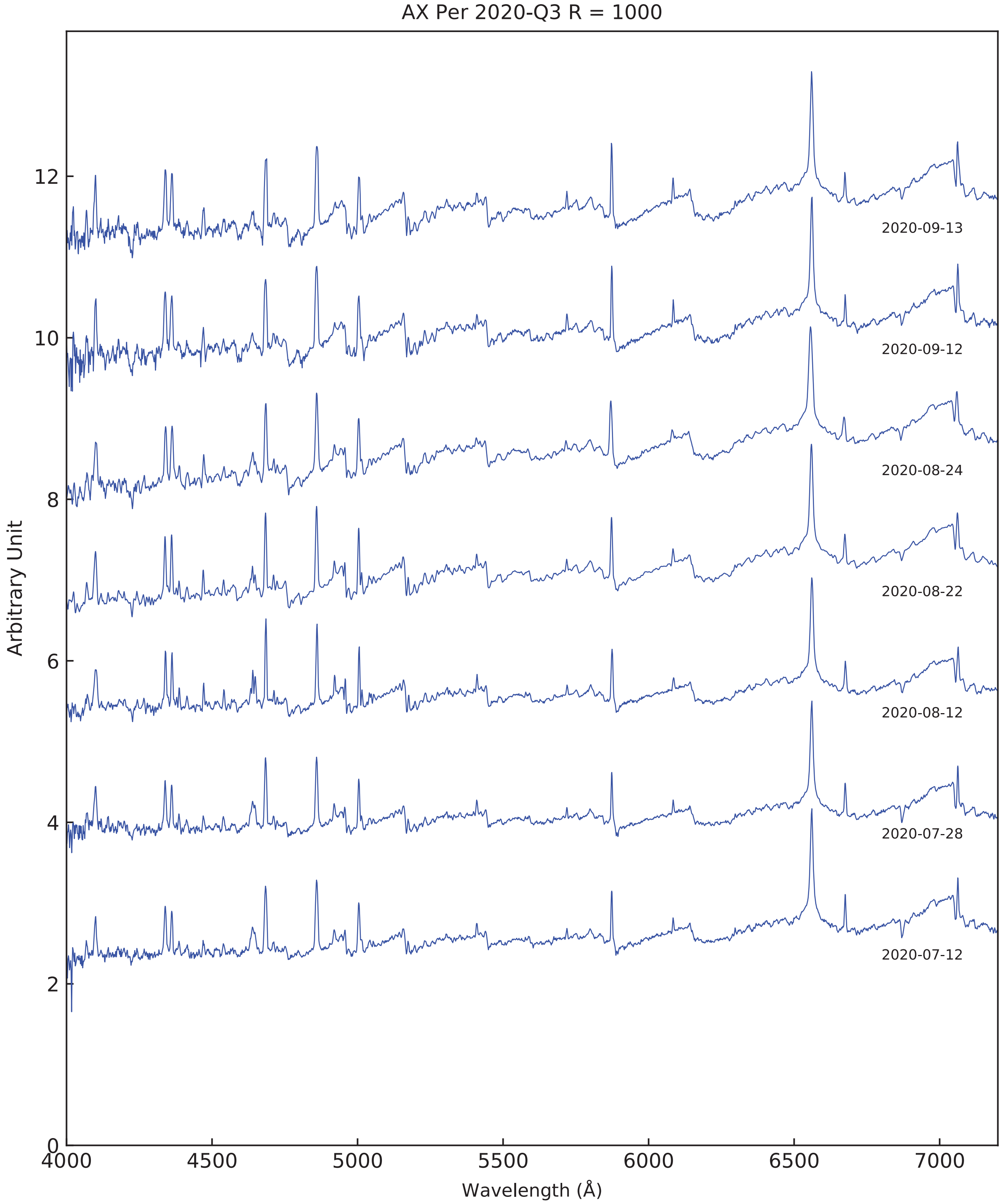
Coordinates (2000.0)	
R.A.	01 36 22.7
Dec	+54 15 02.4
Mag	11.1 (2020-04)



V band according to the phase (AAVSO selected data) Ephemeris: Mikolajewska+ (1992)
During the decline of the outburst observed in 2019 (orbital cycle 32, brown + line) the eclipse is shallow (Delta V= 0.4), the maximum V = 11.7 is observed on JD at phase 0.95 . The phase of the beginning of the eclipse (phase = 0.9) and the slope are similar to those observed during cycle 29. The egress of the eclipse (Cycle 33, black squares) follows that of cycle 27, slightly brighter than observed during cycles 31 and 32).

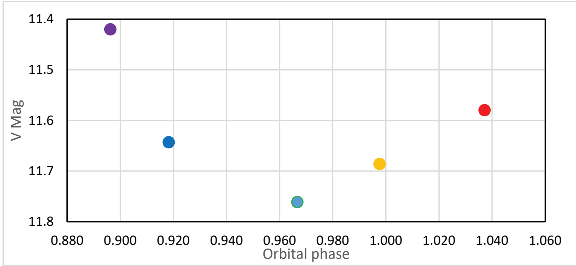


Measured AAVSO V-band magnitudes averaged and interpolated to the dates of ARAS spectra.



Tomas Medulka & Pavol Dubovsky (07-12) , David Boyd (07-28, 09-12, 09-13),
Pavol Dubovsky (08-12,08-22), Fran Campos (08-24)

Lines profiles variations during the eclipse from echelle spectra (R = 14000) obtained by Tim Lester.

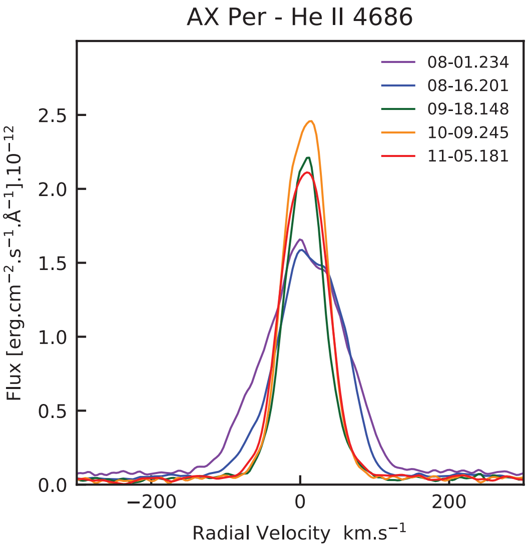


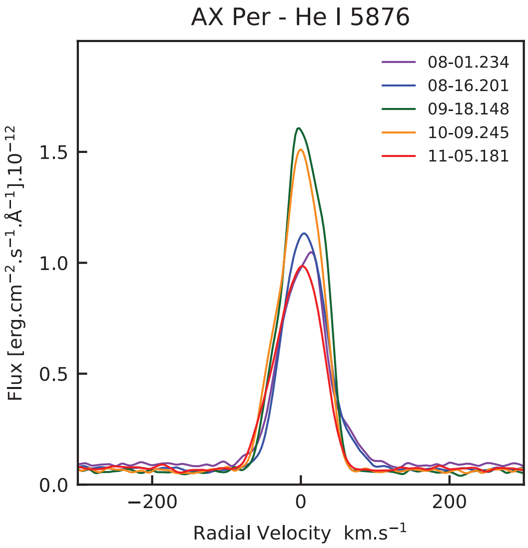
Color map for the spectra

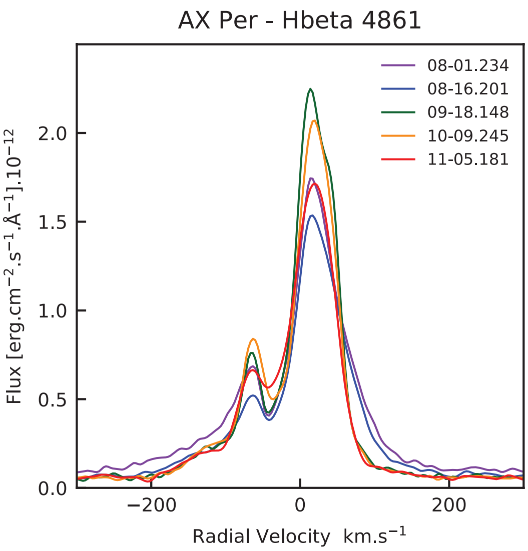
Date	JD	phase	V	Flux	FWHM
01/08/2020	2459062.78	0.896	11.42	3.14E-12	119
16/08/2020	2459077.75	0.918	11.64	2.65E-12	107
18/09/2020	2459110.71	0.967	11.76	2.26E-12	60
09/10/2020	2459131.78	0.998	11.69	2.75E-12	69
05/11/2020	2459158.72	1.037	11.58	2.61E-12	76

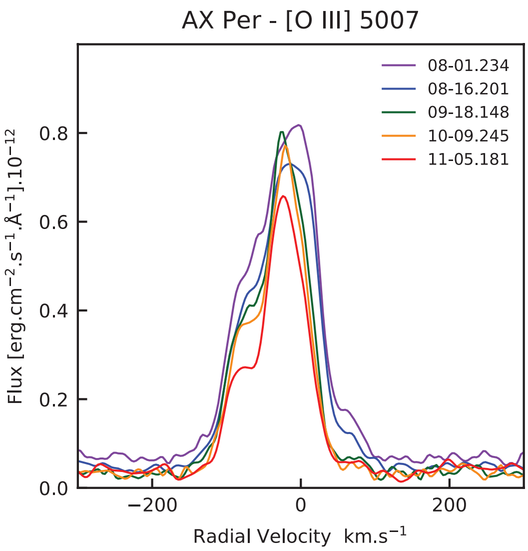
Flux in units of 10^{12} erg.cm^{1}

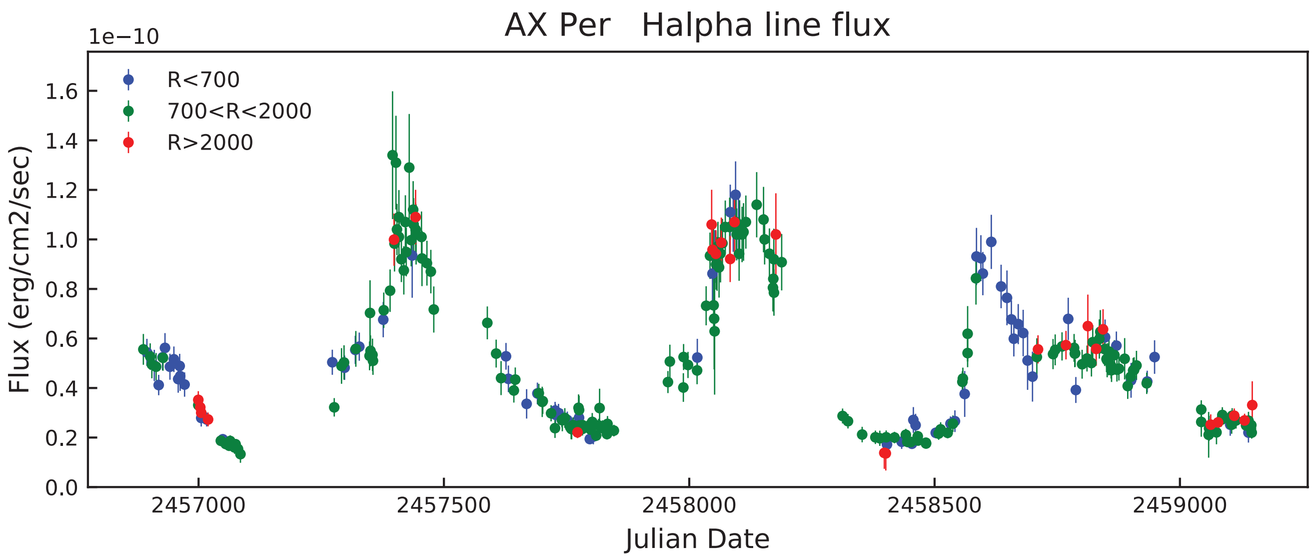
FWHM in k.ms^{1}

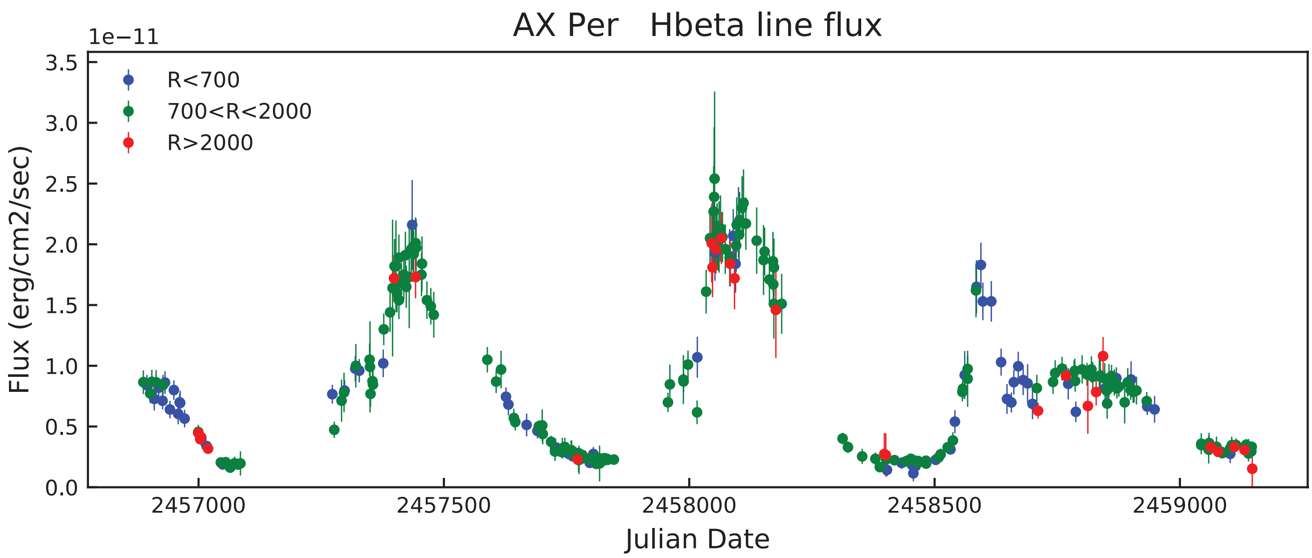


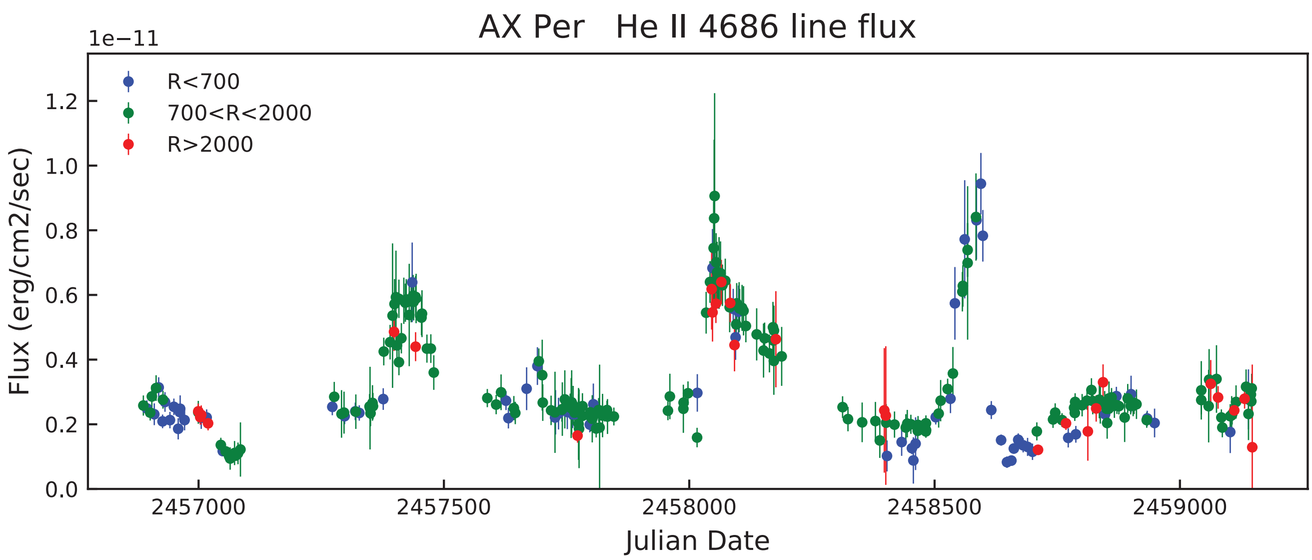


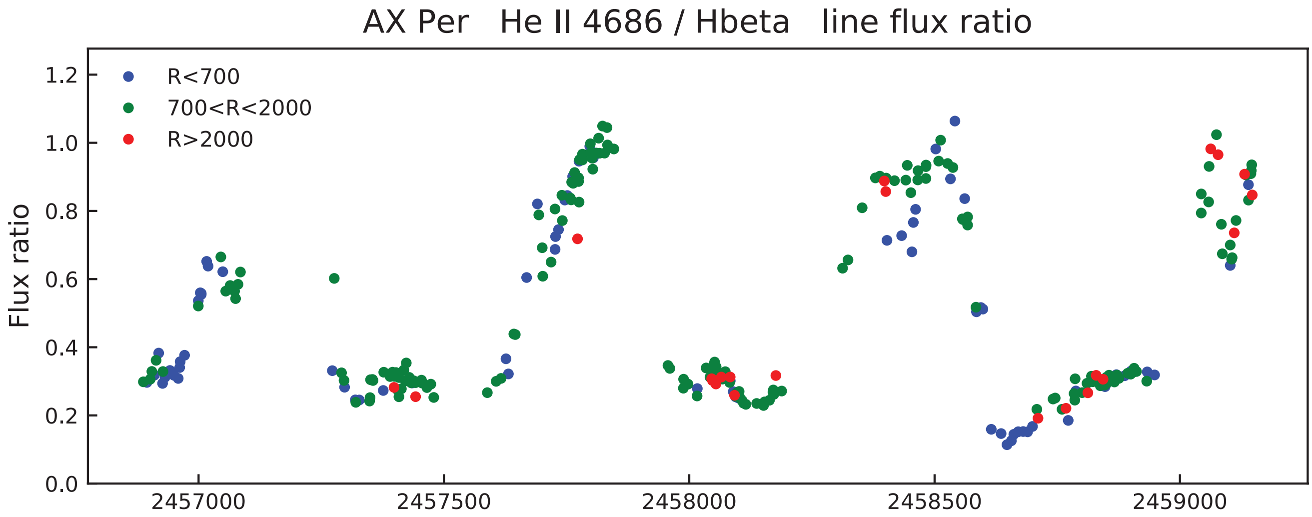


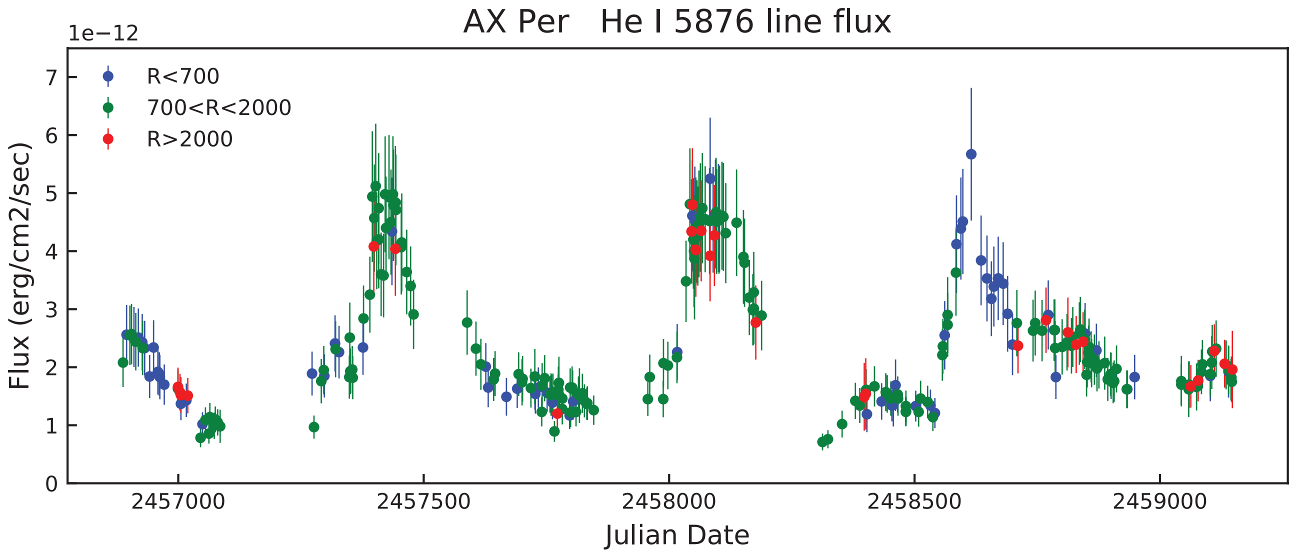


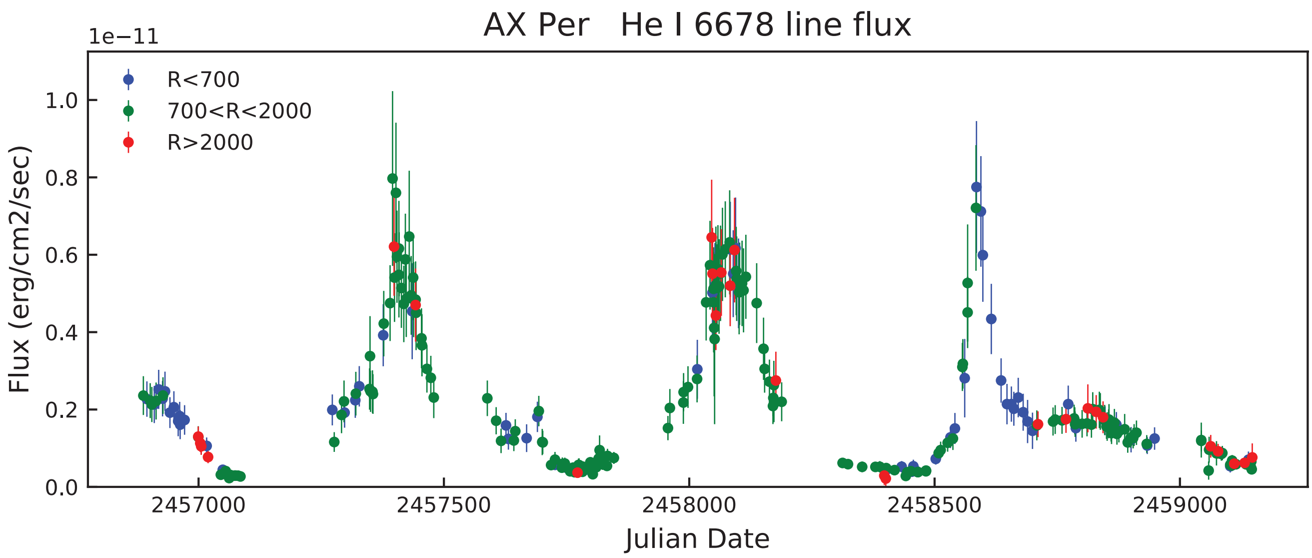

AX Per Halpha line flux
1e−10
R<700
700<R<2000
R>2000
Flux (erg/cm2/sec)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
2457000
2457500
2458000
2458500
2459000
Julian Date

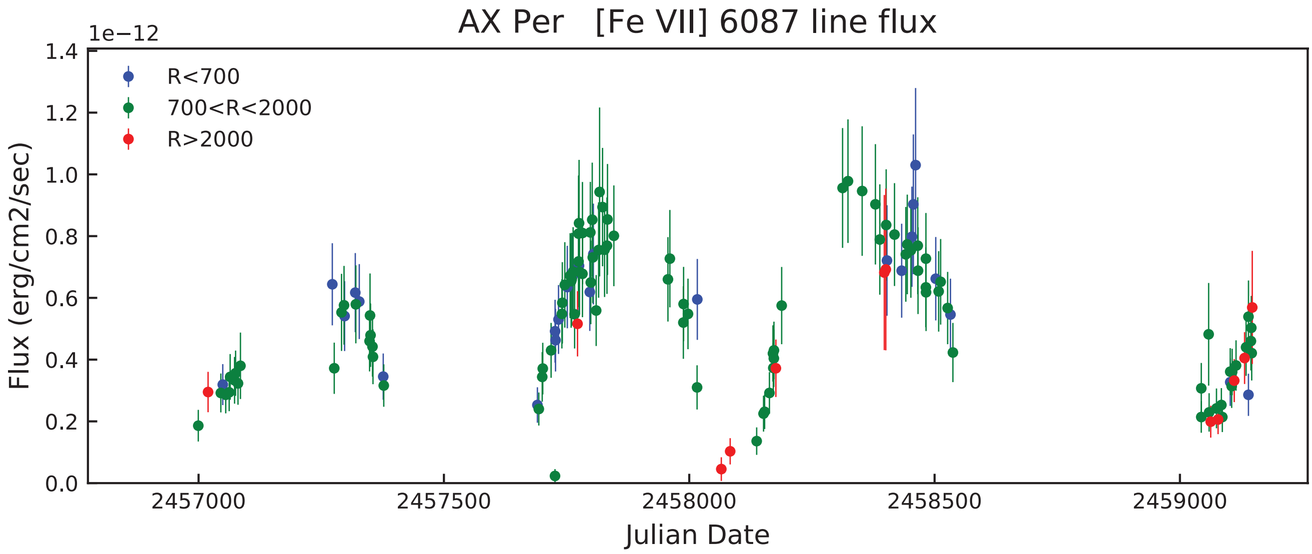

AX Per Hbeta line flux
1e−11
R<700
700<R<2000
R>2000
Flux (erg/cm2/sec)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
2457000
2457500
2458000
2458500
2459000
Julian Date

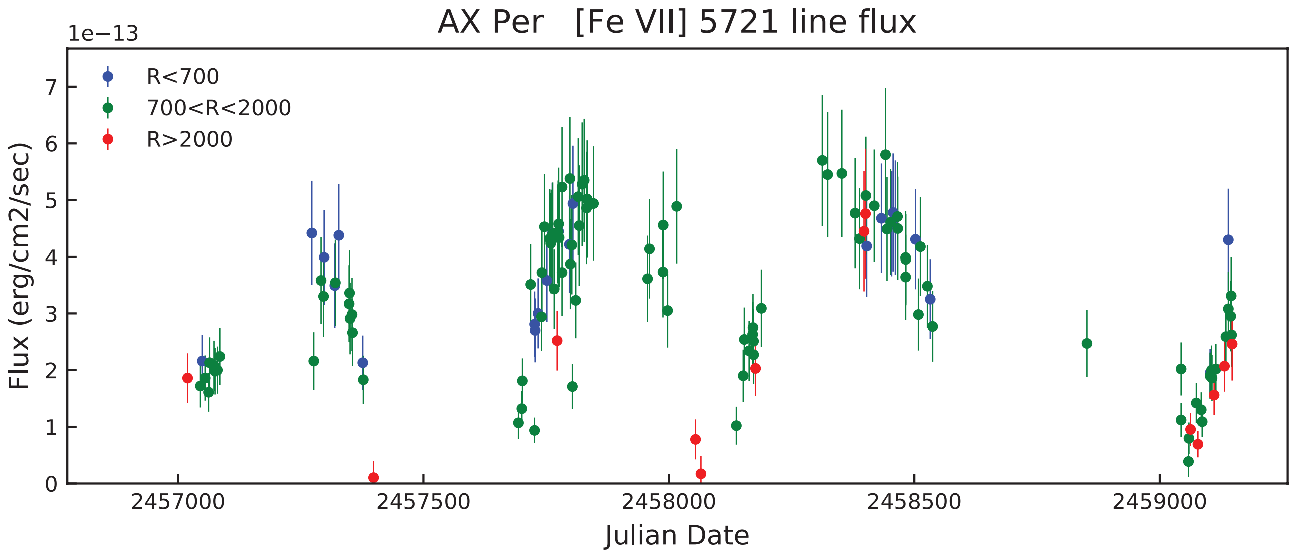

AX Per He II 4686 line flux
1e−11
R<700
700<R<2000
R>2000
Flux (erg/cm2/sec)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
2457000
2457500
2458000
2458500
2459000
Julian Date


AX Per He II 4686 / Hbeta line flux ratio
Flux ratio
1.2
1.0
0.8
0.6
0.4
0.2
0.0
R<700
700<R<2000
R>2000
2457000
2457500
2458000
2458500
2459000


AX Per He I 5876 line flux
1e−12
Flux (erg/cm2/sec)
7
6
5
4
3
2
1
0
R<700
700<R<2000
R>2000
2457000
2457500
2458000
2458500
2459000
Julian Date


AX Per He I 6678 line flux
1e−11
Flux (erg/cm2/sec)
1.0
0.8
0.6
0.4
0.2
0.0
R<700
700<R<2000
R>2000
2457000
2457500
2458000
2458500
2459000
Julian Date

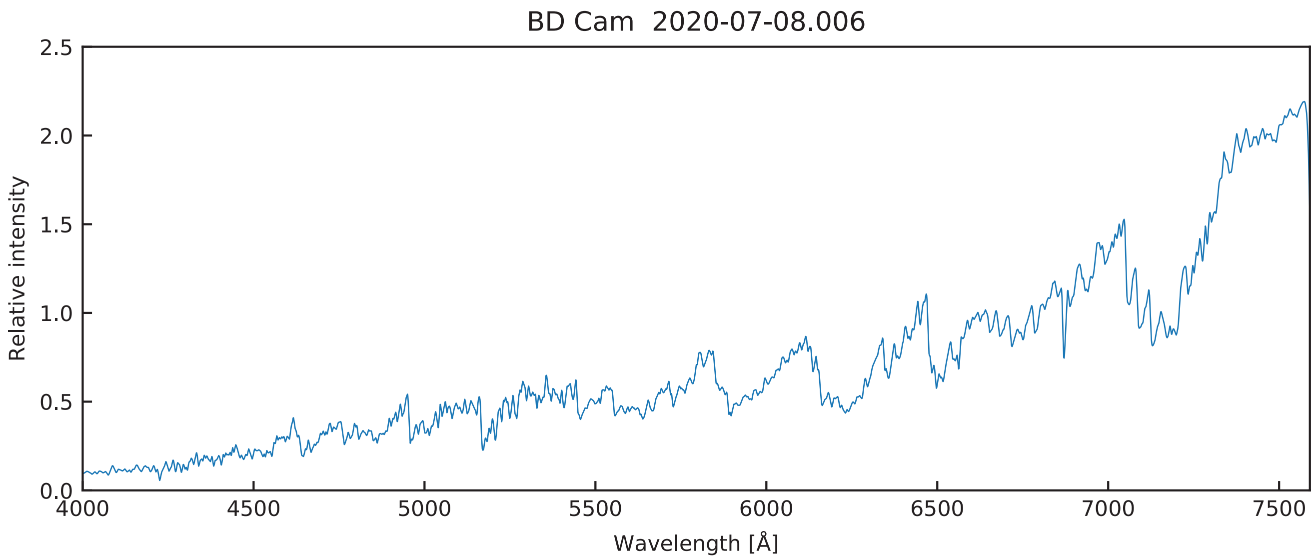

AX Per [Fe VII] 6087 line flux
1e−12
R<700
700<R<2000
R>2000
Flux (erg/cm2/sec)
Julian Date
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2457000
2457500
2458000
2458500
2459000


AX Per [Fe VII] 5721 line flux
1e−13
R<700
700<R<2000
R>2000
Flux (erg/cm2/sec)
Julian Date
7
6
5
4
3
2
1
0
2457000
2457500
2458000
2458500
2459000

BD Cam

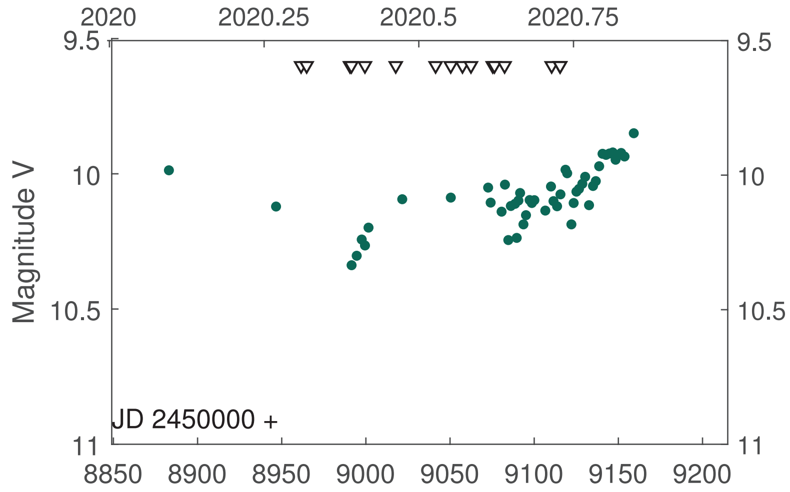
Coordinates (2000.0)	
R.A.	03 37 47.7
Dec	+63 03 24.7
Mag	5

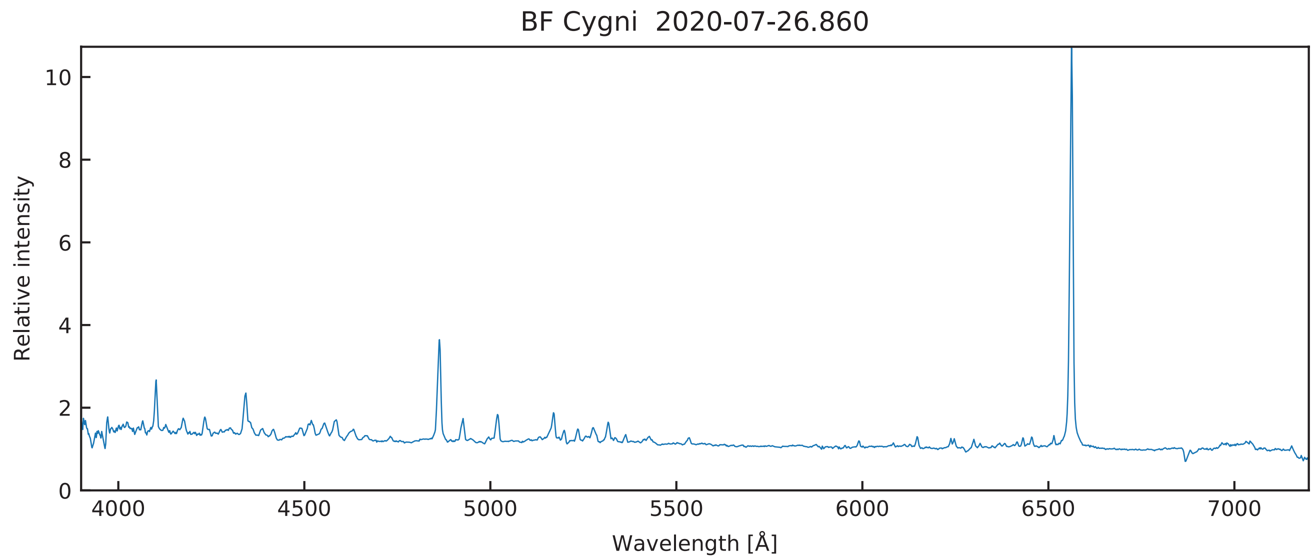
Still no emission lines detected



BD Cam - Spectrum acquired by Tomas Medulka and Pavol Dubovsky with a LISA (R = 1000)

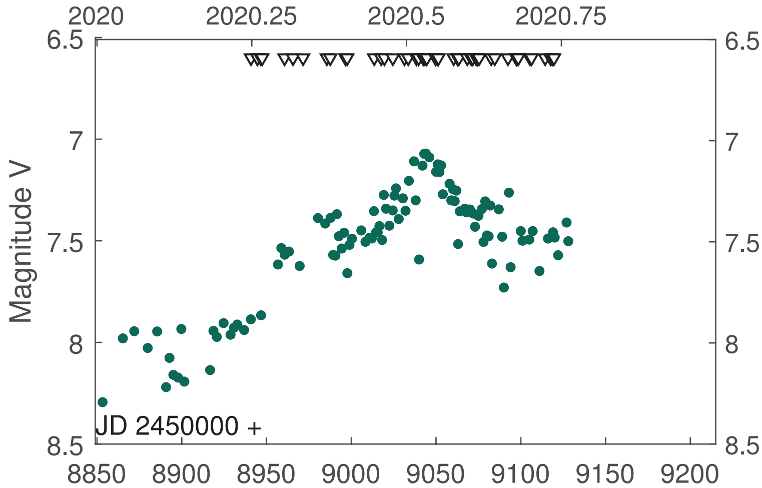
Coordinates (2000.0)	
R.A.	19 23 53.5
Dec	+29 40 29.2
Mag V	10.1 (2020-06)



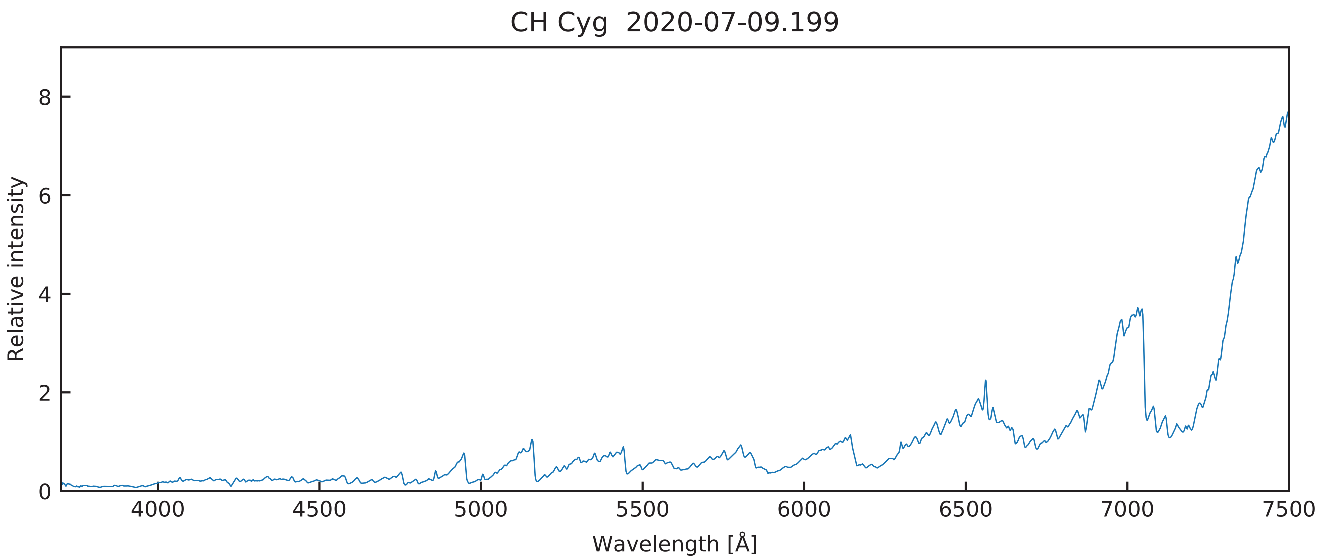


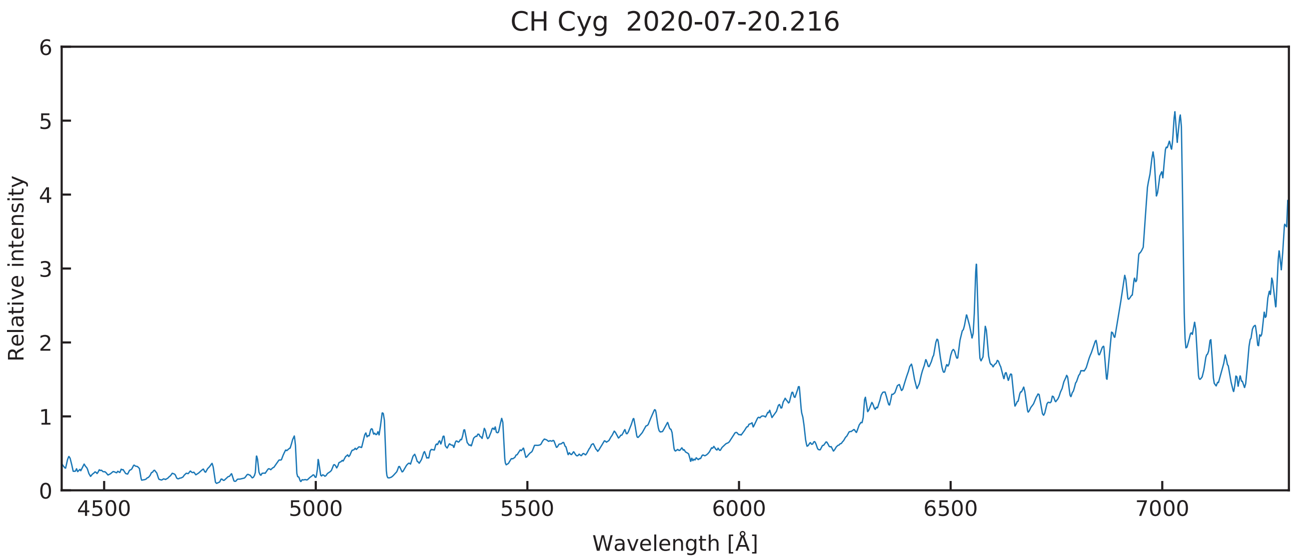
BF Cygni - Spectrum acquired by Jacques Michelet with a LISA (R = 1000)

Coordinates (2000.0)	
R.A.	19 24 33.0
Dec	50 14 29.0
Mag V	7.9 - 7.3

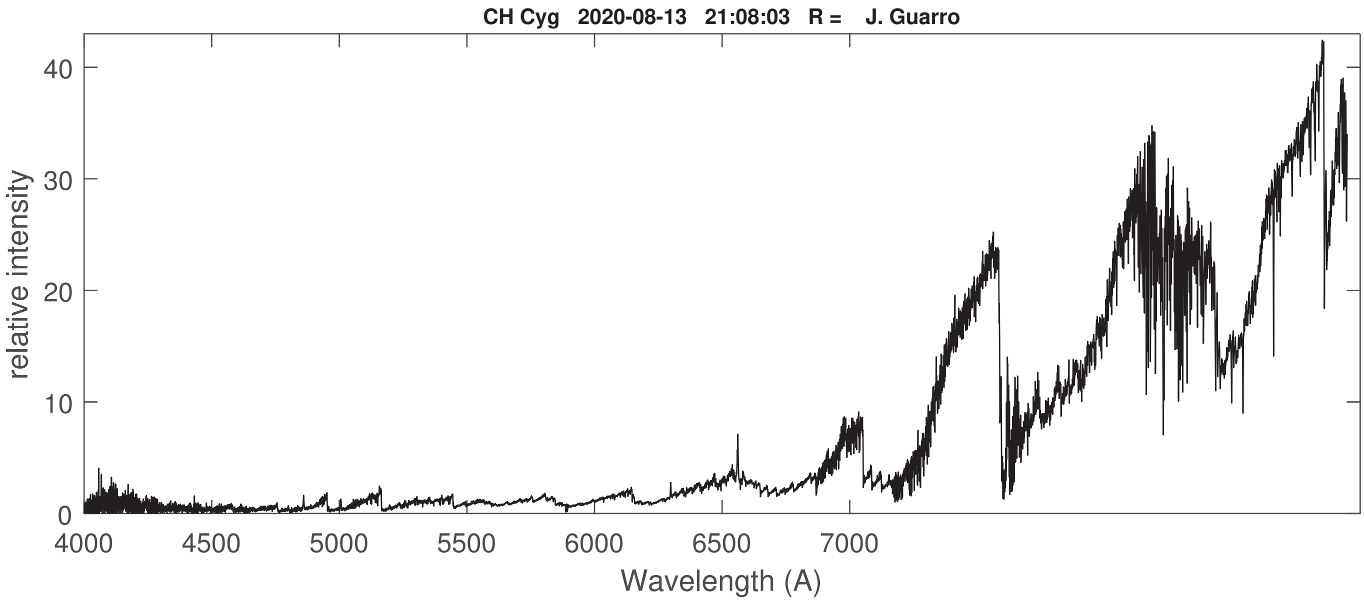


AAVSO (V band - 1 day mean - selected data) and ARAS spectra in 2020
The luminosity continued to rise until 2020-07-12 to reach a maximum at mag V ~ 7.1 and then decrease until 2020-09-07.(~ 7.5)

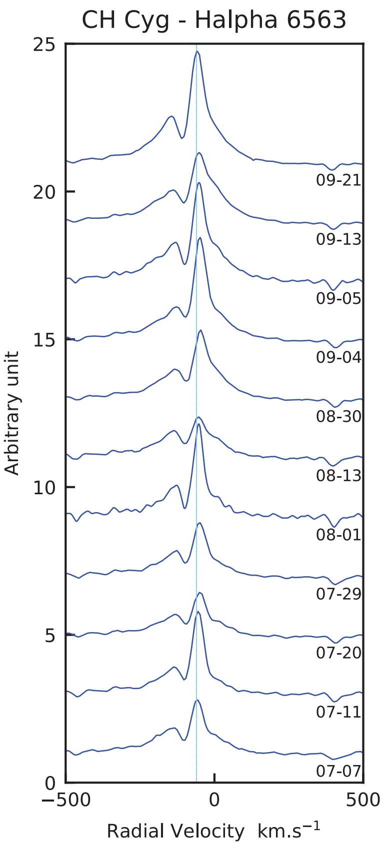


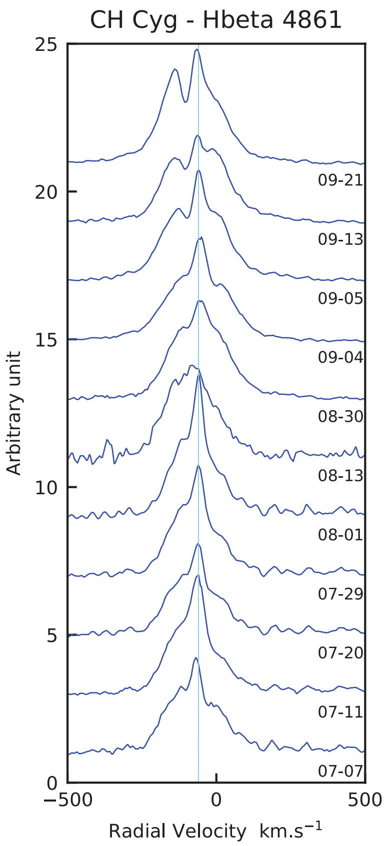


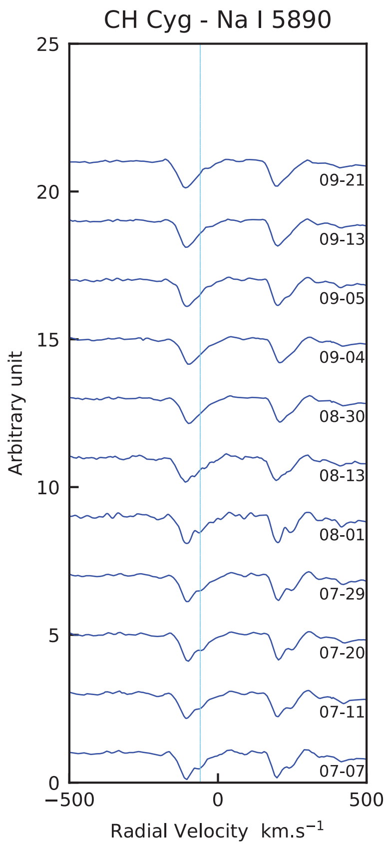
CH Cyg respectively acquired by Sean Curry (ALPY R = 600) and by Keith Shank (LISA R = 1000)

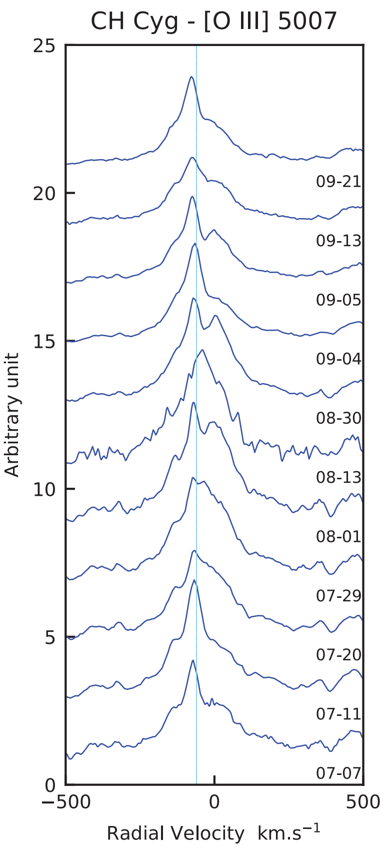


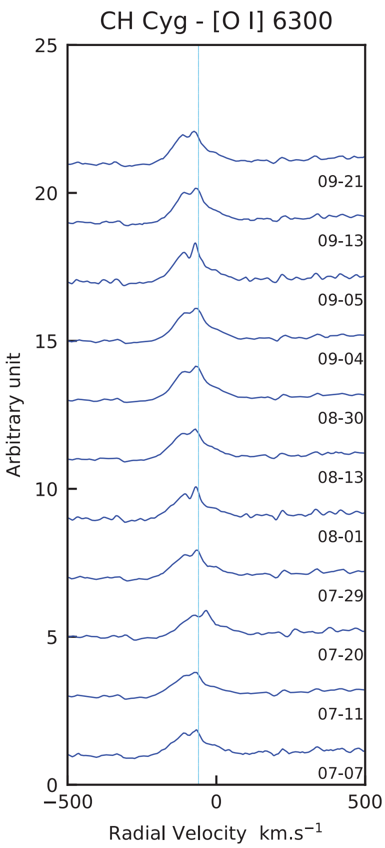
CH Cygni obtained on 2020-28-13 by Joan Guarro with his new prototype NOU-T at R = 10000







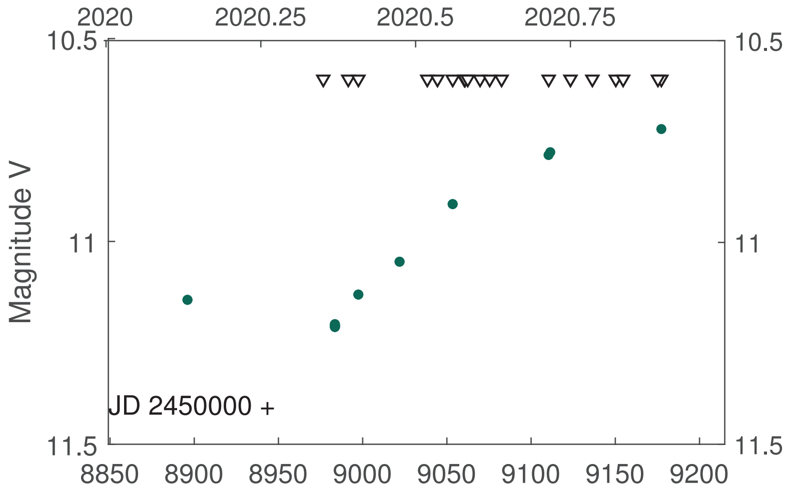


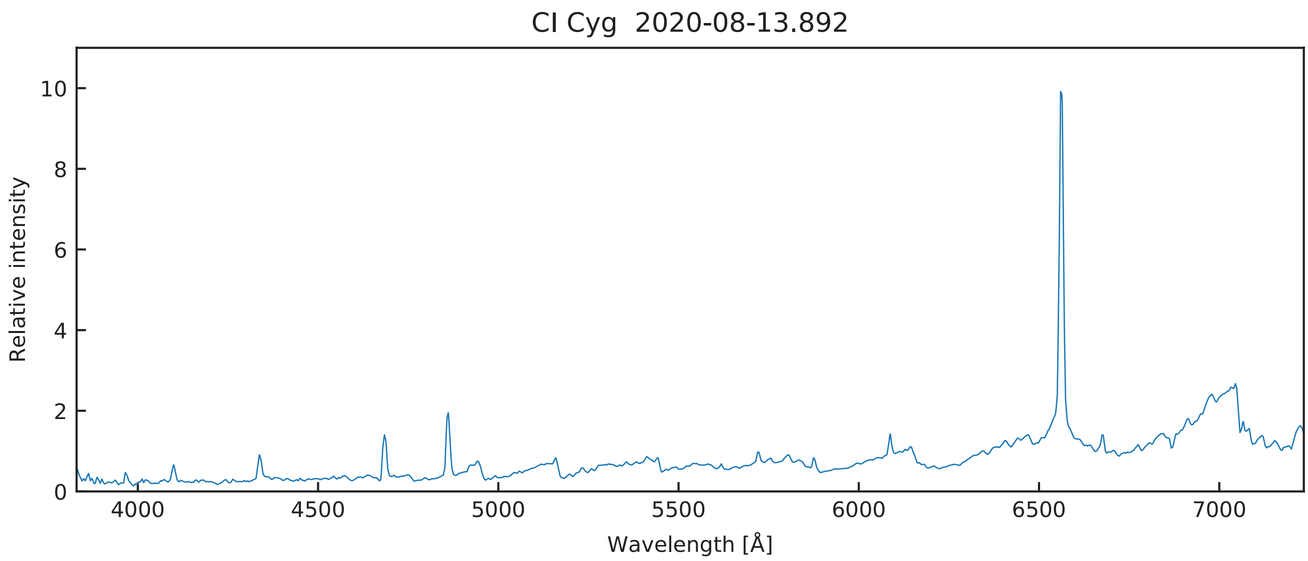


Main lines profiles from echelle spectra acquired by François Teyssier and Joan Guarro

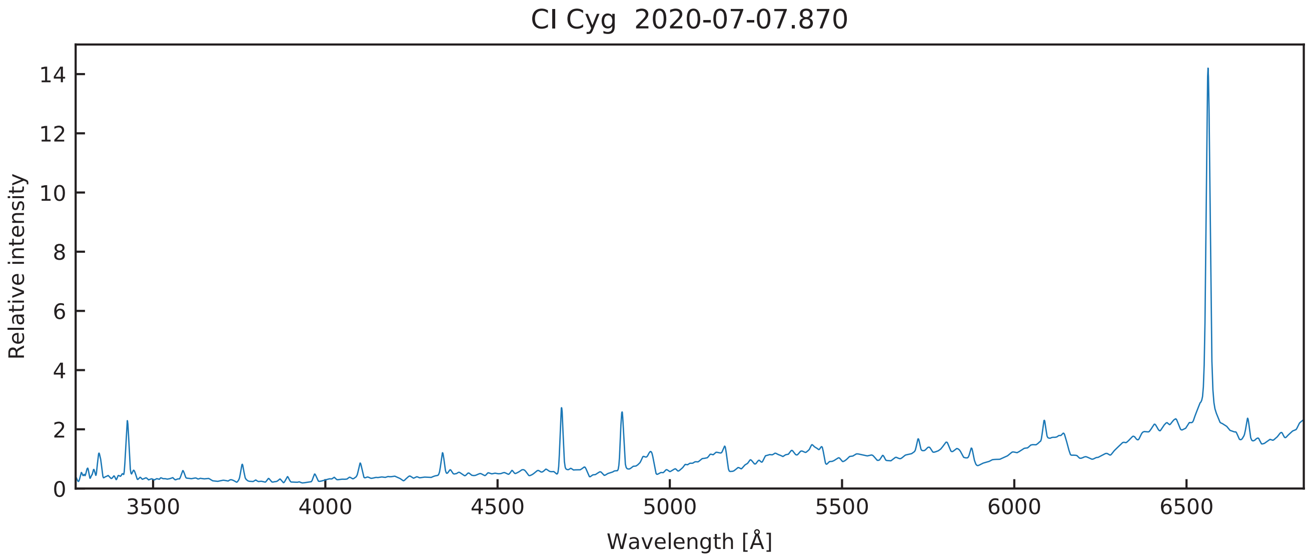
Coordinates (2000.0)	
R.A.	19 50 11.8
Dec	+35 41 03.0
Mag V	11.0 (2020-06)

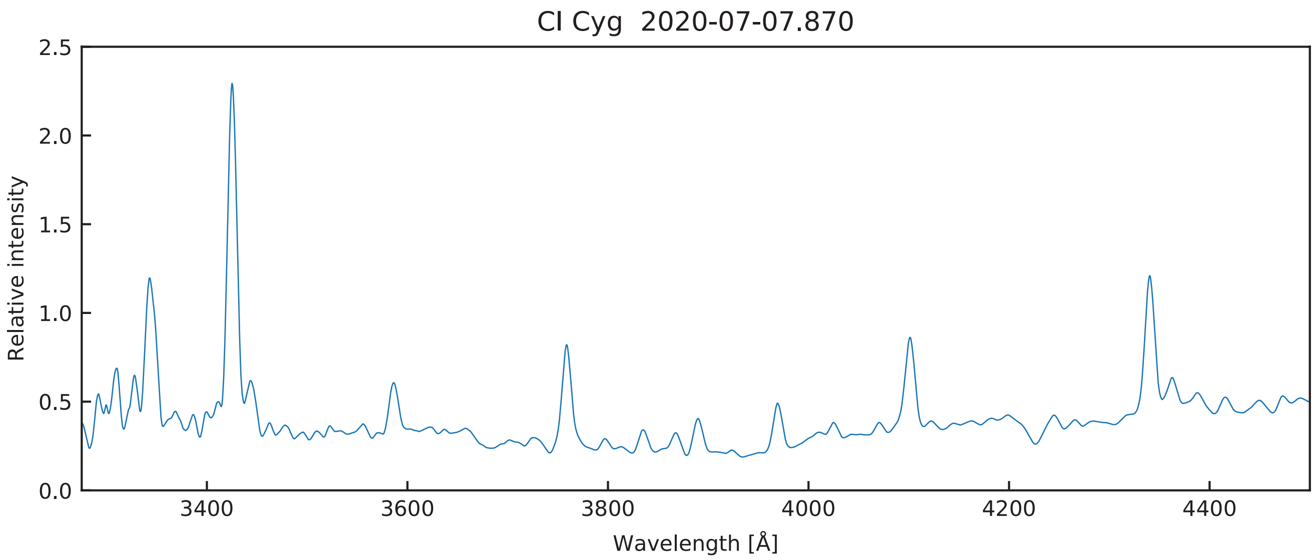
Egress of the eclipse
01-07-2020: Phase = 0.079
01-10-2020: Phase = 0.186



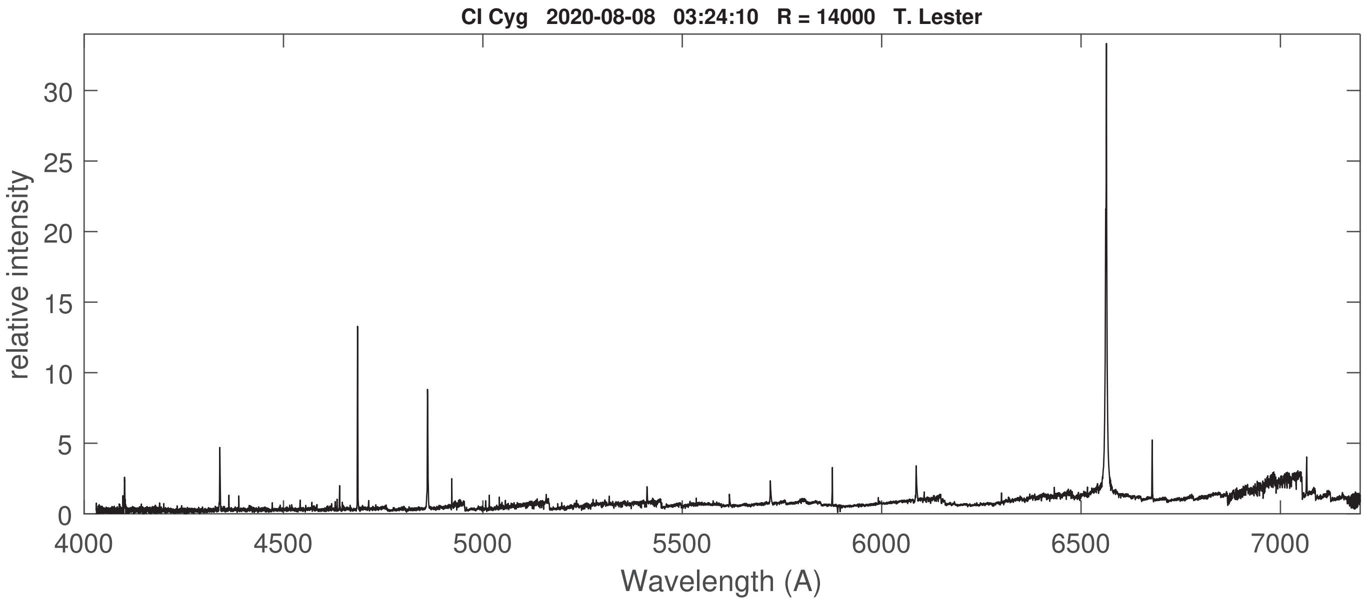


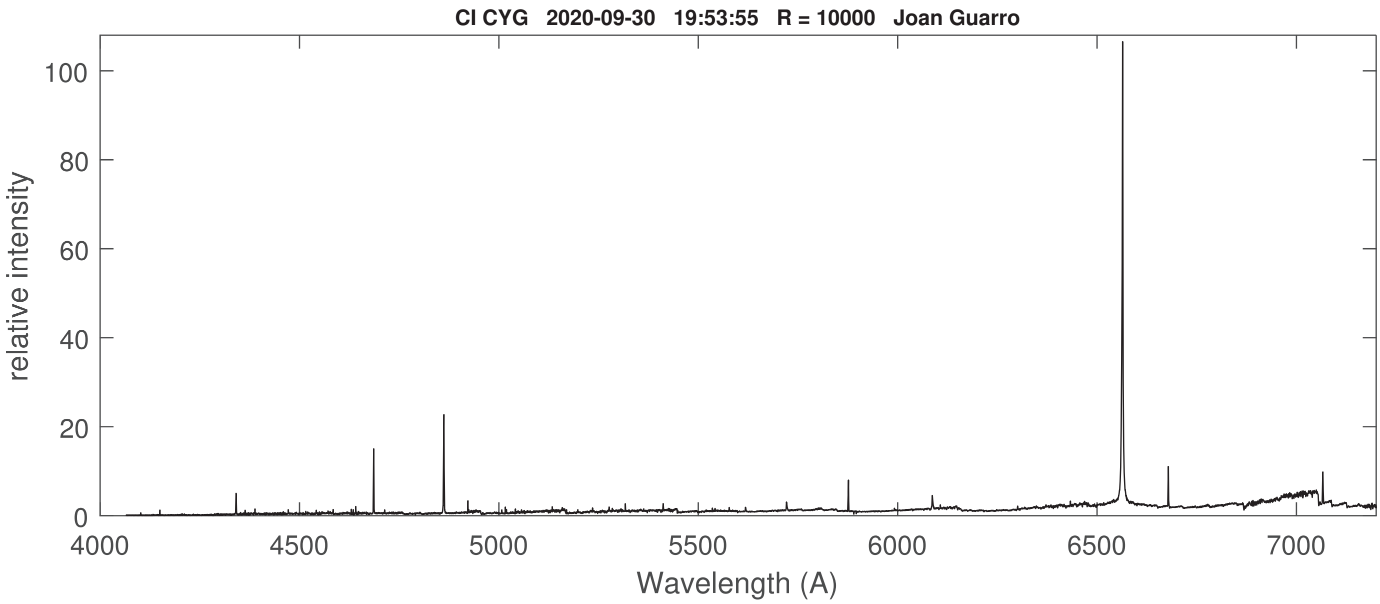
Lorenzo Franco acquired this spectrum of CI Cygni using an ALPY600 mounted on a SC8"

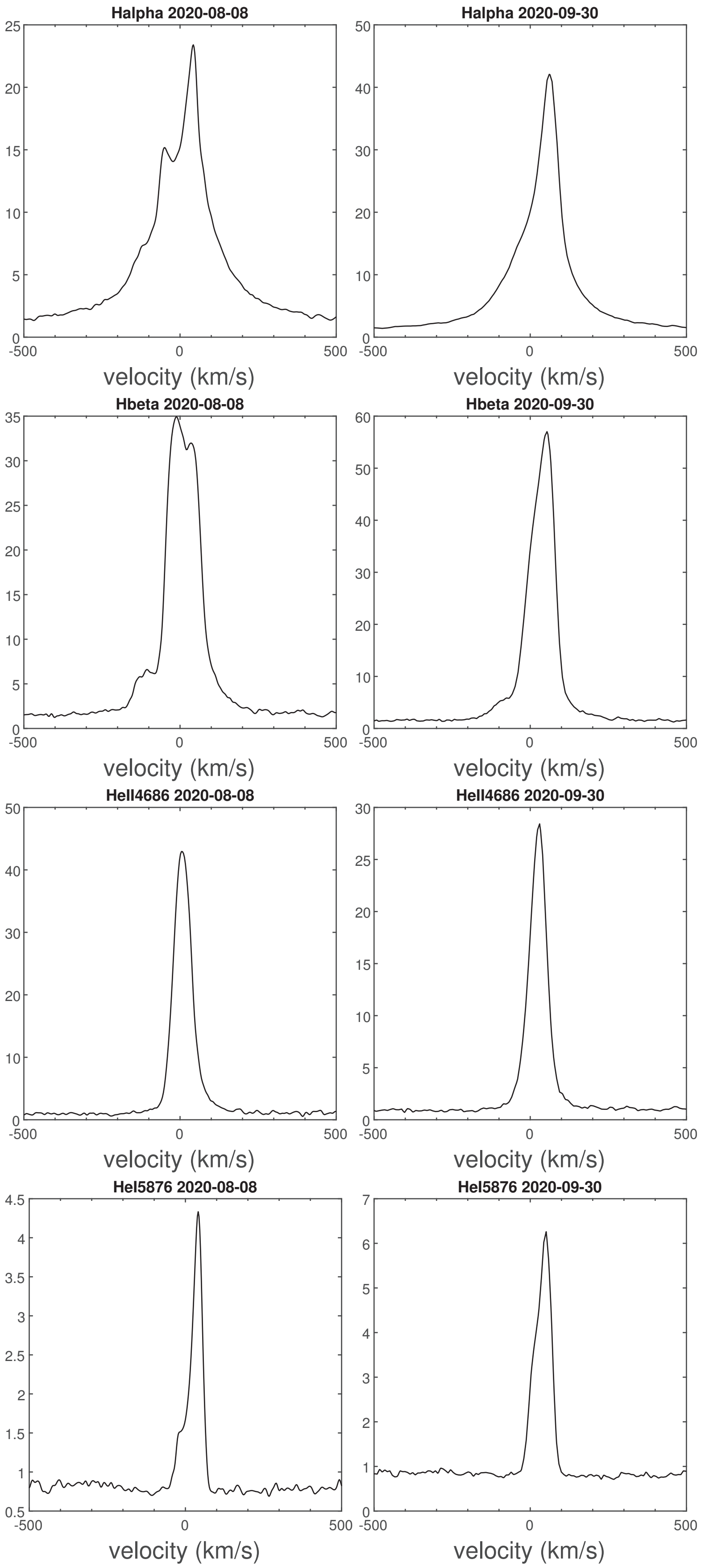




Spectrum acquired Christian Buil UVEX R = 475.
The UVEX opens a new field for Citizen Astronomers.
The near UV with good SNR is now within their reach.


CI Cyg 2020-08-08 03:24:10 R = 14000 T. Lester
relative intensity
0
5
10
15
20
25
30
4000
4500
5000
5500
6000
6500
7000
Wavelength (A)

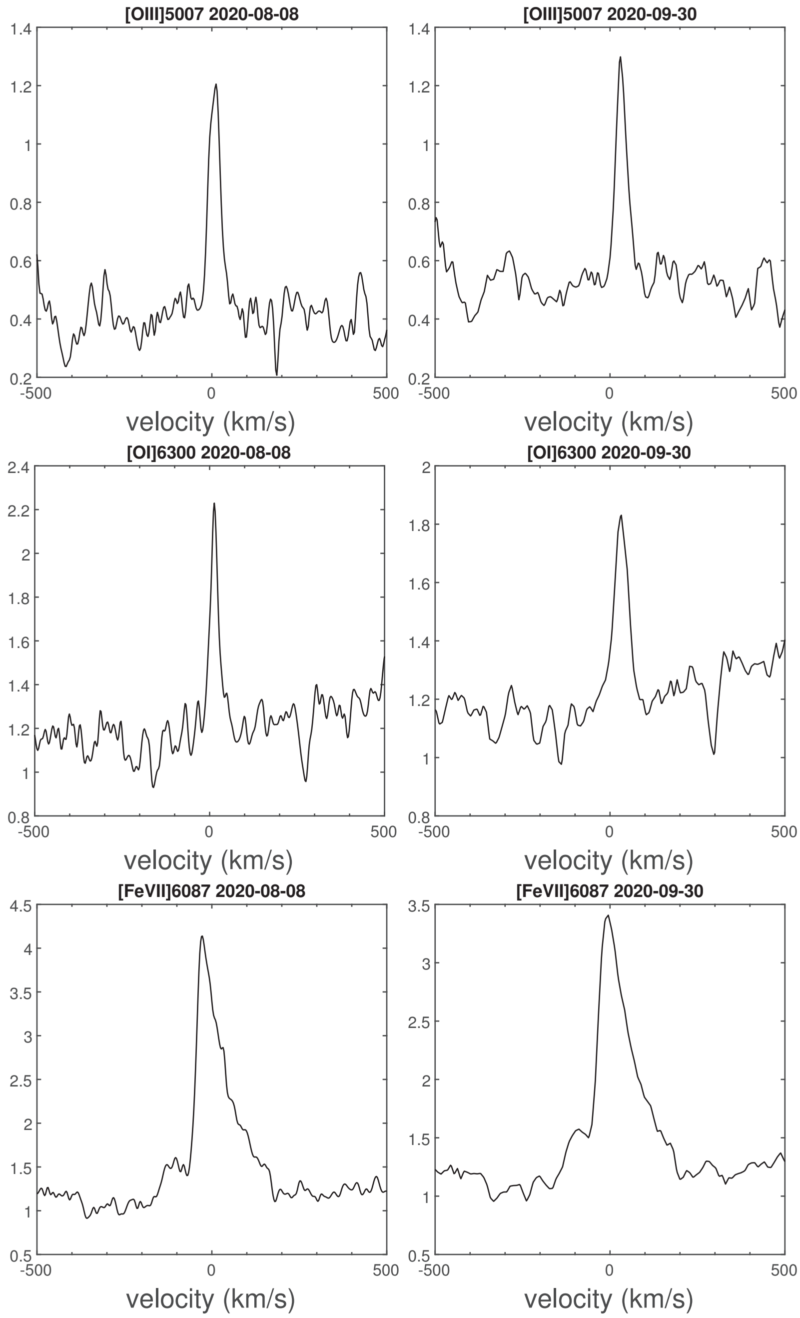

CI CYG 2020-09-30 19:53:55 R = 10000 Joan Guarro
relative intensity
0
20
40
60
80
100
4000
4500
5000
5500
6000
6500
7000
Wavelength (A)

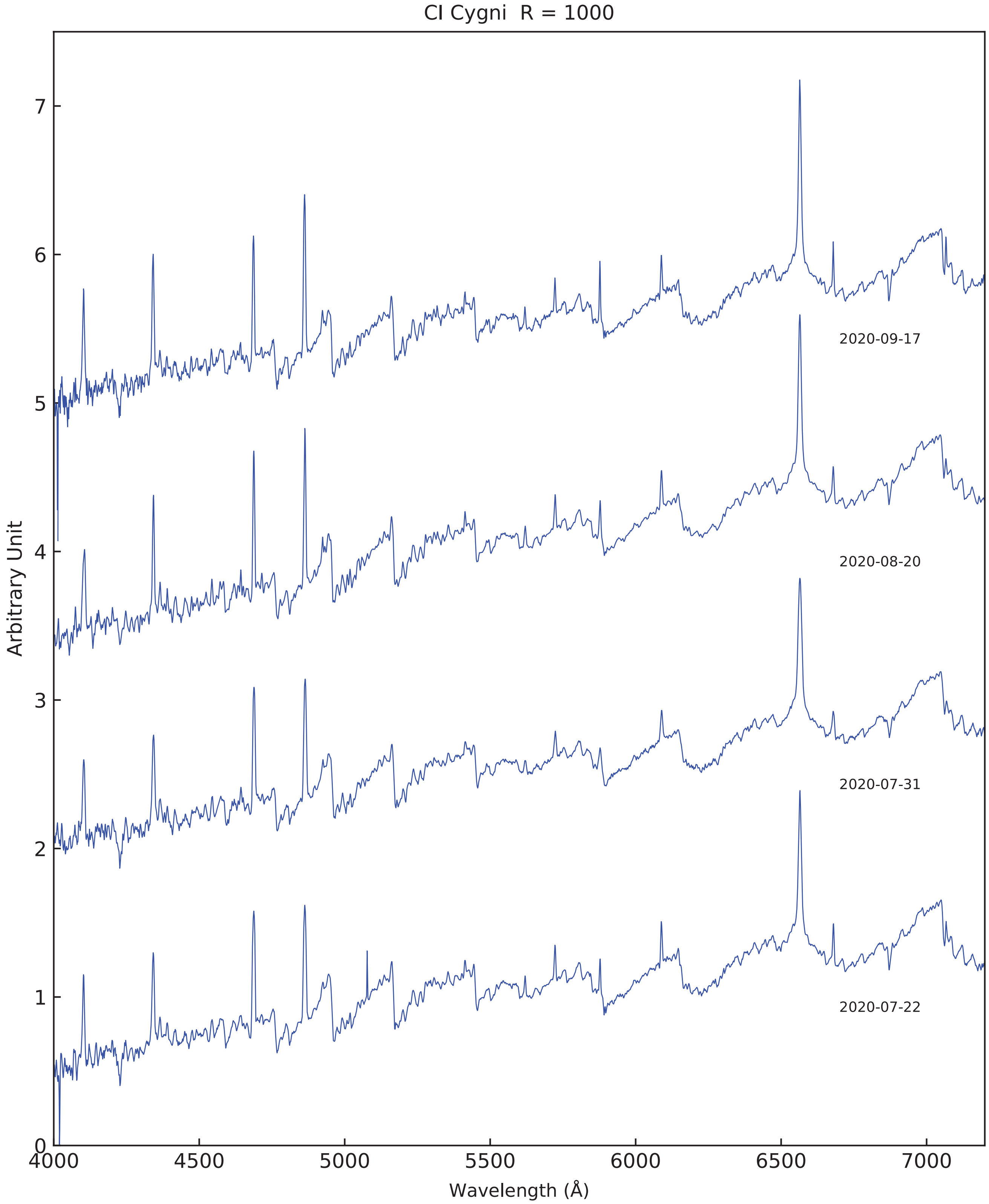


Profiles of the main emission lines from echelle spectra respectively by Tim Lester (R = 14000 and Joan Guarro (R = 10000).

We have not sufficient spectra for an accurate monitoring of the very complex and fast changes of the profiles during this eclipse.

Rendez-vous in 2022 for a better coverage of the eclipse. We should aim for two spectra per week between February and August 2020. See e.g. Teyssier, 2019 (http://articles.adsabs.harvard.edu/pdf/2019CoSka..49..217T)


[OIII]5007 2020-08-08
[OIII]5007 2020-09-30
[OI]6300 2020-08-08
[OI]6300 2020-09-30
[FeVII]6087 2020-08-08
[FeVII]6087 2020-09-30
velocity (km/s)

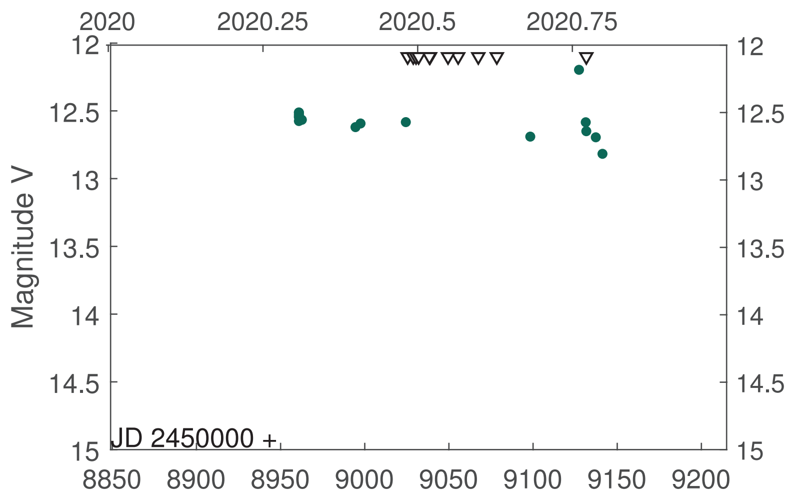


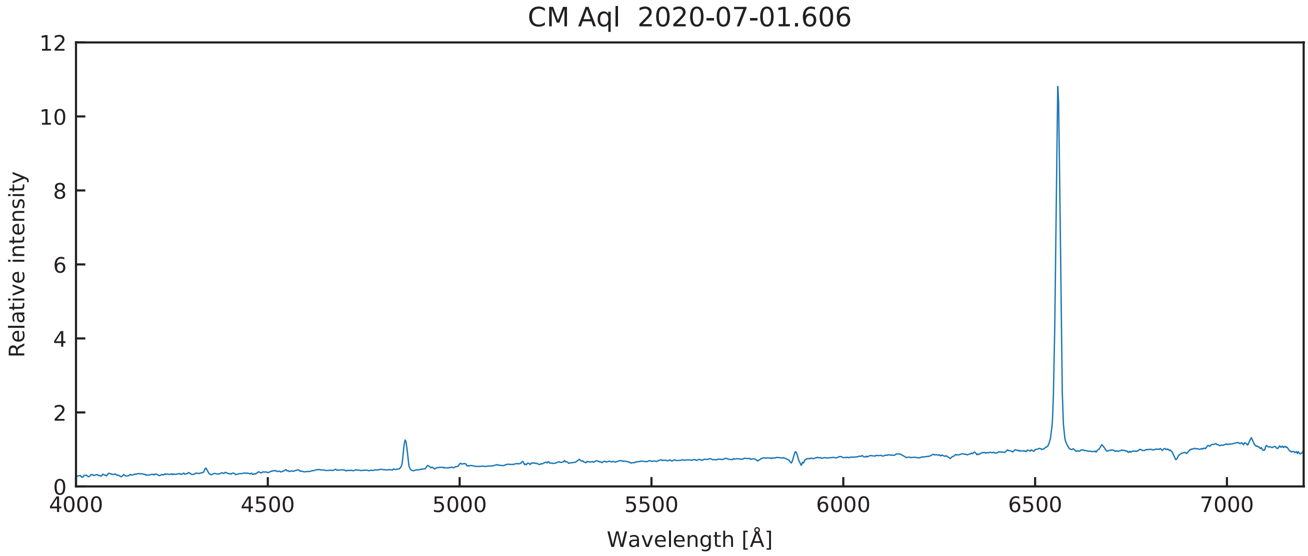
LISA (R = 1000) sequence during 2020-Q3 with spectra obtained by David Boyd (22-07-2020 & 17-09-2020), Forrest Sims (31-07-2020) and Pavol Dubovsky (20-08-2020)

CM Aql

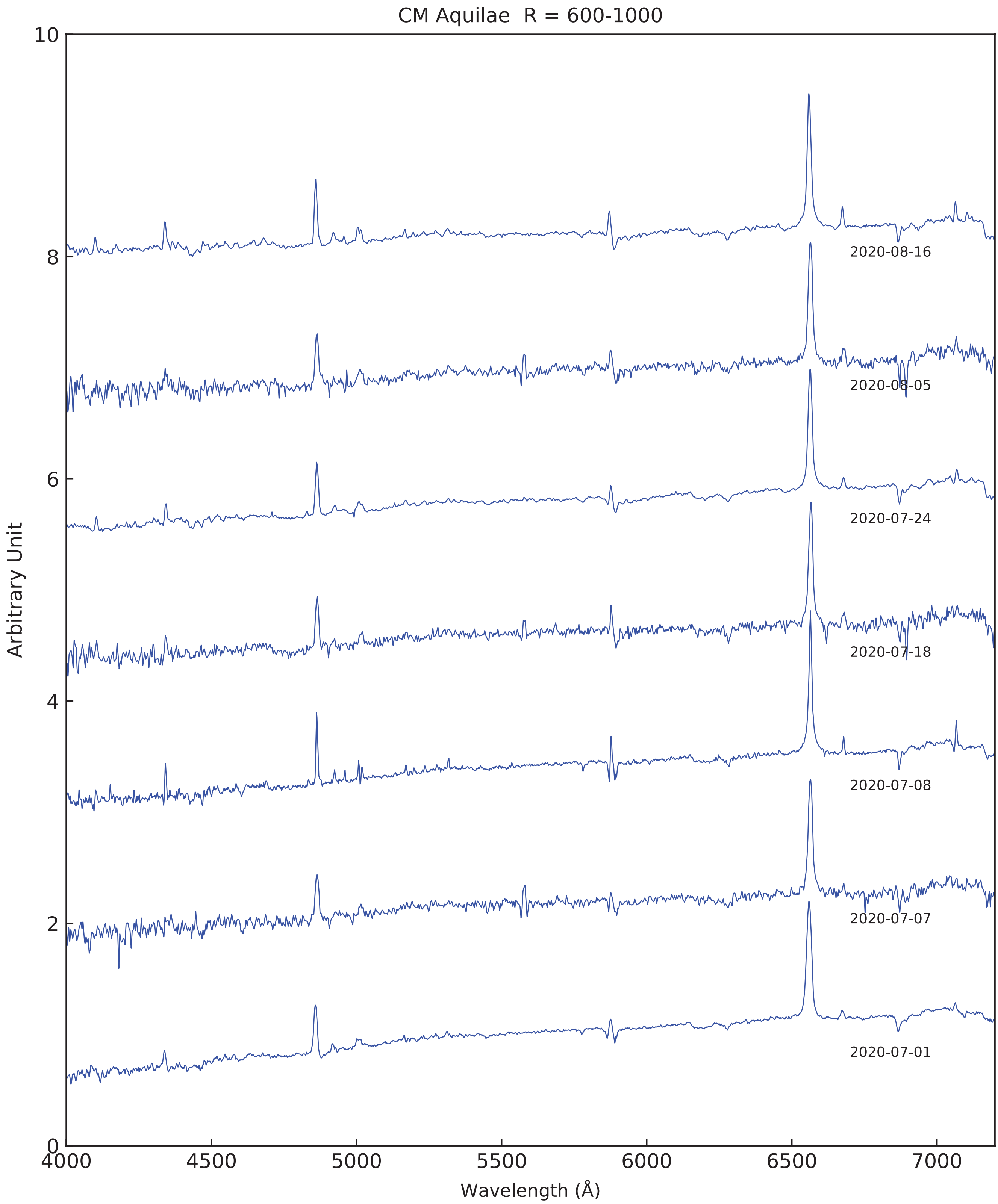
Coordinates (2000.0)	
R.A.	19 03 35.1
Dec	-03 03 15.3
Mag V	11.7 (2020-06)

The poorly studied symbiotic star CM Aql was detected in outburst mid April by U. Munari & al. (ATel# 13647) following a GAIA alert.

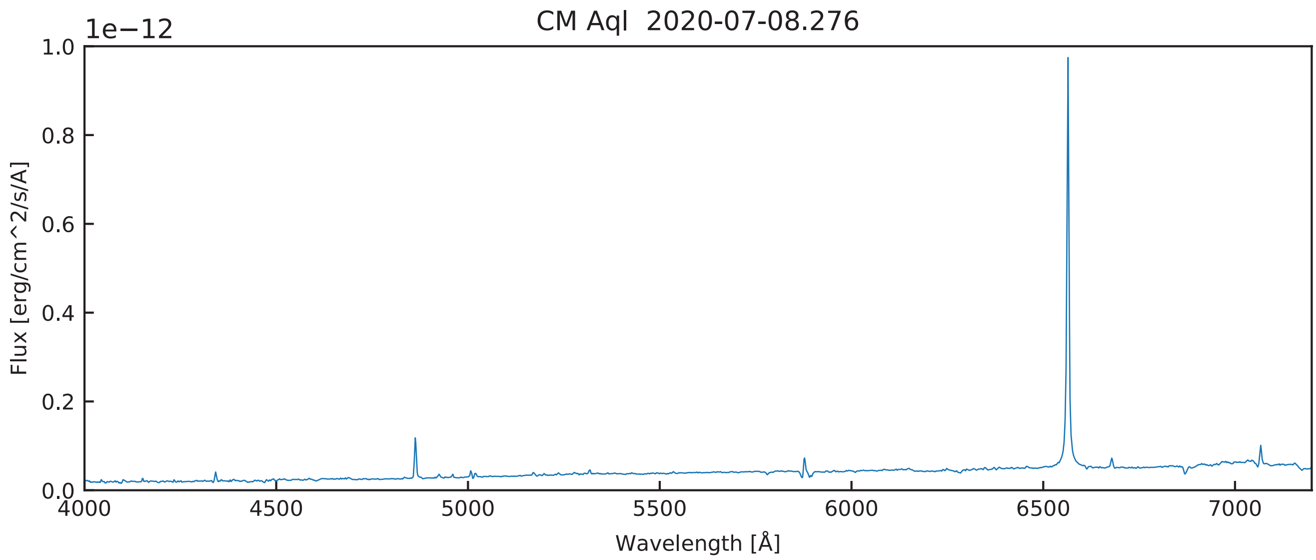


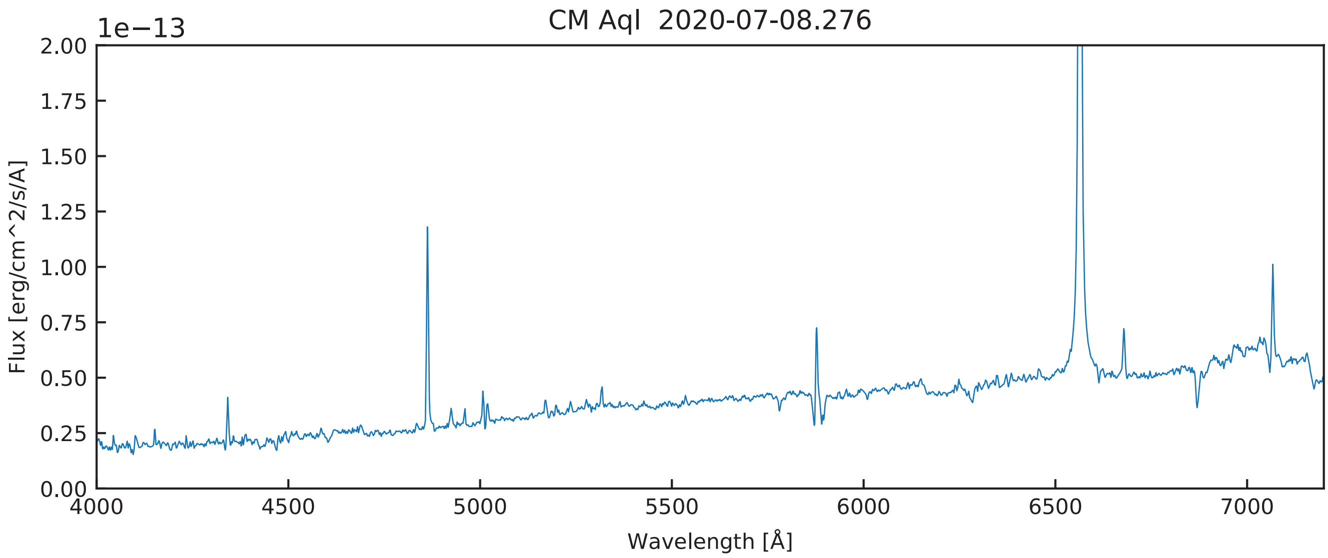


Spectrum acquired by Colin Eldrige with an ALPY 600



Monitoring of the outburst with spectra obtained by Colin Elridge, Christophe Boussin, Forrest Sims, Paolo Cazzato

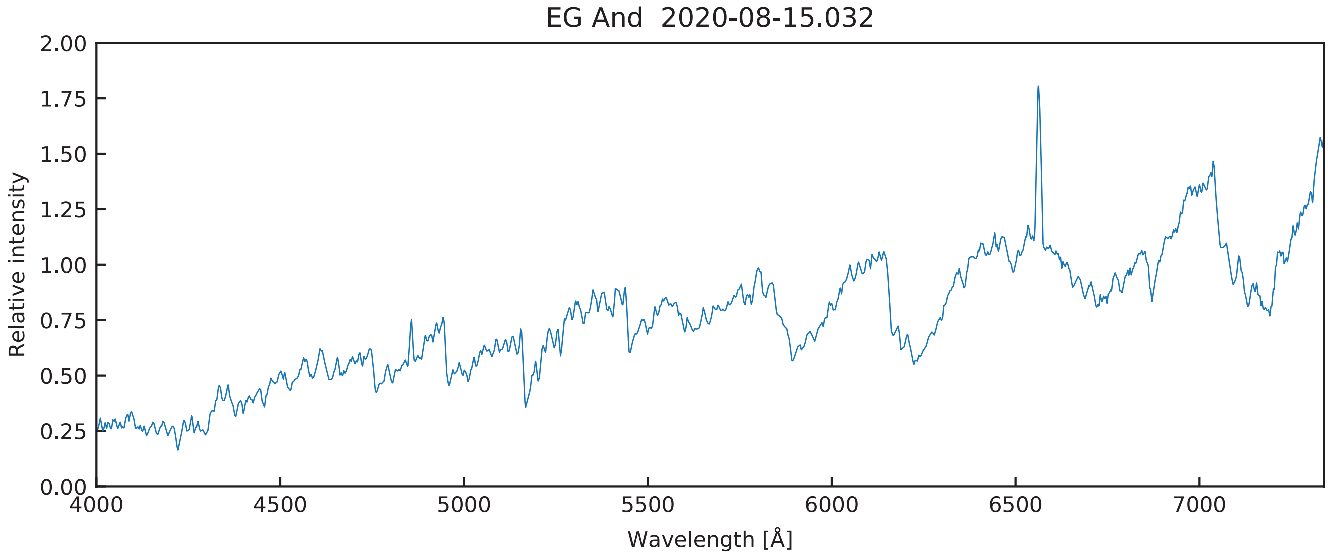




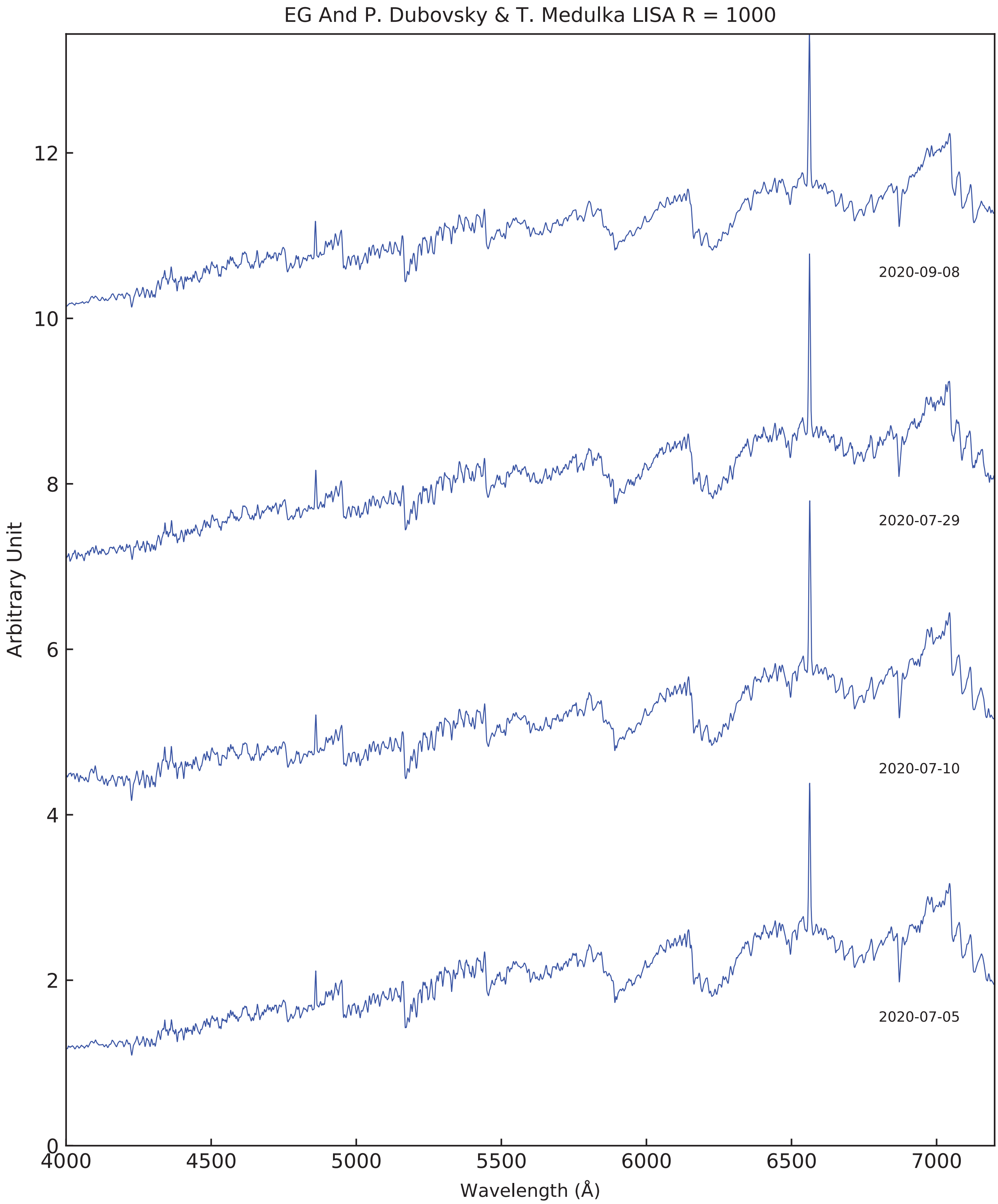
Flux calibrated spectrum (V= 12.504 +/- 0.037) secured by Forrest Sims with a LISA (R = 1000)

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

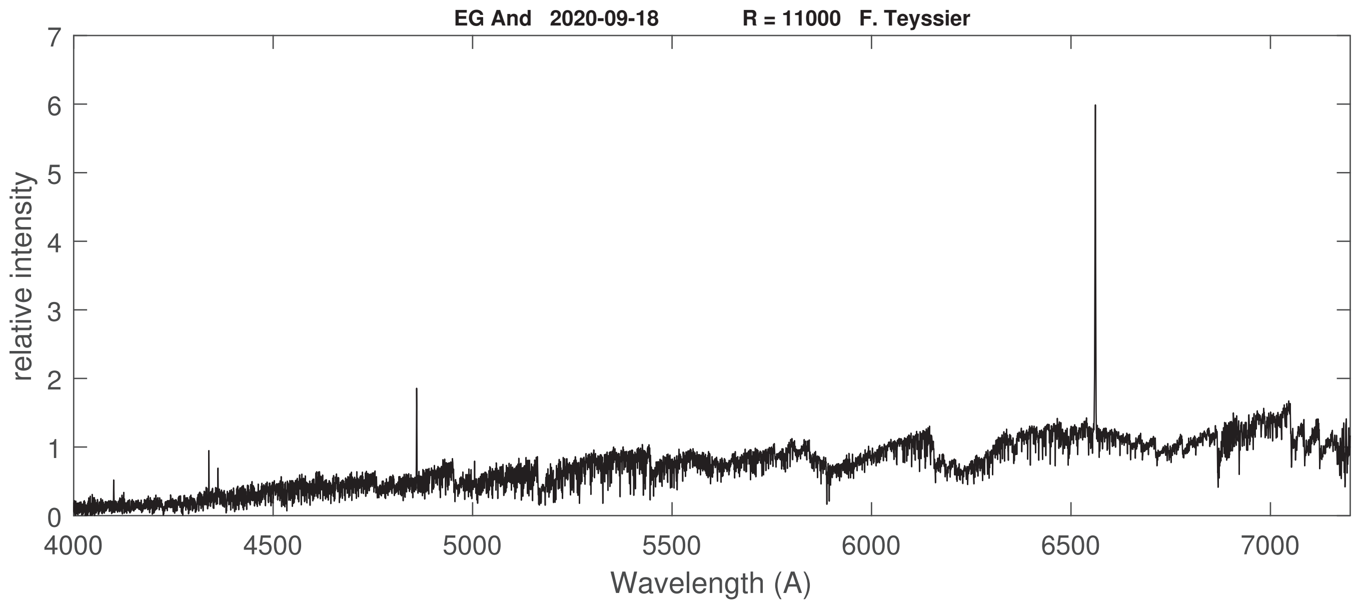
01-07-2020: Phase = 0.293
01/10/2020: Phase = 0.484
Ephemeris Kenyon & Garcia (2016)

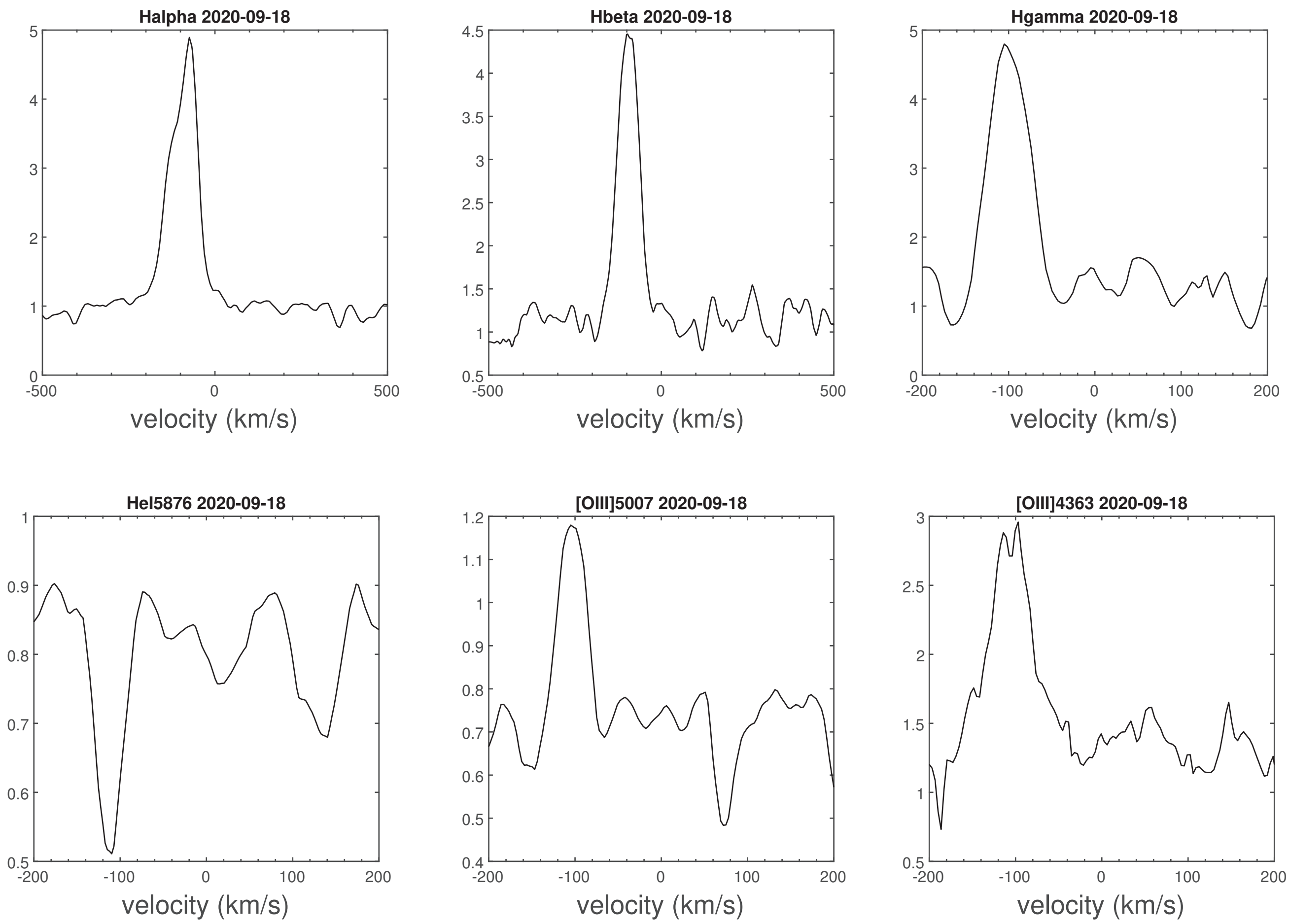


Spectrum acquired by Vincent Marik with an ALPY600
We note the intense Balmer lines



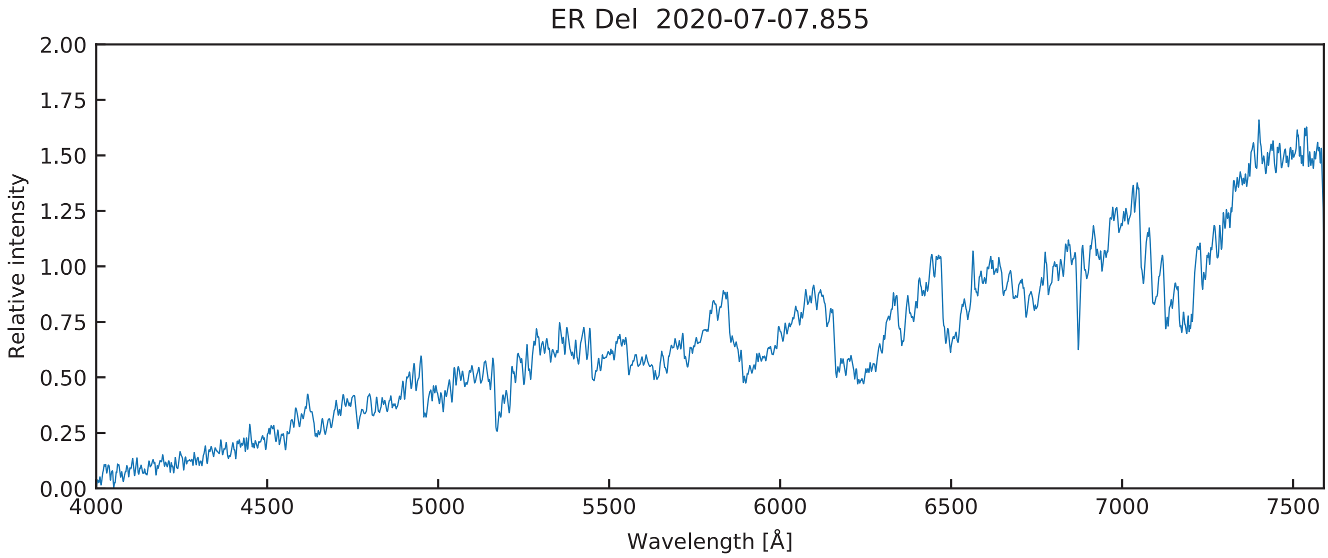
Sequence obtained by Pavol Dubovsky and Tomas Medulka with a LISA R = 1000

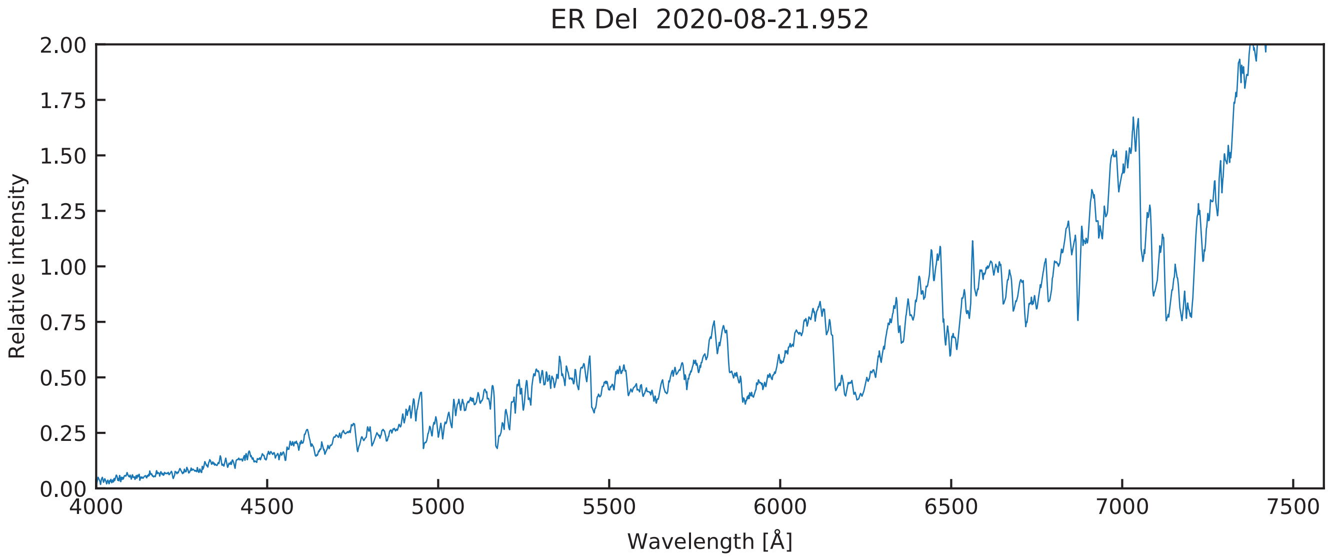

EG And 2020-09-18 R = 11000 F. Teyssier
relative intensity
Wavelength (A)


Halpha 2020-09-18
Hbeta 2020-09-18
Hgamma 2020-09-18
HeI5876 2020-09-18
[OIII]5007 2020-09-18
[OIII]4363 2020-09-18
velocity (km/s)

ER Del

Coordinates (2000.0)	
R.A.	20 42 46.49
Dec	+08 41 13.5
Mag V	10.0 -10.5

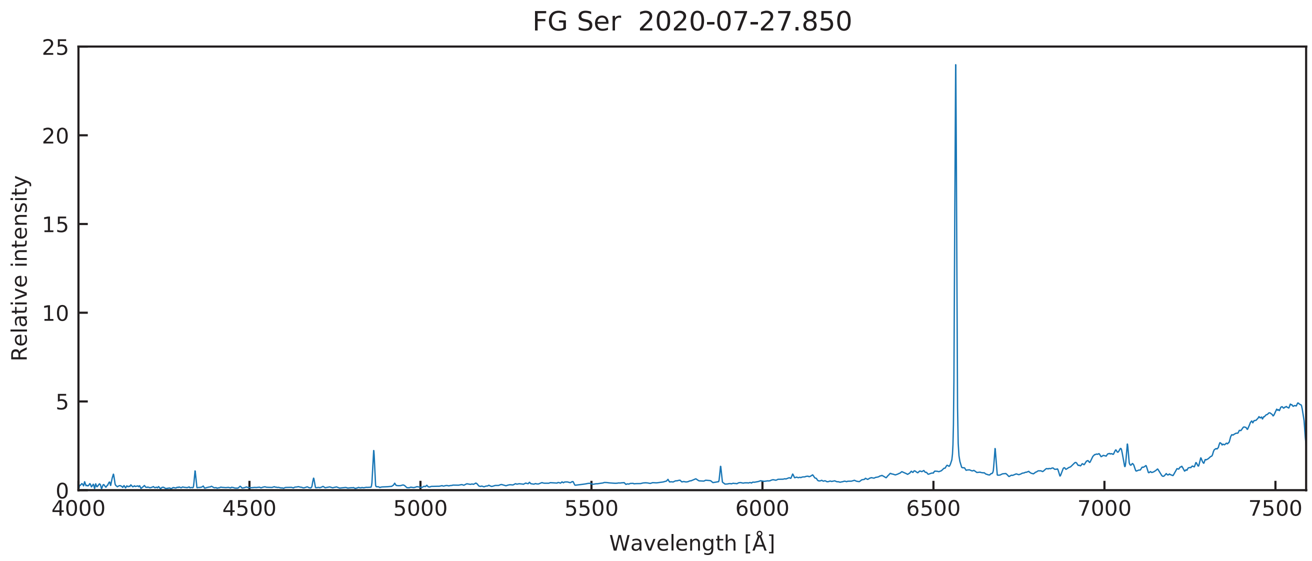


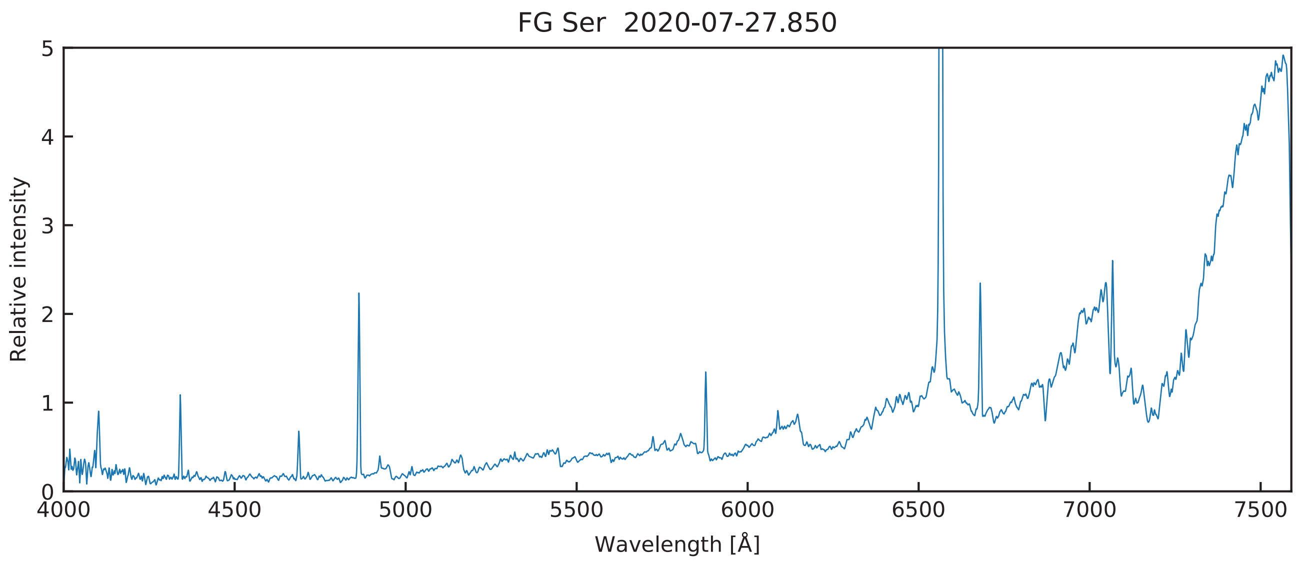


Spectra acquired byTomas Medulka and Pavol Dubovsky with a LISA (R = 1000)

Coordinates (2000.0)	
R.A.	18 15 07.1
Dec	-00 18 52.3
Mag V	11.5

A classical symbiotic star, currently in quiescent state which deserves a better monitoring

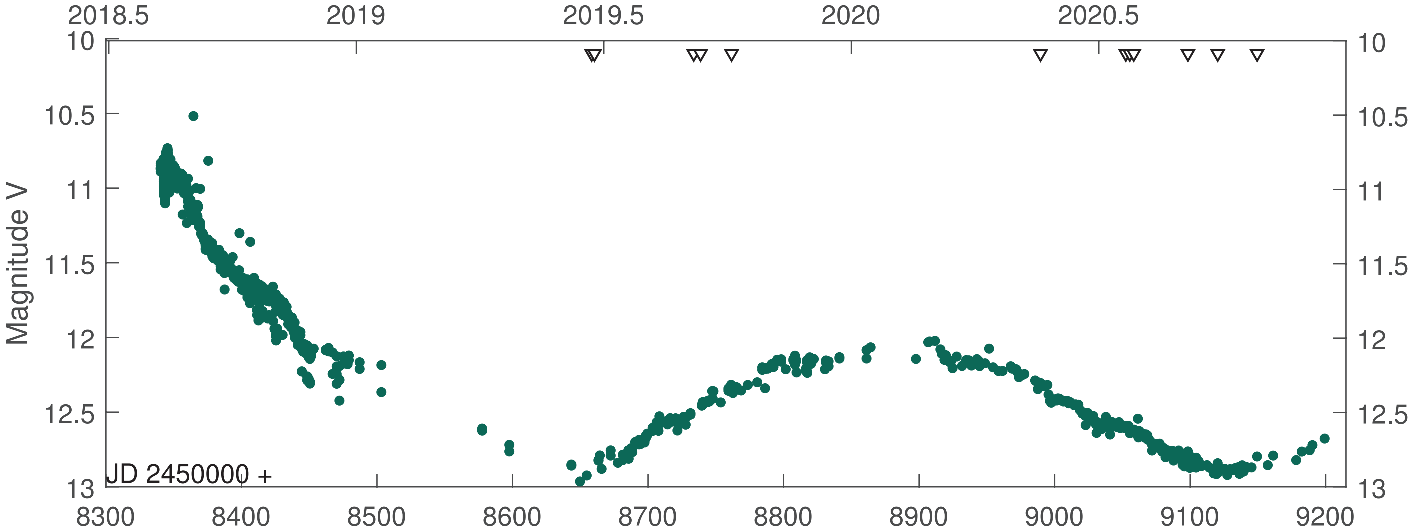




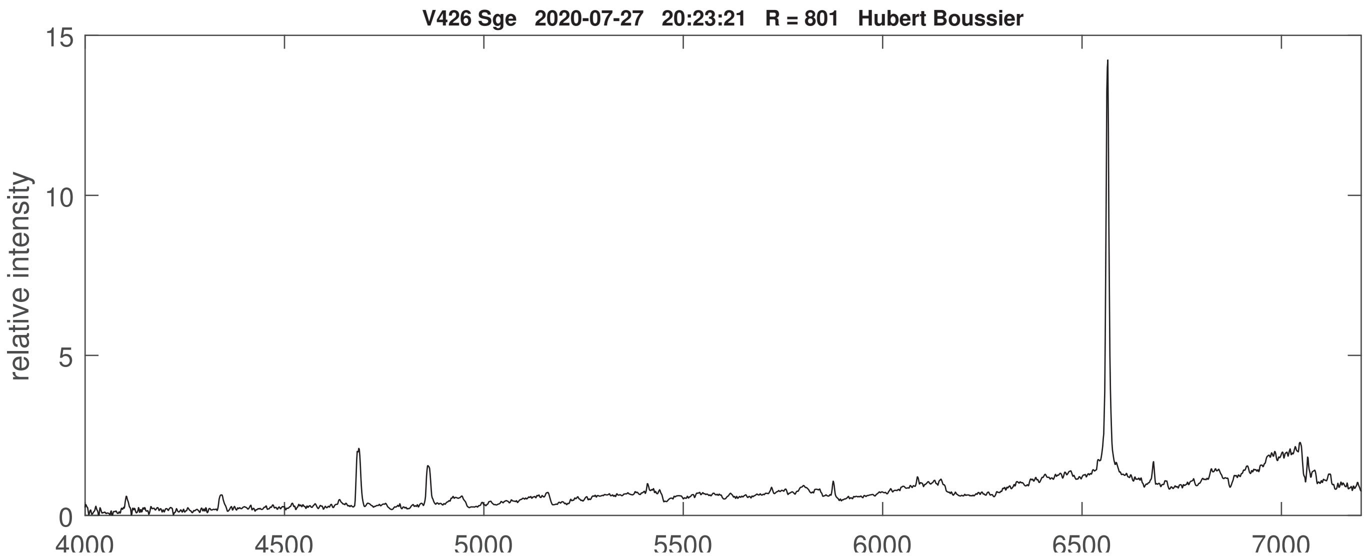
Spectrum obtained by Thomas Medulka and Pavol Dubovsky with a LISA (R = 1000)

HbHa 1704-05 = V426 Sge

Coordinates (2000.0)	
R.A.	19 54 42.9
Dec	+17 22 12.5
Mag V	12 - 13



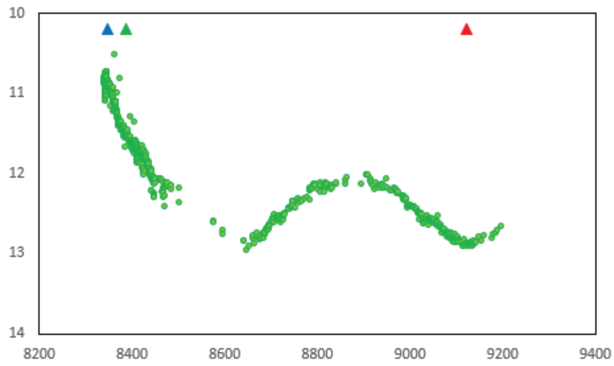
The AAVSO V band light-curve since the identification of HbHa1704-05 as a symbiotic star in outburst (see Munari & al., 2018 Skopal & al. 2018). We note the orbital wave-like variation (Period = 493 days, Skopal, 2020) with a large amplitude (~ 1 mag in V) clearly visible from the high quality data acqired by AAVSO observers:
DFS DUBF HMH BDG SMIH TIA

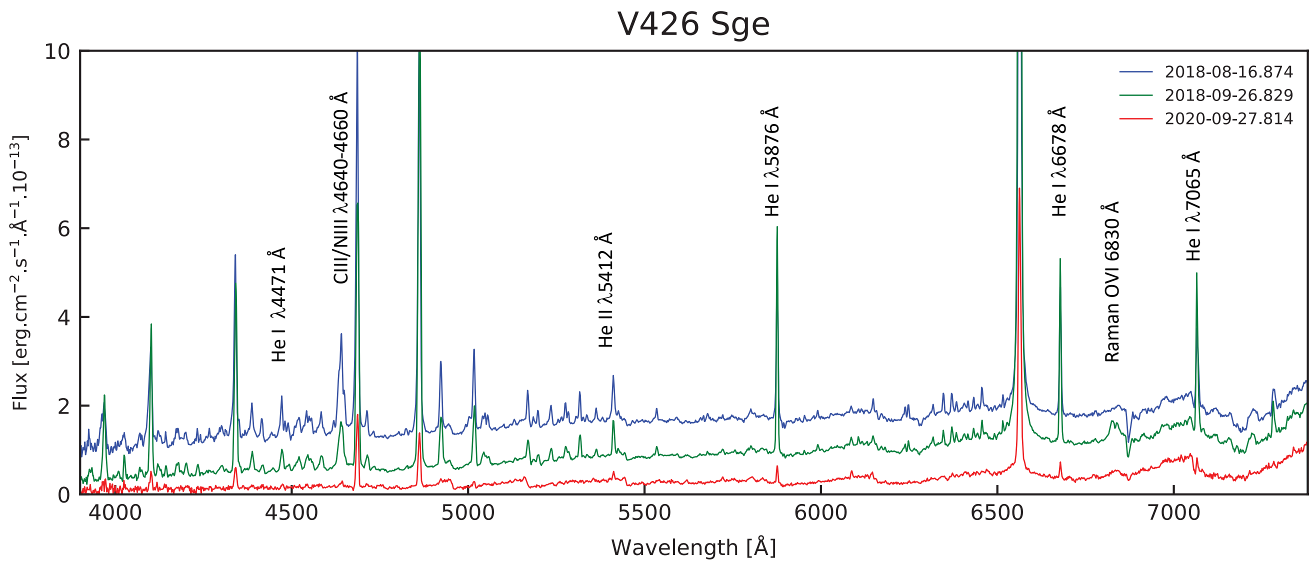


Spectrum secured by Hubert Boussier using a LISA (R = 1000)

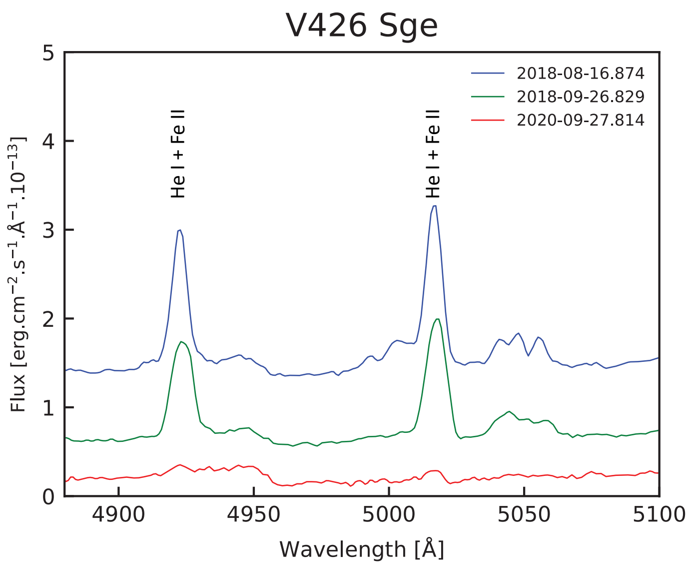
Comparison of the spectra during the outburst and in quiescent state

The AAVSO lightcurve (V) and the JD dates of the following spectra





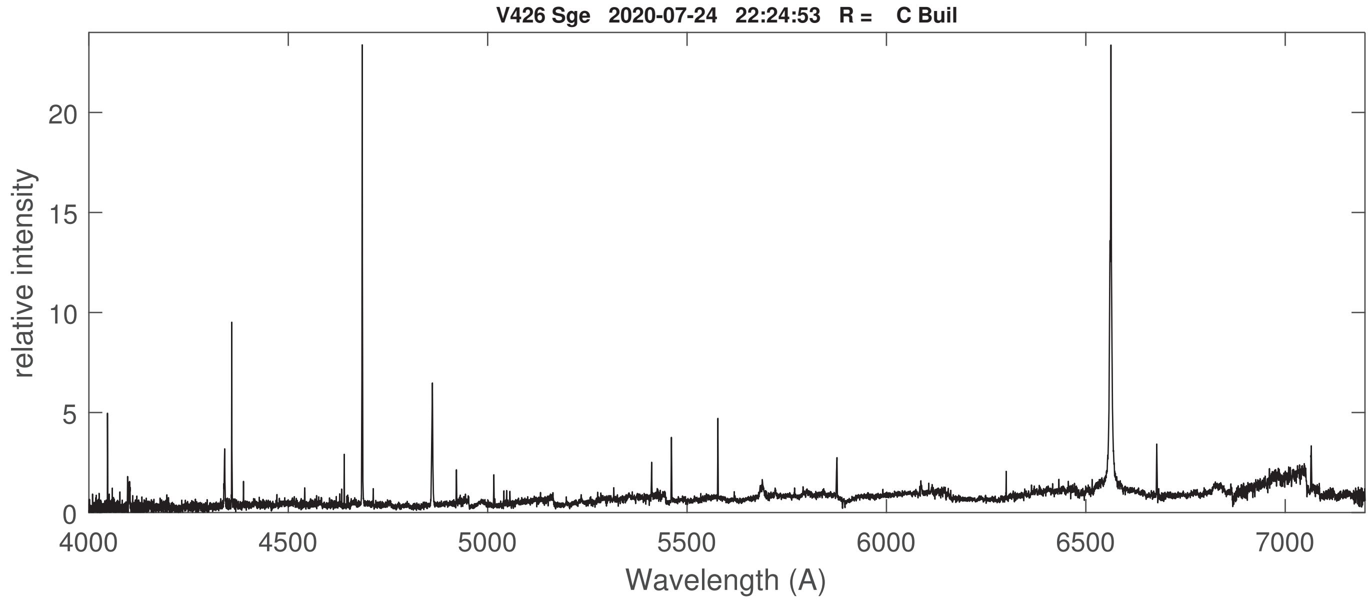
Plot showing the change in the spectrum between the decline from the discovery outburst in Aug and Sept 2018 and Sept 2020. Note the transient appearance of Raman O VI 6826 in Sept 2018, the persistence of [Fe VII] 6087 and several other changes.
Flux calibrated spectra (V band) acquired by David Boyd with a LISA (R = 1000)

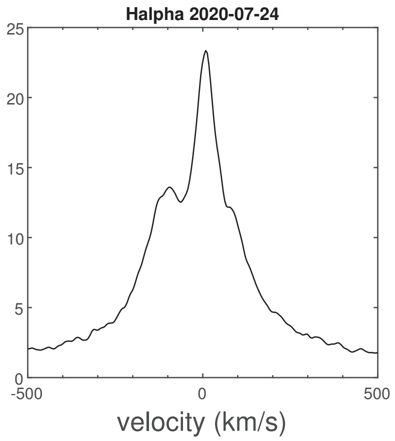


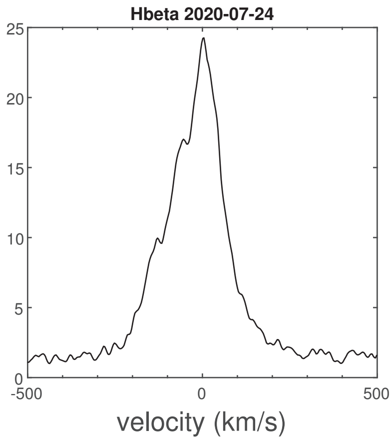
The resolution of LISA is insufficient to resolve the blends
He I λ 4922 Å - Fe II λ 4924 Å and
He I λ 5016 Å - Fe II λ 5018 Å.

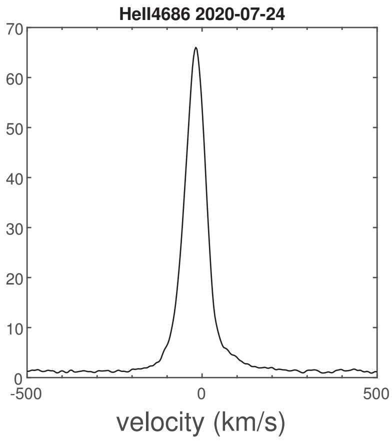
These lines are very weak in quiscent state.

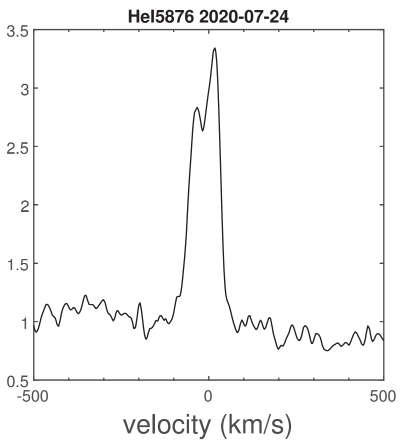
Spectrum acquired by Christian Buil using his improved setup (eshel 2, CMOS camera ASI6200) on a Newton 250 mm. The magnitude of the target was ~12.6.
See http://www.astrosurf.com/buil/asi6200mm/ for more information

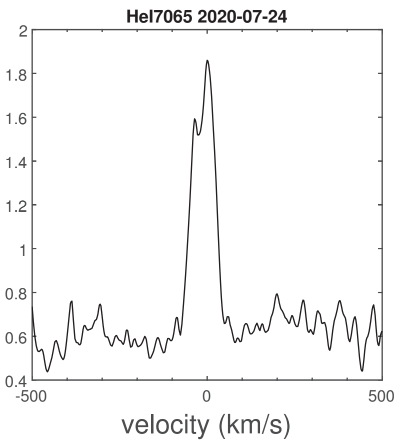


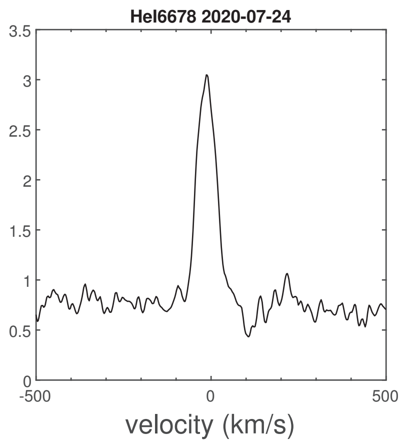




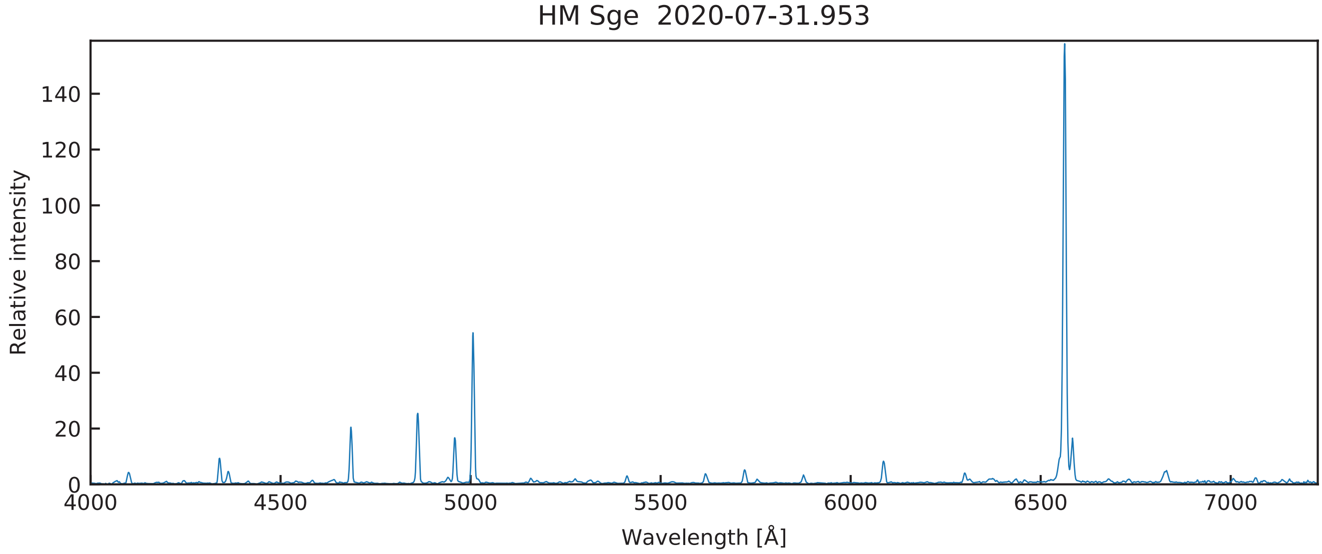


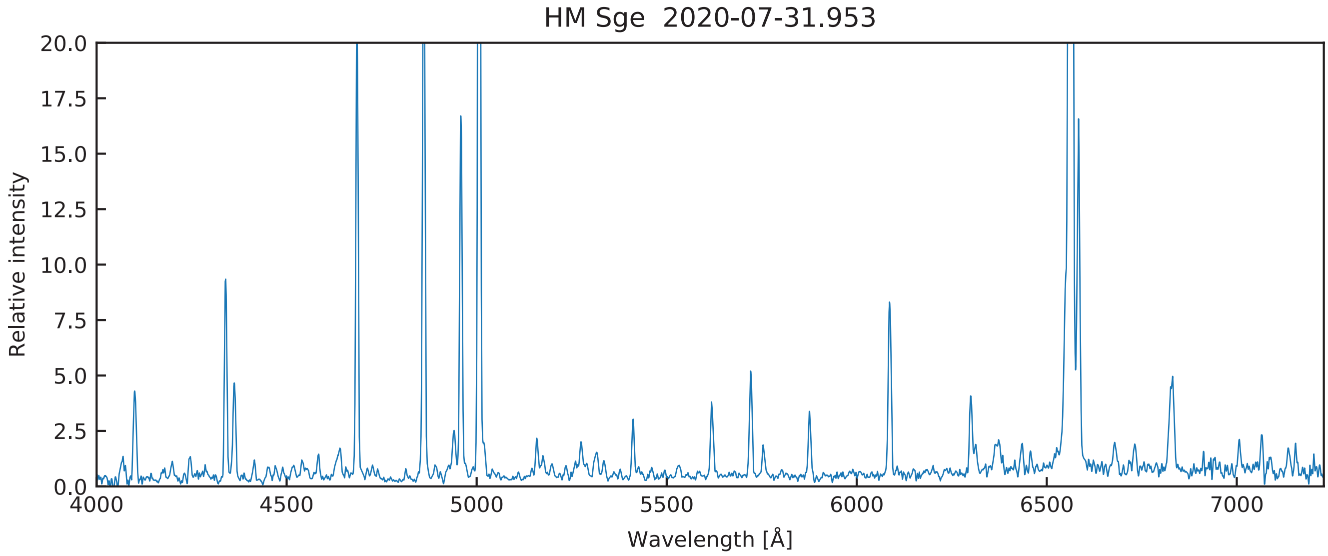






Coordinates (2000.0)	
R.A.	19 41 57.07
Dec	+16 44 39.9
Mag V	12.3

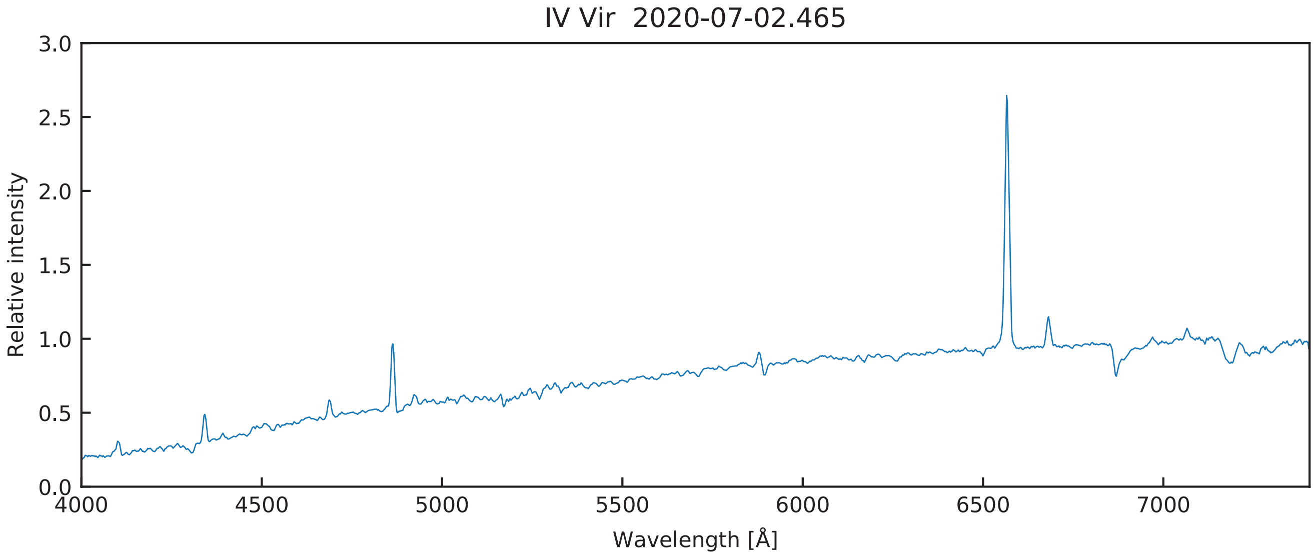




Fran Campos DADOS (R = 1000)

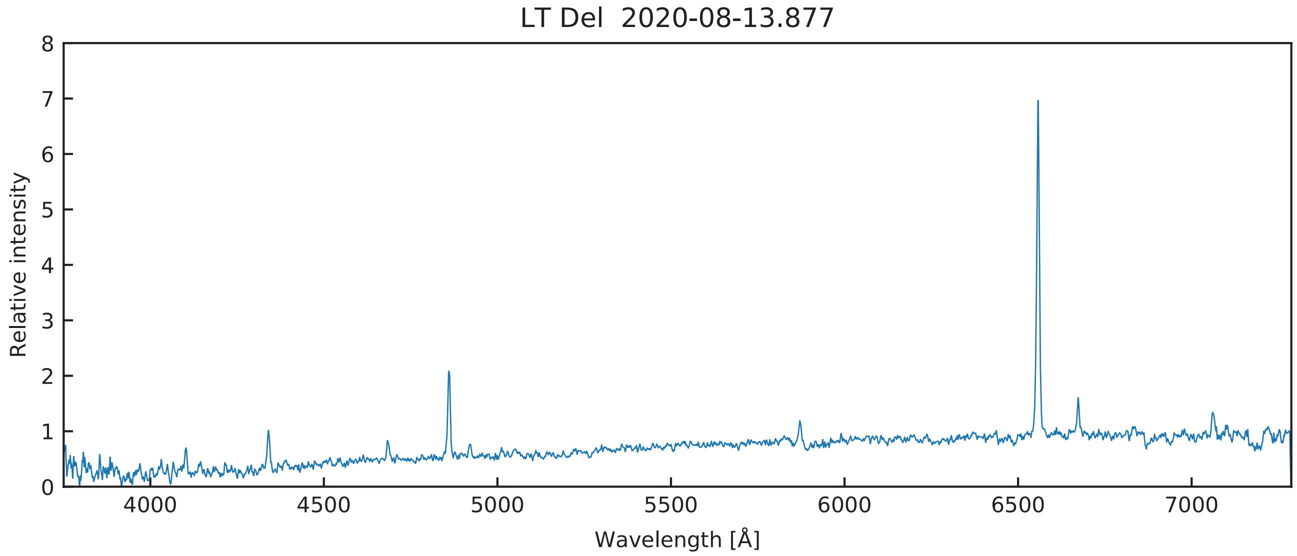
IV Vir

Coordinates (2000.0)	
R.A.	14 16 34.3
Dec	-21 45 50.0
Mag V	~10.8



The yelllow symbiotic star IV Vir acquired by Colin Eldrige with an Alpy600

Coordinates (2000.0)	
R.A.	20 35 57.2
Dec	+20 11 27.5
Mag V	~13

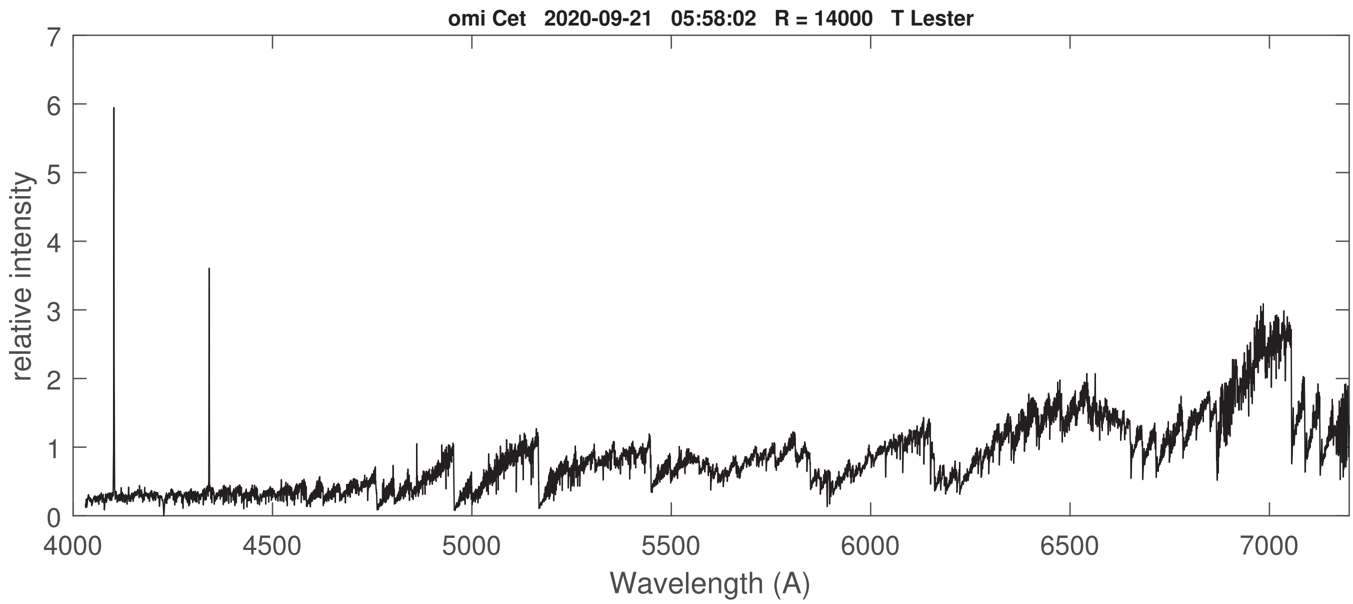


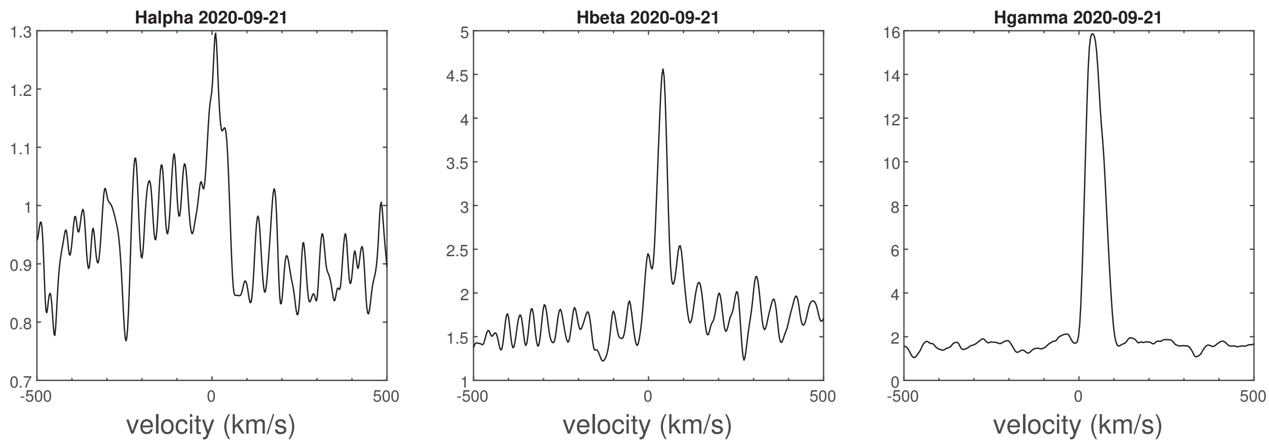
Fran Campos with a DADOS200 (R = 1000)

omi Cet

Coordinates (2000.0)	
R.A.	02 19 20.8
Dec	-02 58 39.49
Mag V	

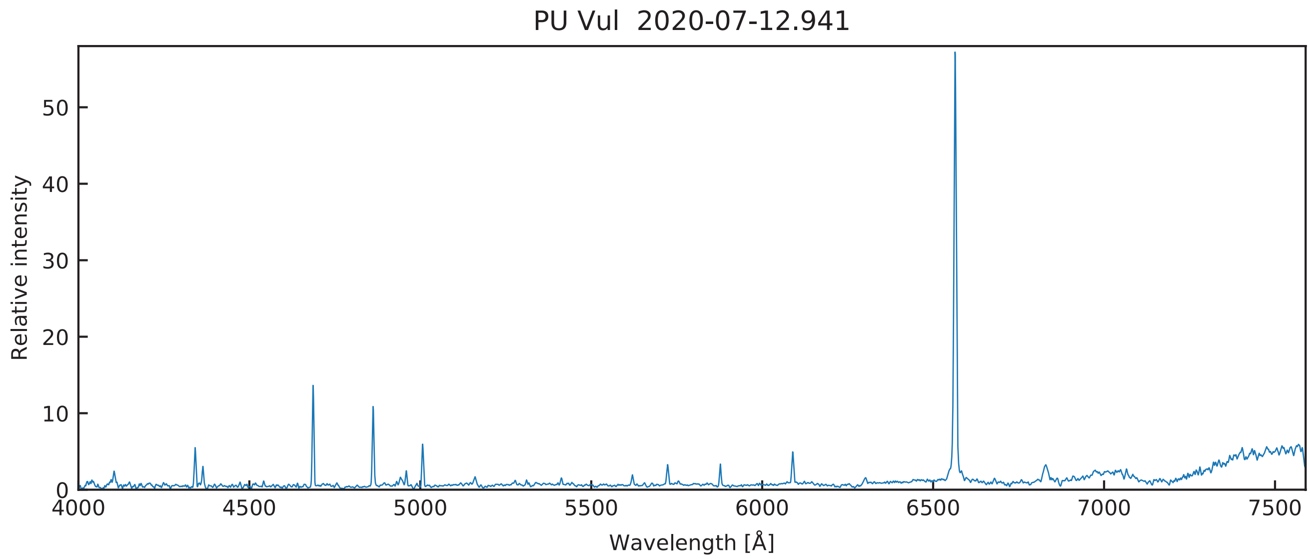
Add phase and V mag

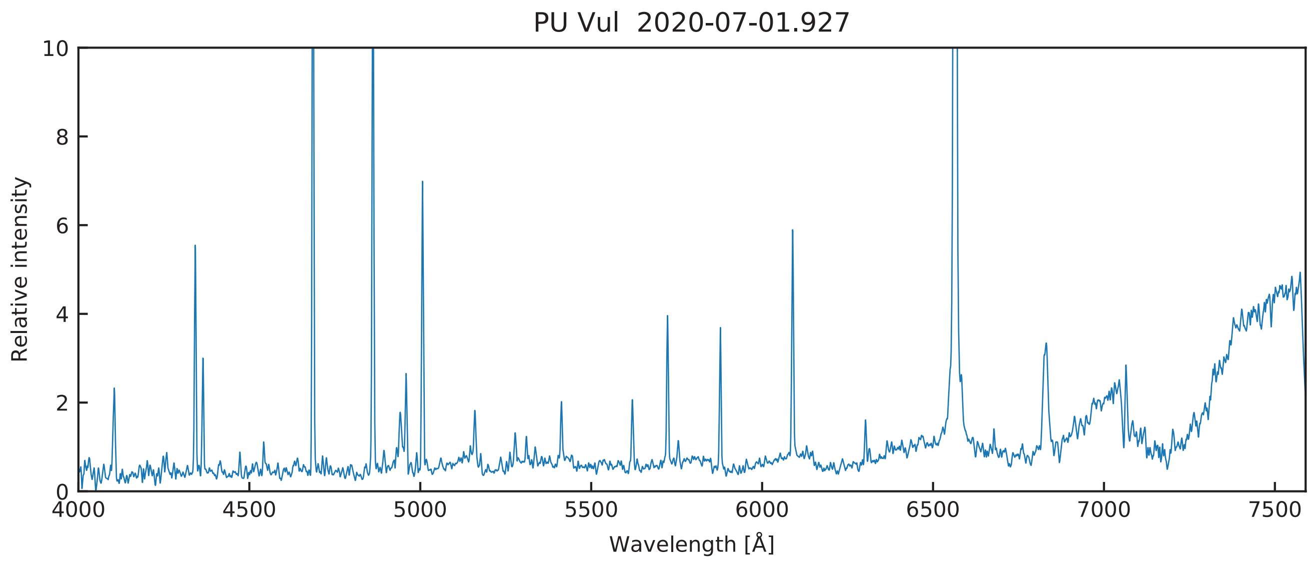




PU Vul

Coordinates (2000.0)	
R.A.	20 21 13.3
Dec	+21 34 18.69
Mag V	13.2

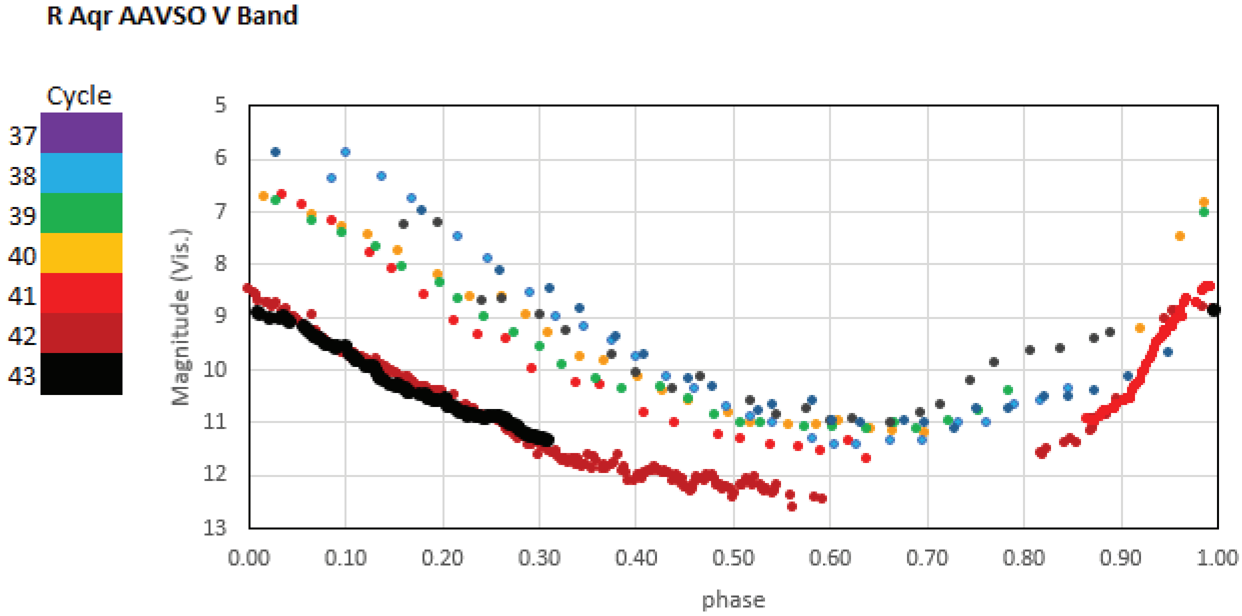




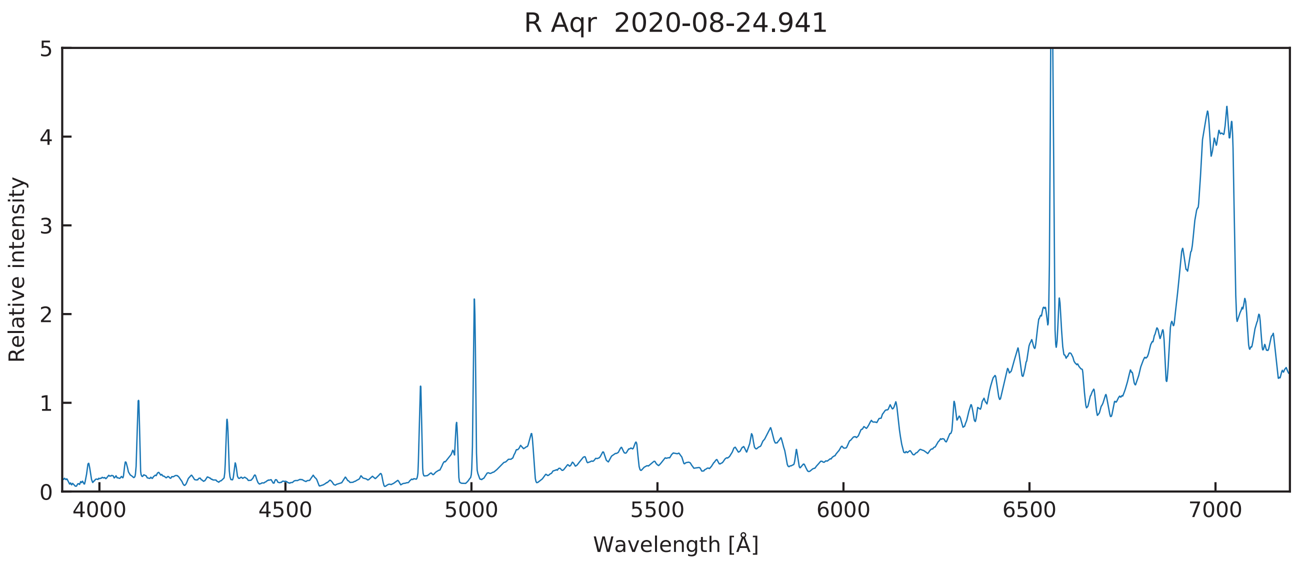
Spectrum acquired by Tomas Medulka & Pavol Dubovsky using a LISA (R = 1000)

R Aqr

Coordinates (2000.0)	
R.A.	23 43 49.4
Dec	-15 17 04.18
Mag V	



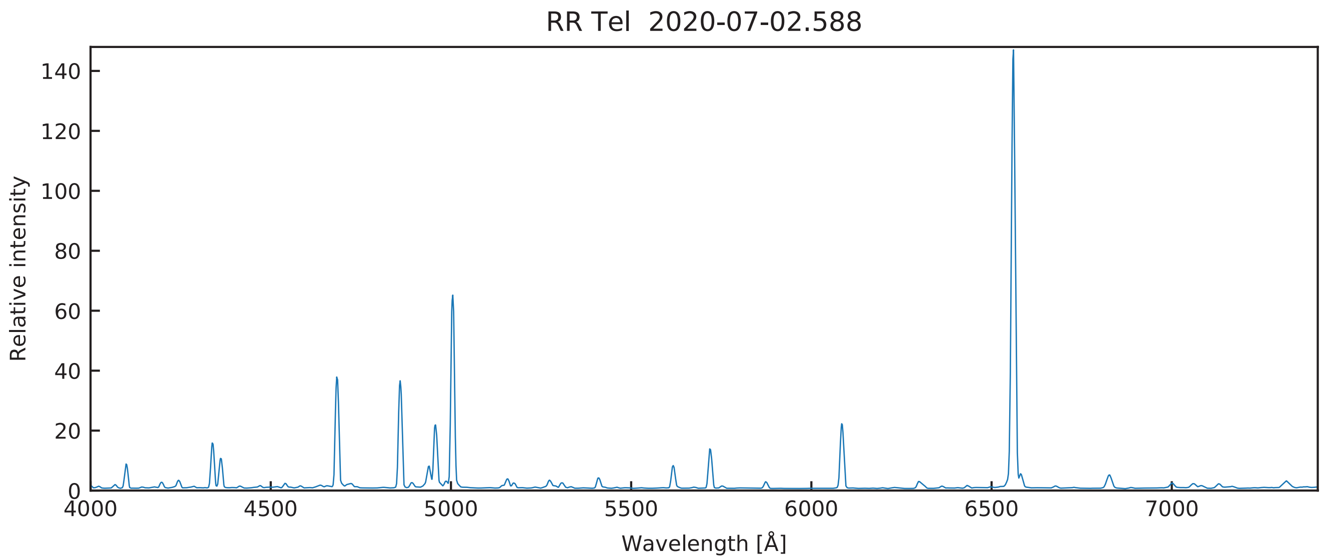
R Aqr AAVSO V lightcurve (current pulse in black). The lightcurve matches quite well with that one observed during the previous cycle at a low level probably due to an eclipse

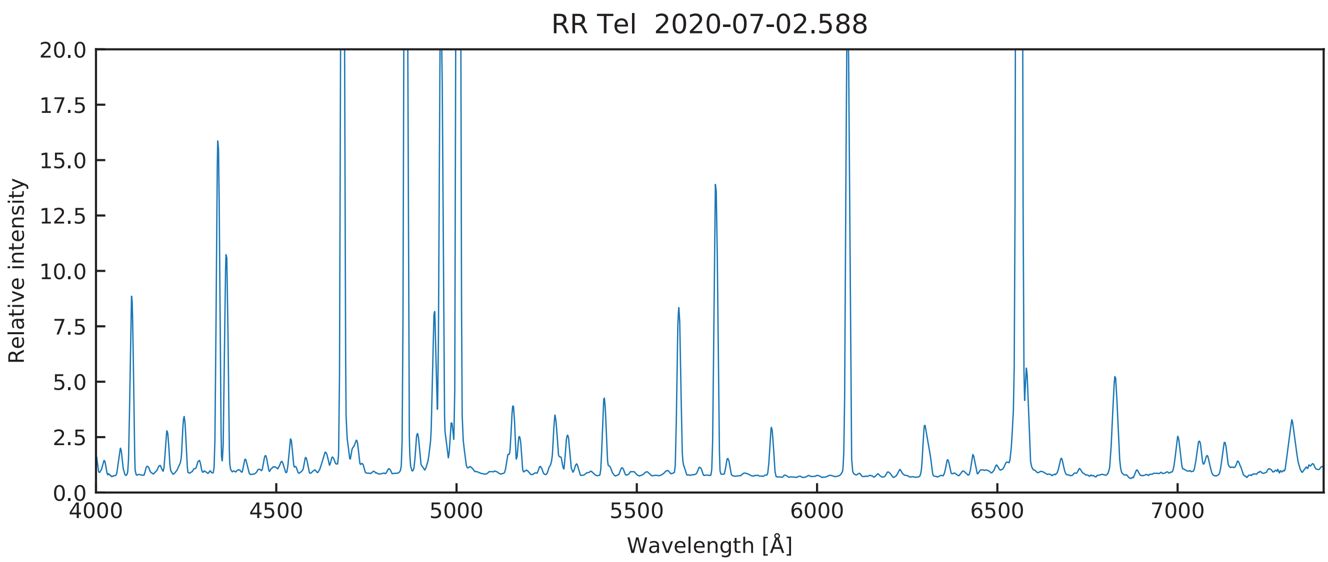


R Aqr Spectrum obtained by Fran Campos with a DADOS200 (R = 1000)

RR Tel

Coordinates (2000.0)	
R.A.	20 04 18.53
Dec	-55 43 33.15
Mag V	11.9



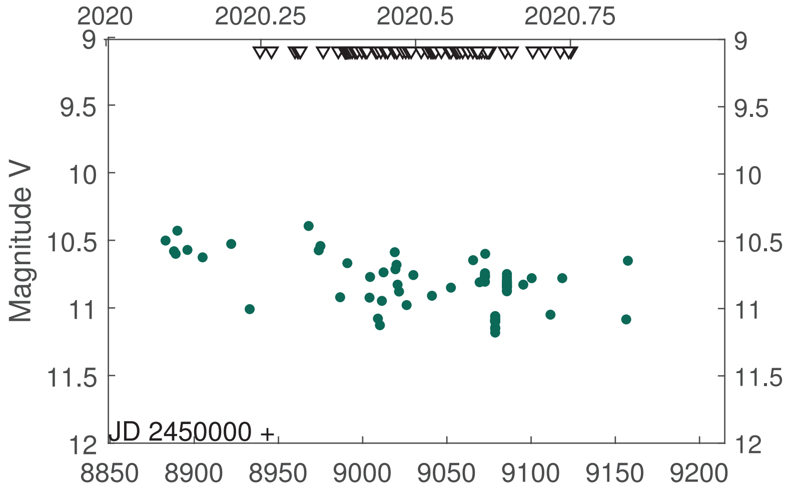


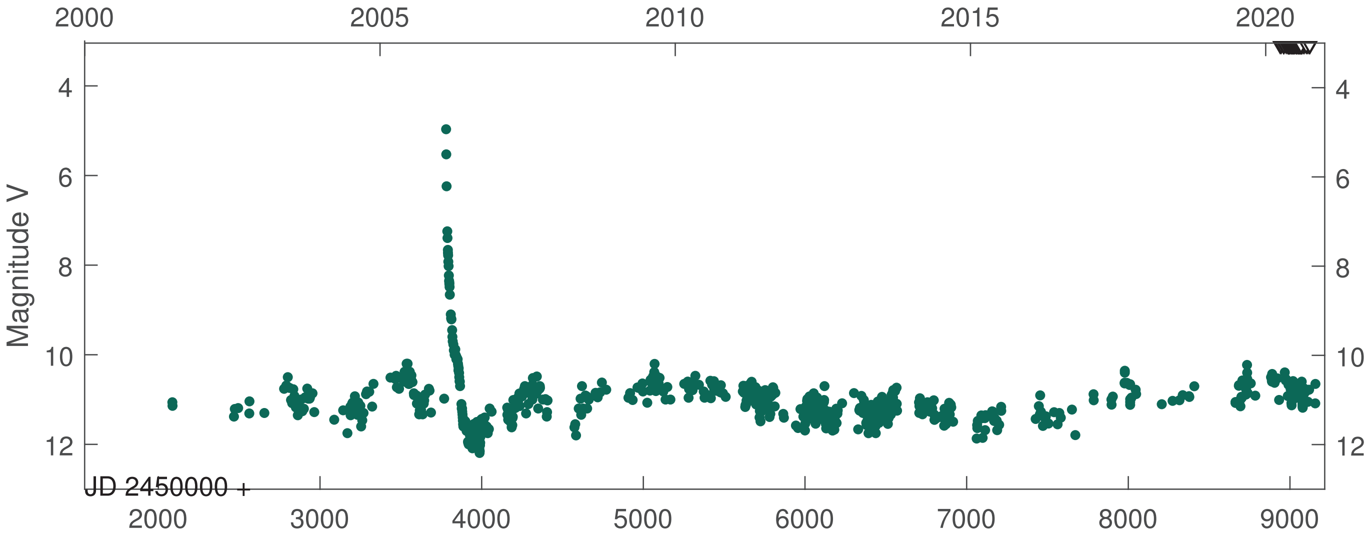
Colin Elridge Alpy (R = 600)

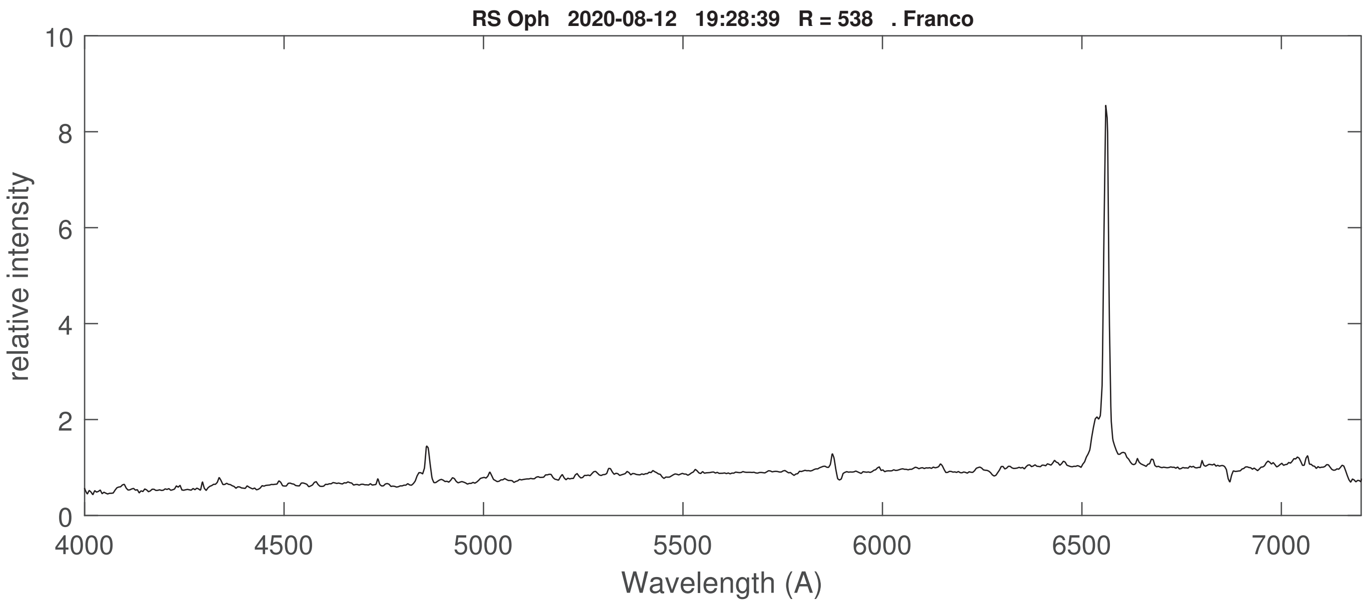
RS Oph

Coordinates (2000.0)	
R.A.	17 47 31.5
Dec	-06 41 39.5
Mag V	10.2 - 11.2

Monitoring of RS Oph before its next nova outburst on the request of Natalia Shagatova and Augustin Skopal.
G. Luna & al. detected a brightening in X - rays from SWIFT observations (ATel # 13810, June 2020).

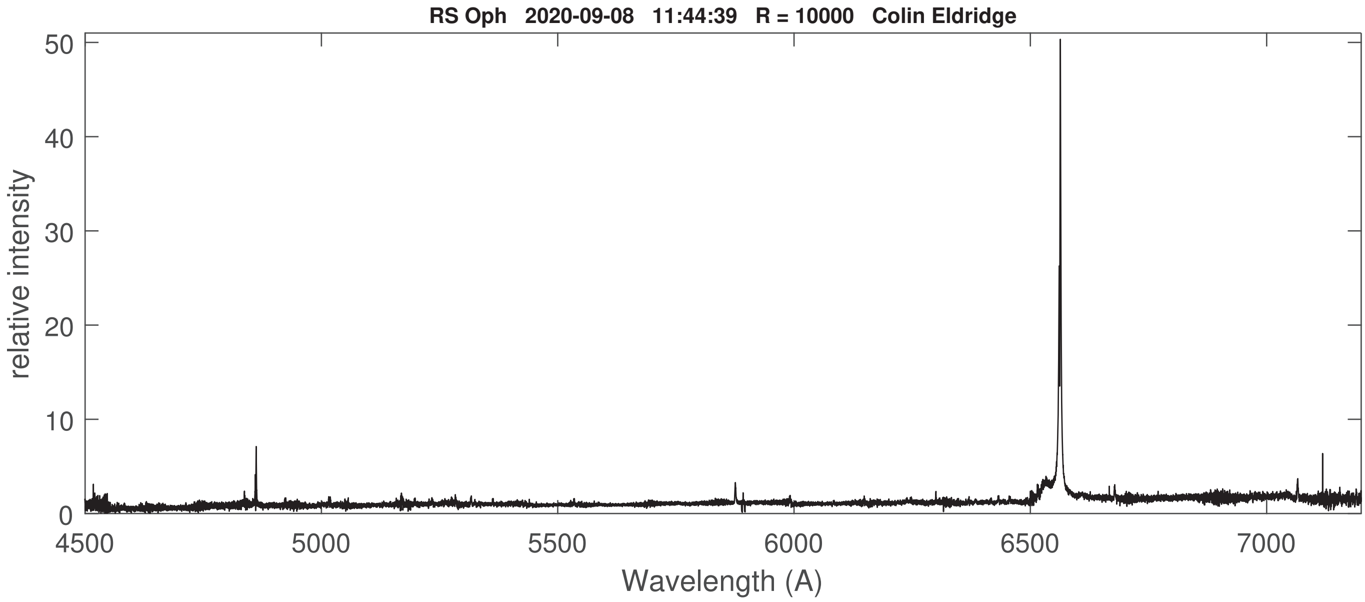




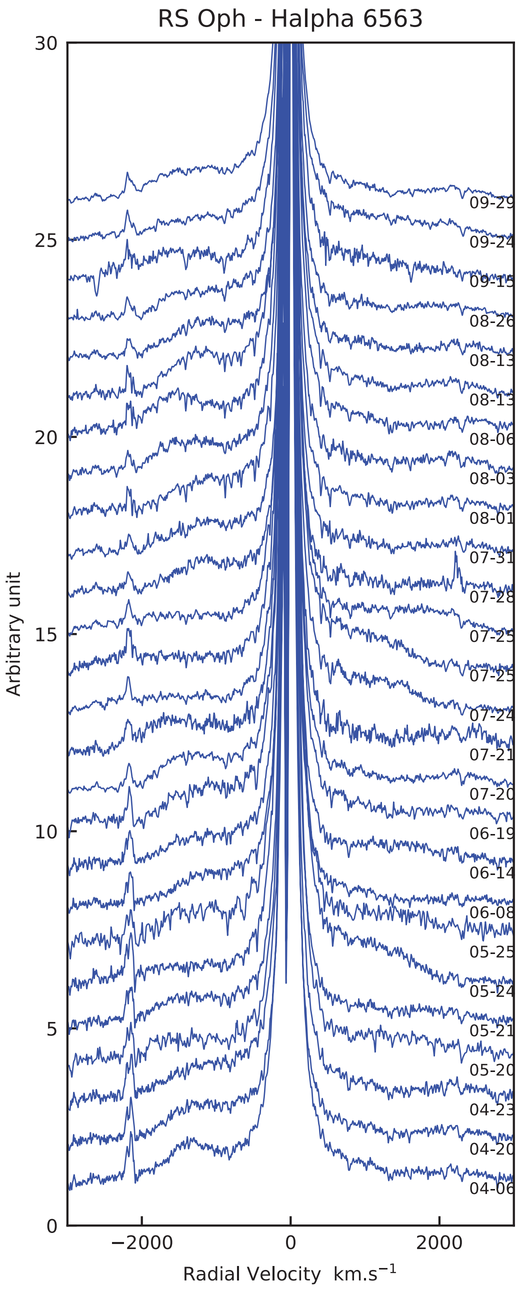


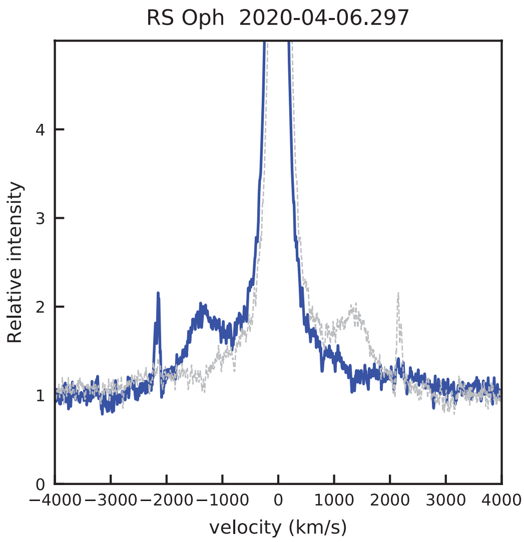
Spectrum acquired by Lorenzo Franco with an Alpy (R = 600). Even at that low resolution, the broad component of Balmer lines appear

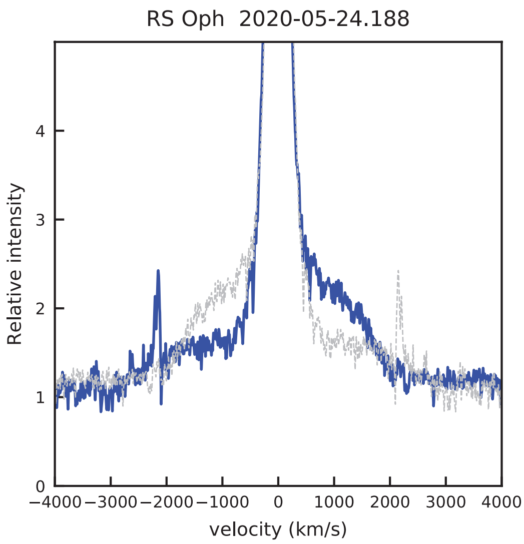
27 echelle spectra were acquired in 2020 by Tim Lester, Joan Guarro and Colin Elridge



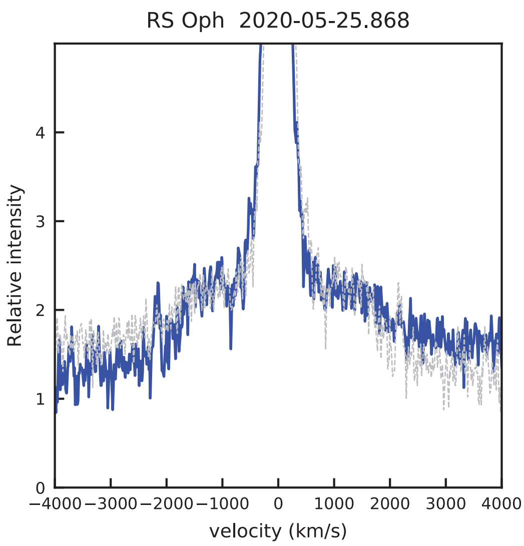
Spectrum acquired by Colin Eldridge with an eshel (R = 10000)

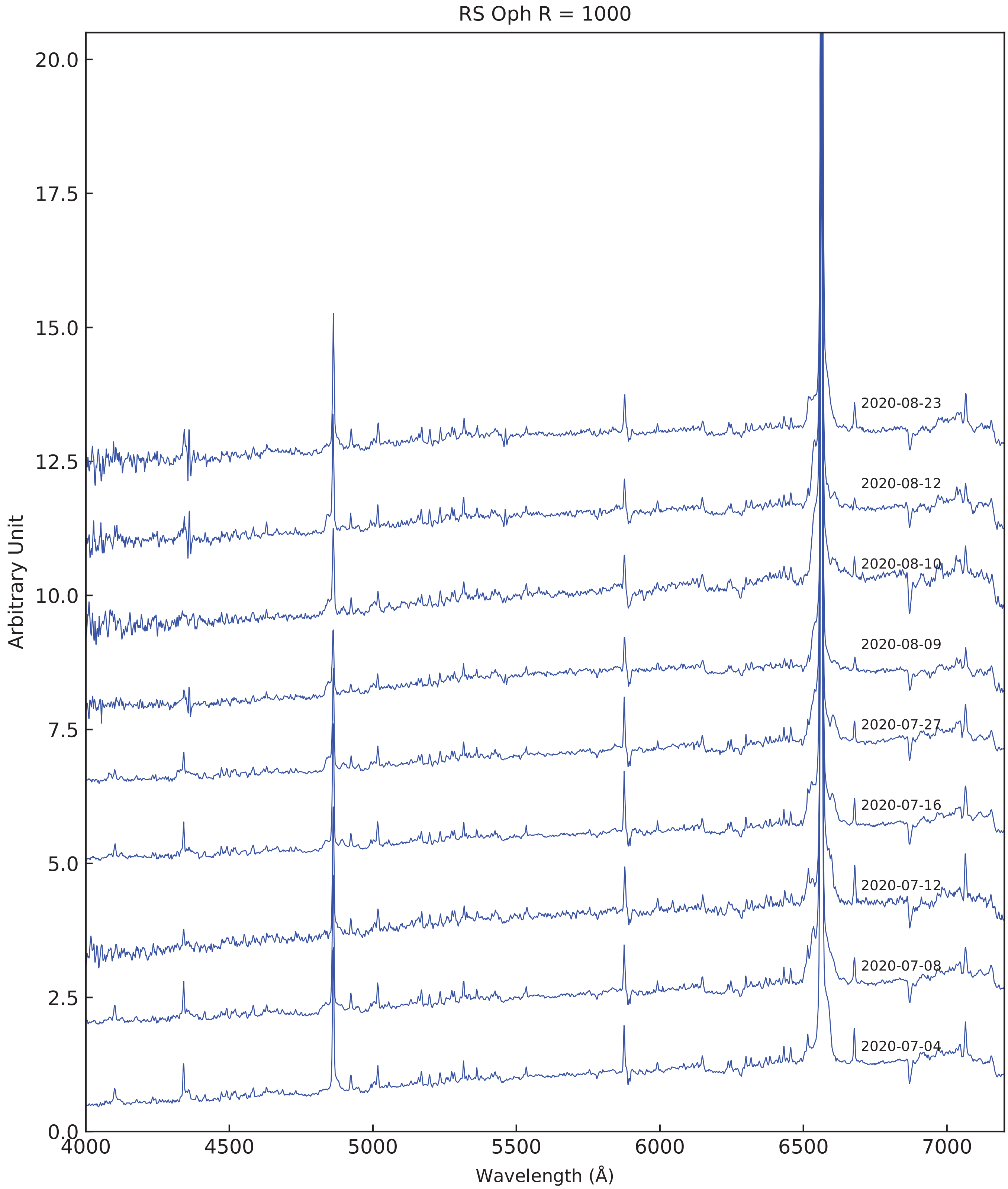






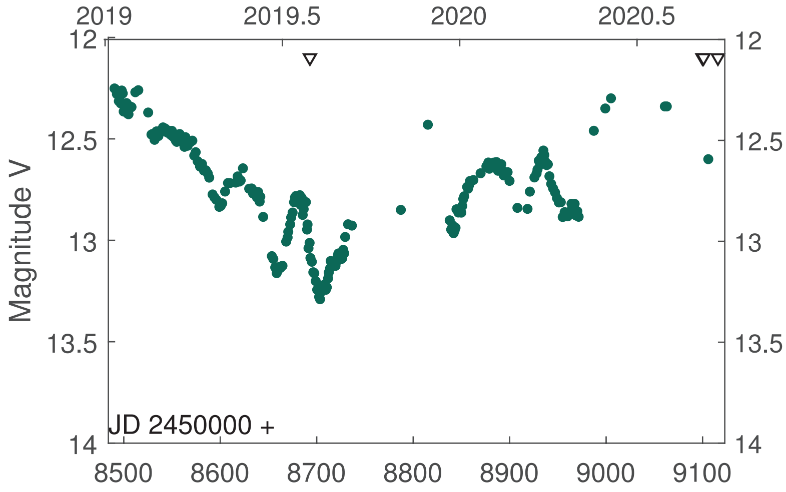
H alpha profile (broad component) from the echelle spectra acquired by Joan Guarro and Tim Lester.
Graphs on the right shows the broad component and its reverse profile (grey).



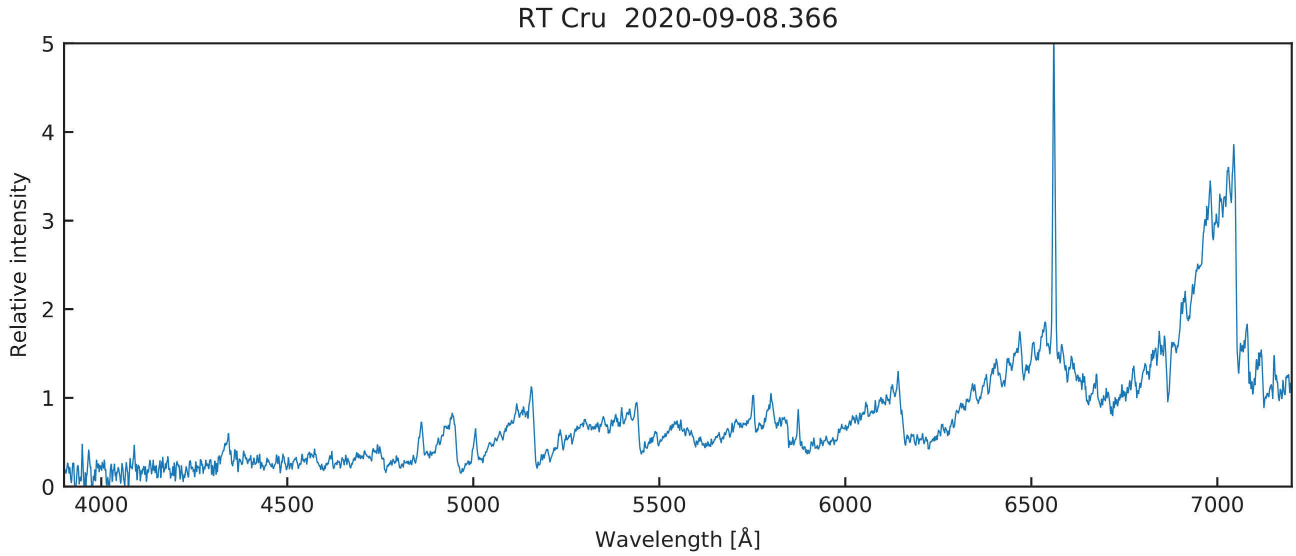


Spectra acquired with LISA spectrograph by Forrest Sims, Tomas Medulka, Pavol Dubovsky,

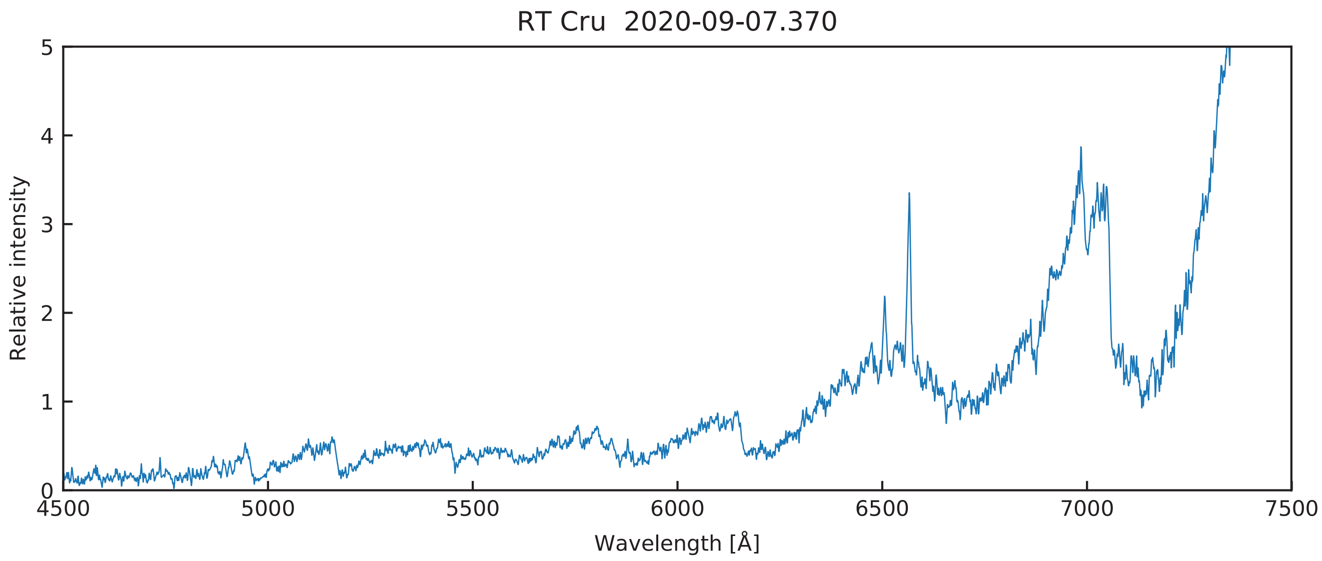
Coordinates (2000.0)	
R.A.	12 34 53.7
Dec	-64 33 56.1
Mag V	11.0 - 13.3

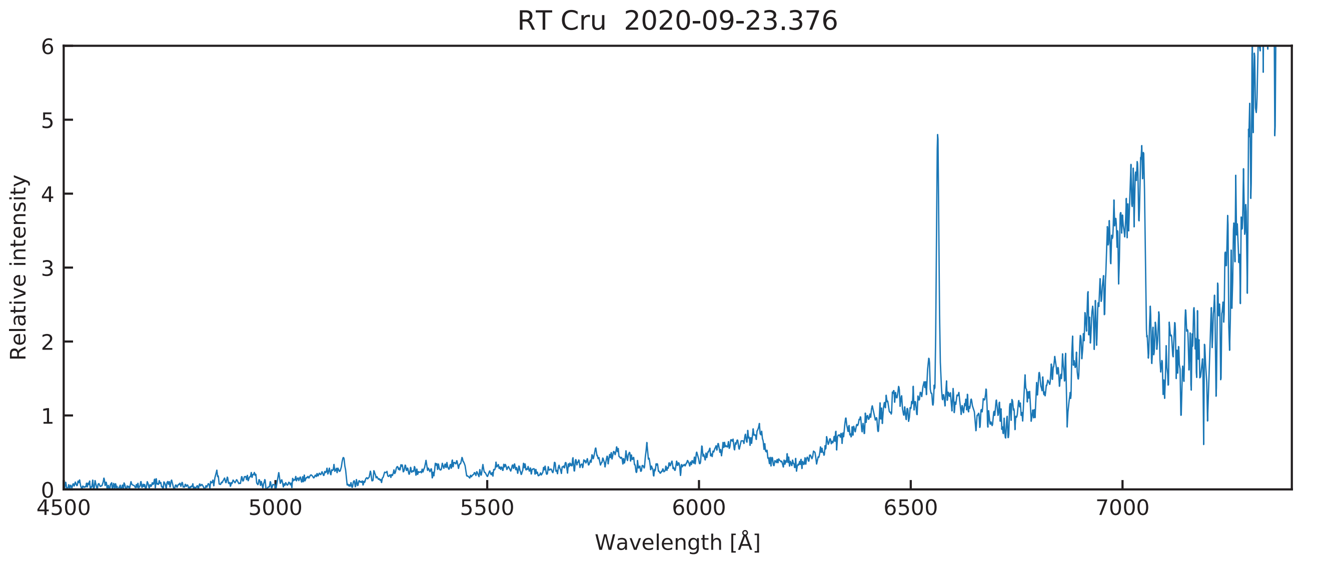


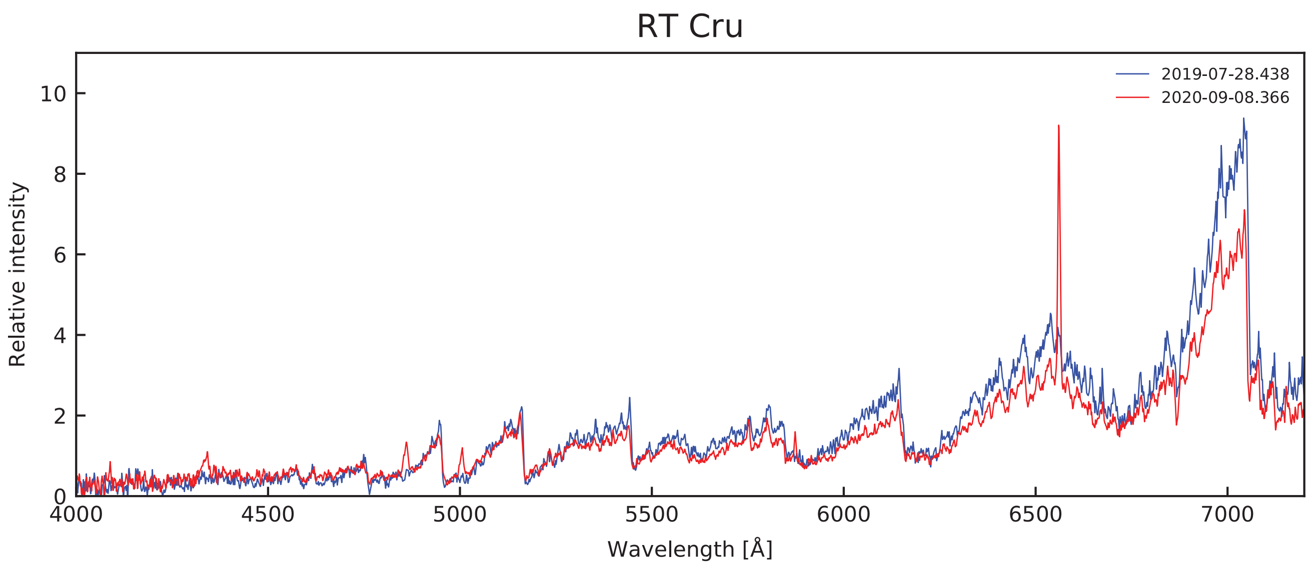
RT Cru was classified as a symbiotic star by Cielsinski & al. (1994) with a spectrum similar to those obtained in September by Peter Velez upon the request of J. Luna.
The spectra differ significantly from a previous spectrum obtained by Terry Bolhsen in 2019 which showed no evidence for emission lines (see a comparison page 67).



Spectrum of RT Cru acquired by Peter Velez using a LISA (R = 1000)
The Balmer lines are strong, equivalent width of Hα = -16.3, Hβ = -12.7, the ratio of intensities I(Hα)/I(Hβ) = 5.9, a common value for symbiotic stars. [O III] λ 5007 Å and He I λ5876 Å appear clearly in emission.



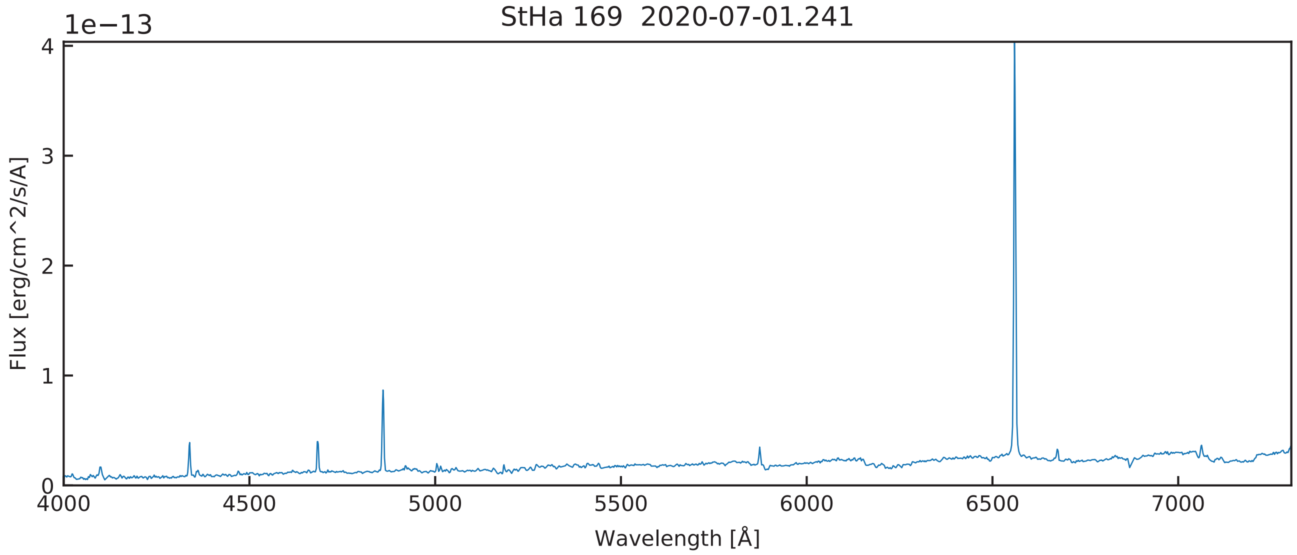


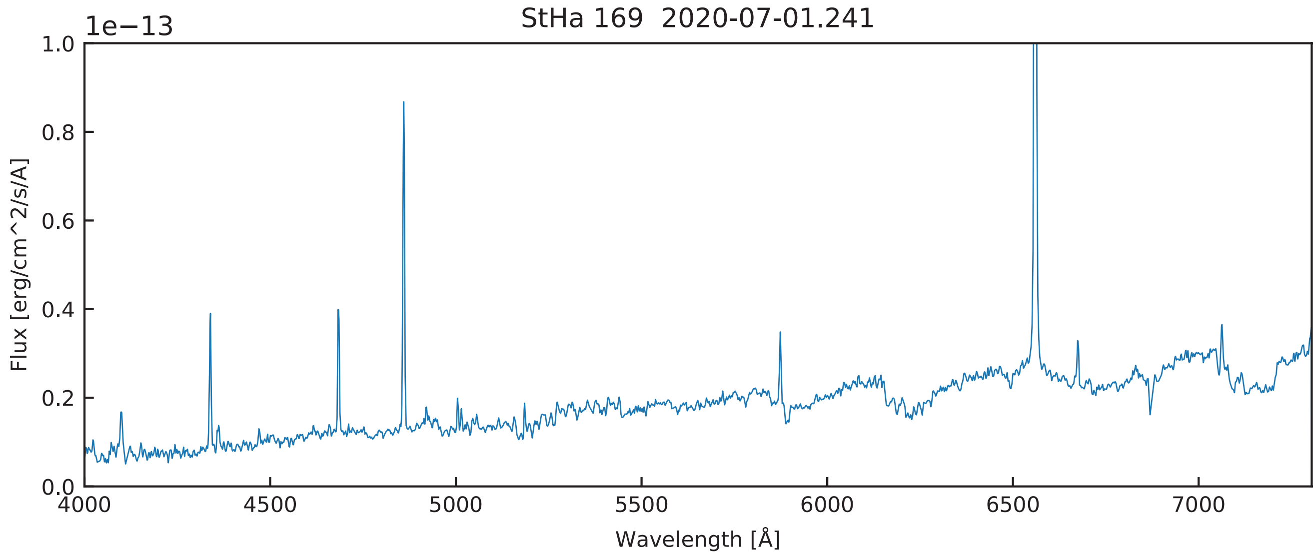


Comparison with a spectrum of RT Cru acquired by Terry Bohlsen in 2019 (R = 1000)

StHA 169 = V2873 Cyg

Coordinates (2000.0)	
R.A.	19 49 57.6
Dec	+46 15 20.5
Mag V	10.5-10.6

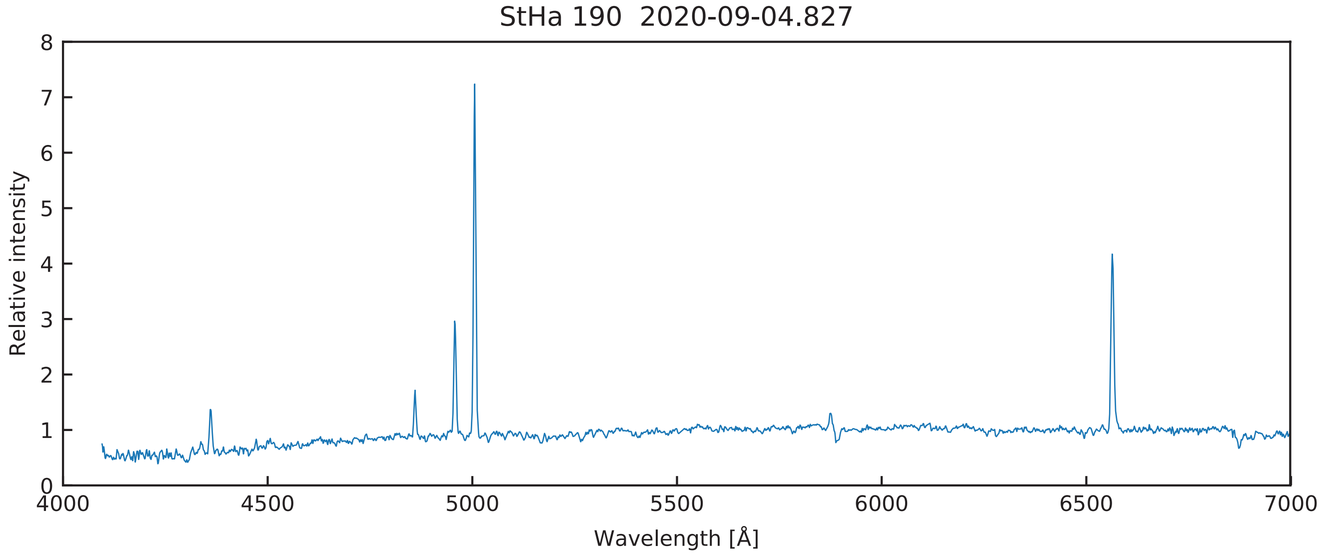




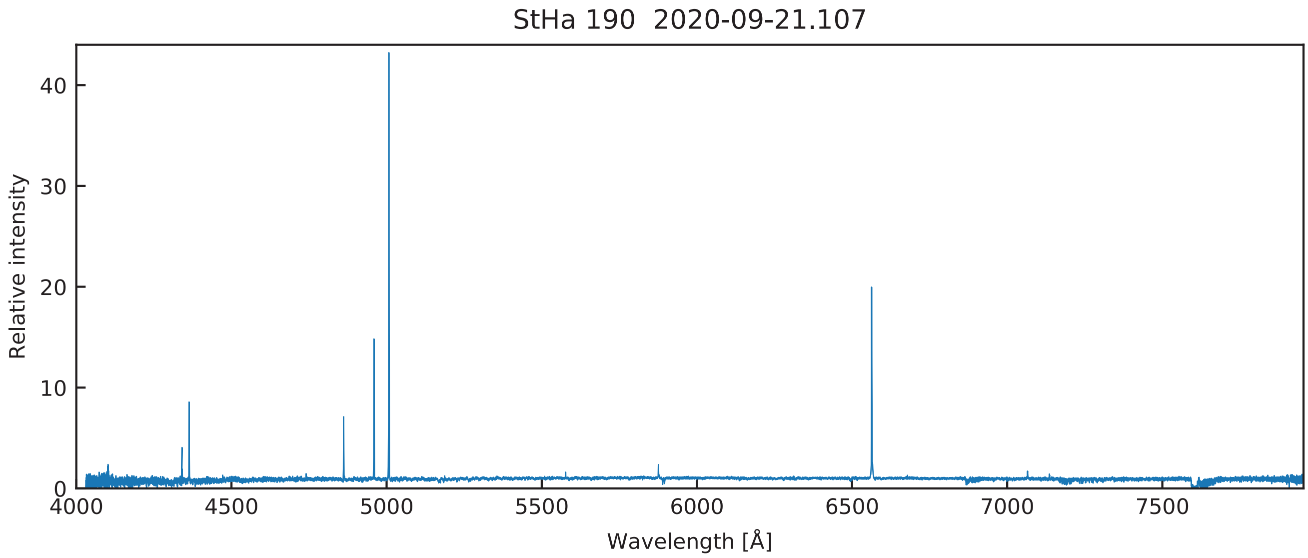
Spectrum obtained by Forrest Sims with a LISA (R = 1000)

StHA 190

Coordinates (2000.0)	
R.A.	19 49 57.6
Dec	+46 15 20.5
Mag V	



StHa 190 acquired by Antonino Ventura with an UVEX Prototype

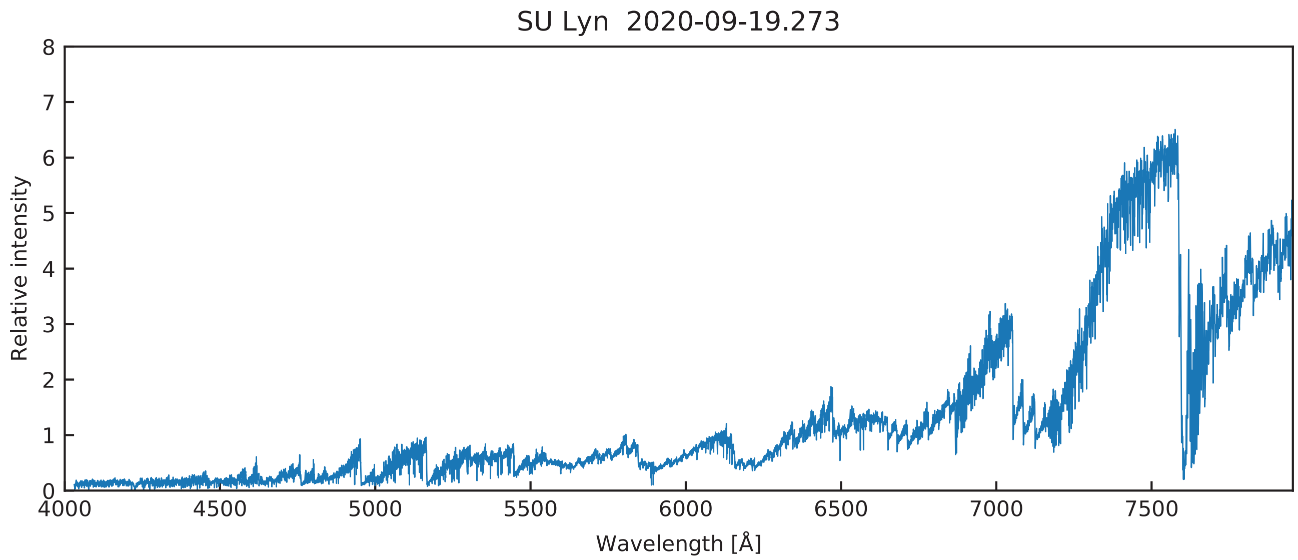


LES

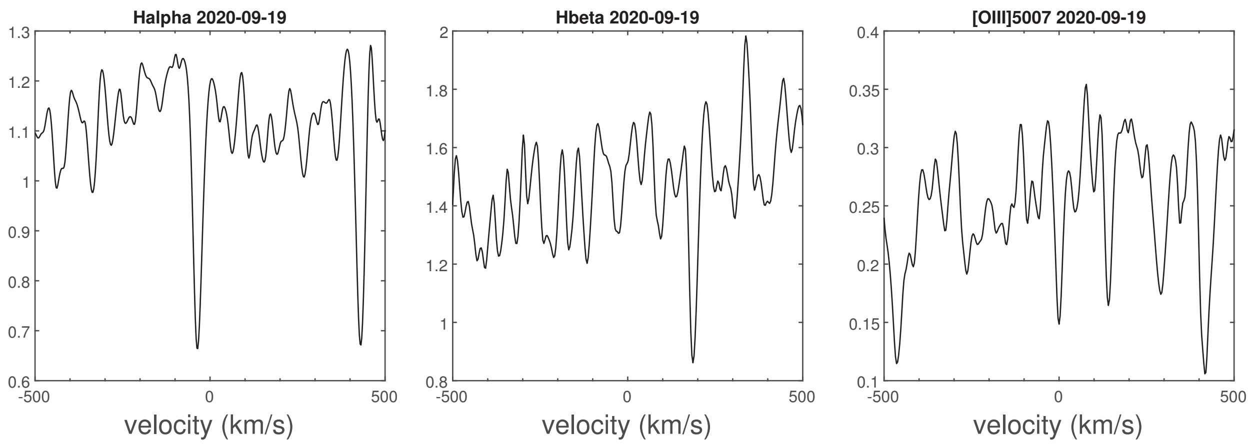
Add: comparison of the lines

SU Lyn

Coordinates (2000.0)	
R.A.	06 38 45.7
Dec	+55 31 24.9
Mag V	7



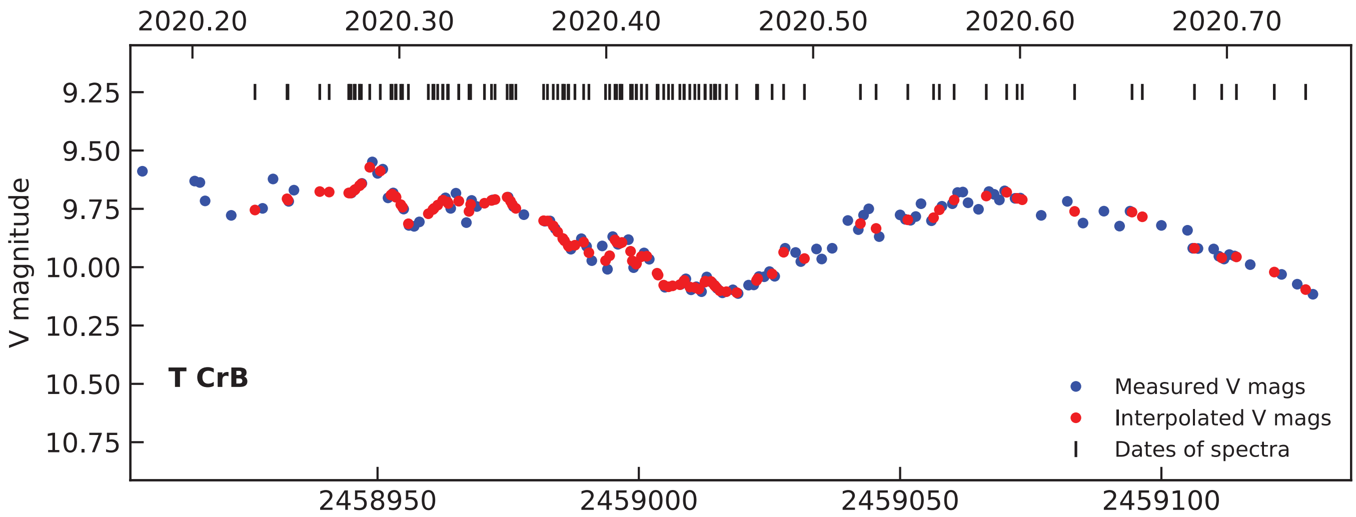
First spectrum of the new observing season obtained by Tim Lester with an echelle (R= 14000)



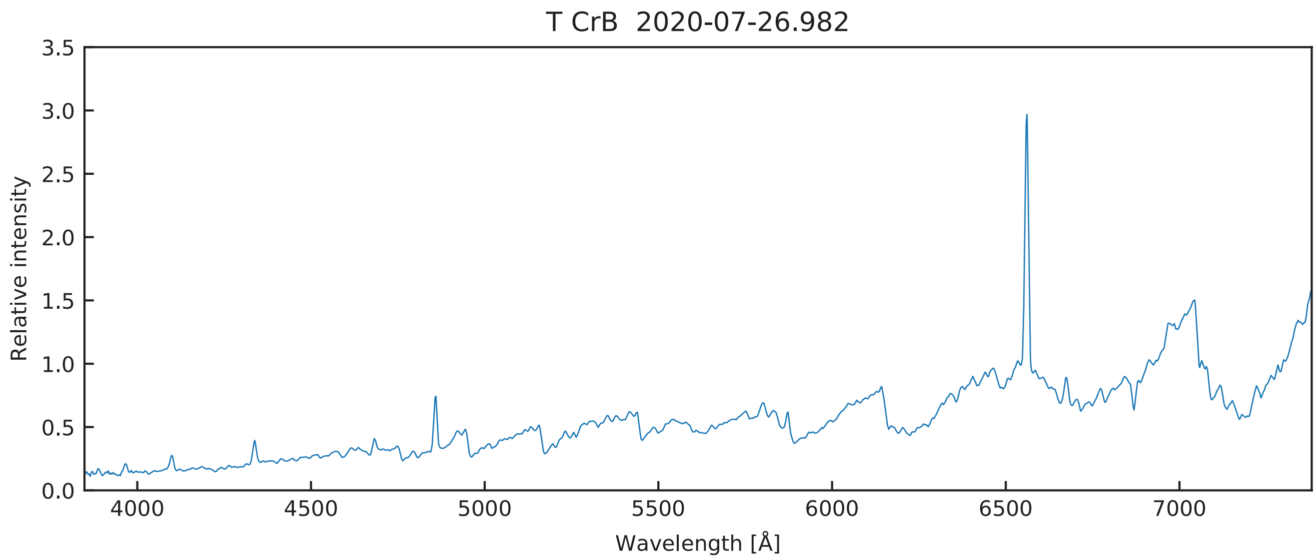
The main lines are in absorption

Coordinates (2000.0)	
R.A.	15 57 24.4
Dec	+26 03 38.8
Mag V	9.8

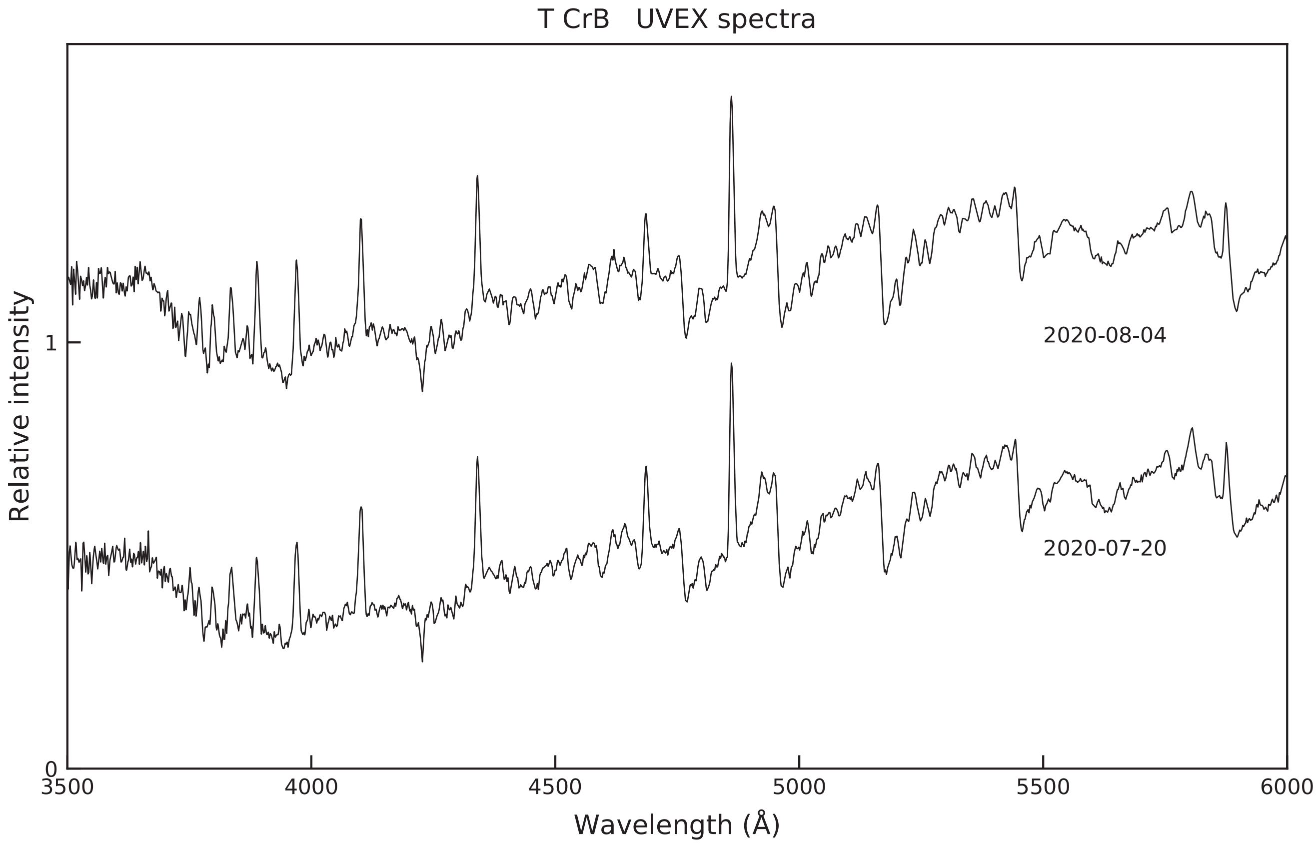
Main target until the next nova event.
See: B. Schaefer in Information Letter n° 44, p. 51.



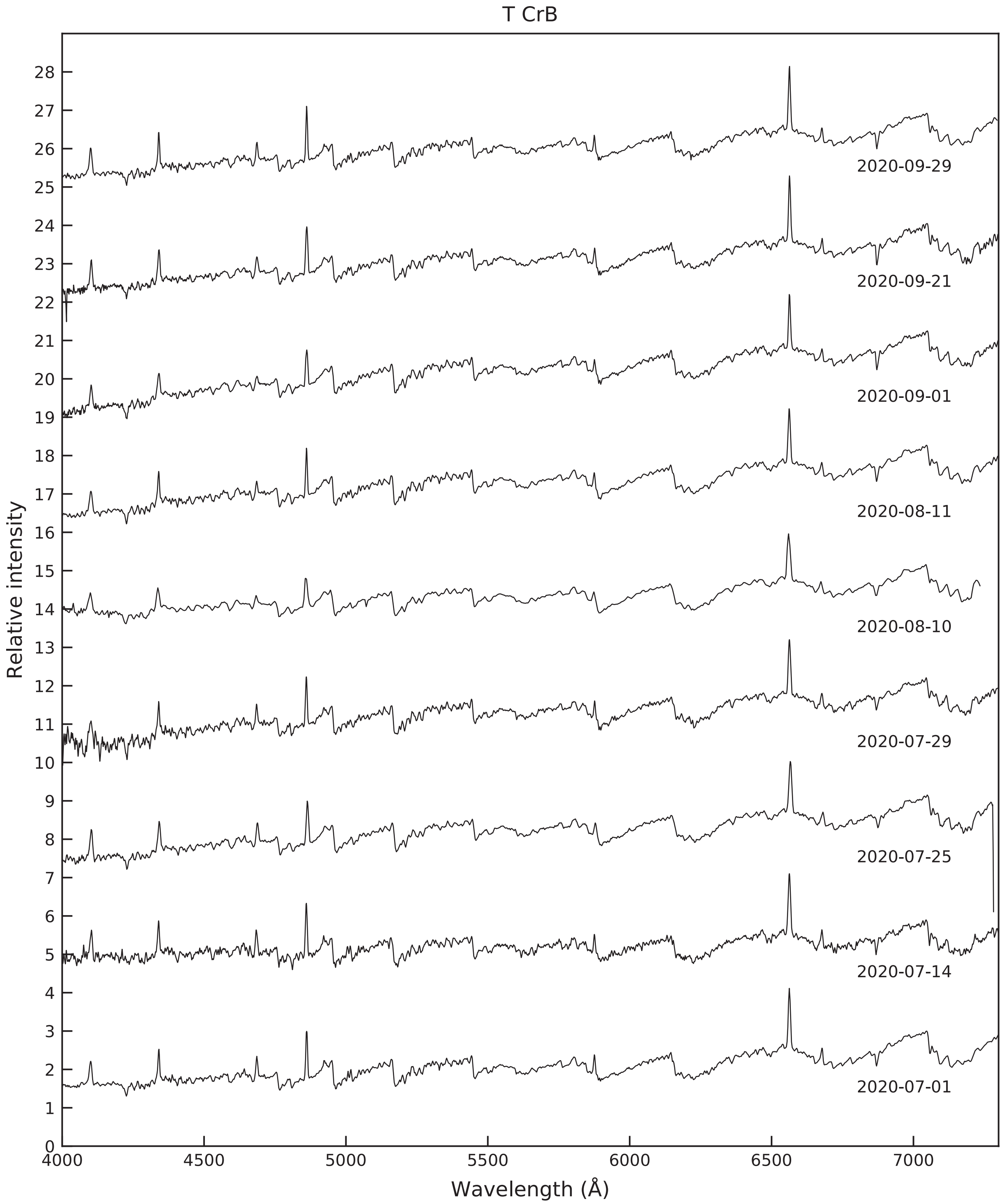
Measured AAVSO V-band magnitudes averaged and interpolated to the dates of ARAS spectra.



T CrB spectrum acquired by Miguel Rodriguez with an ALPY600



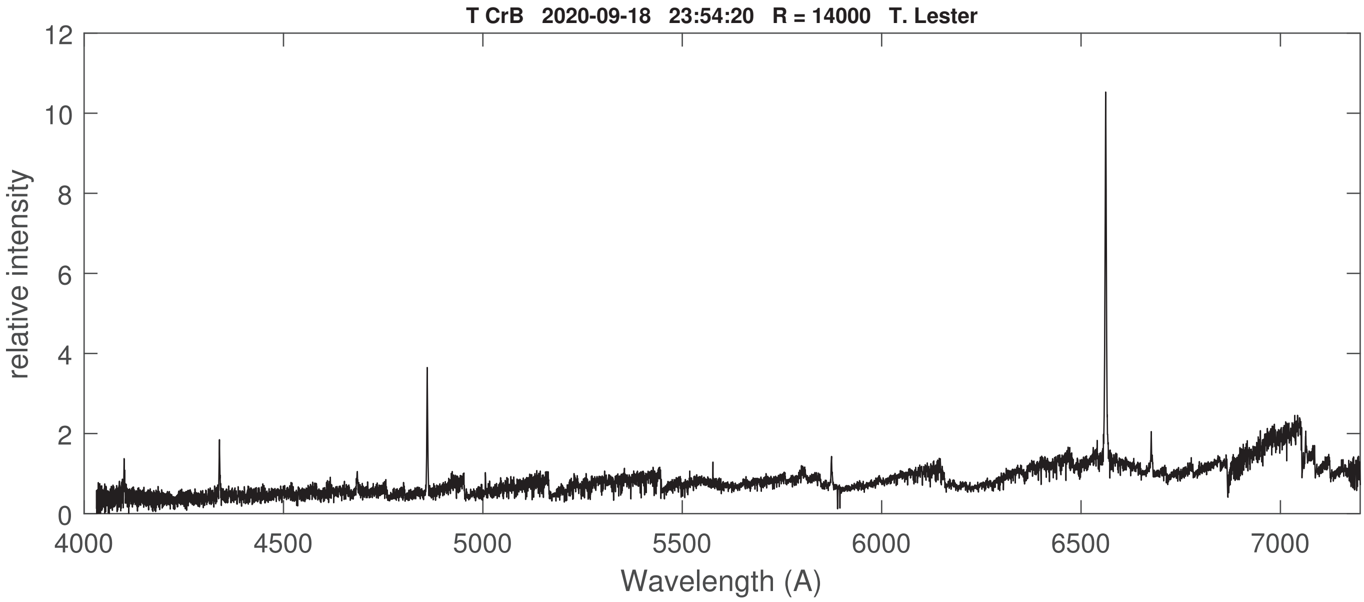
Spectra acquired by Ibrahima Diabassoura using an UVEX prototype (R = 600)



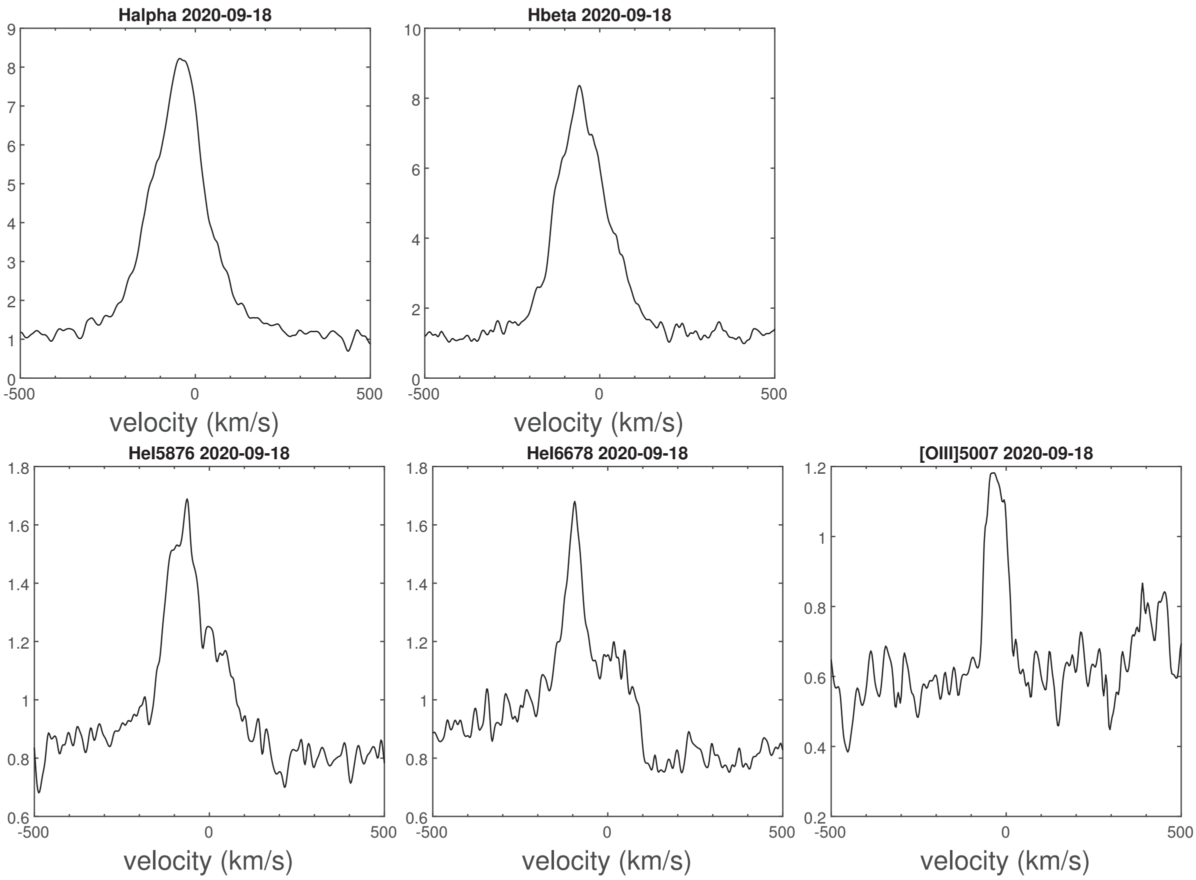
T CrB sequence in 2020-Q3 with low resolution spectra

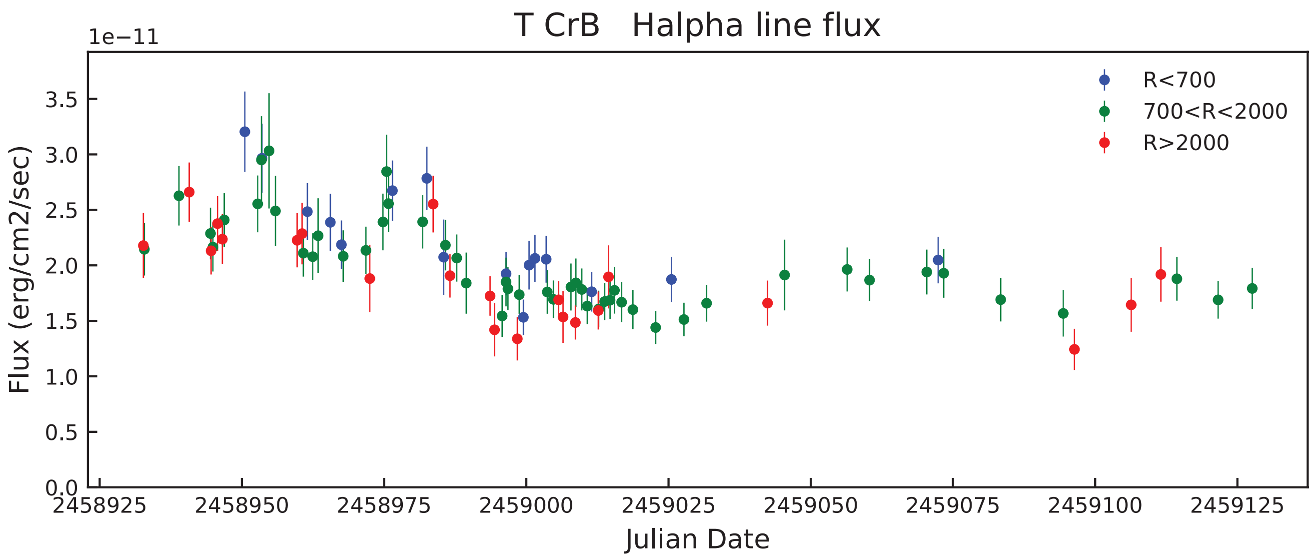
01/07/2020 R = 1073 Forrest Sims
25/07/2020 R = 884 Fran Campos
29/07/2020 R = 1062 Tomas Medulka
10/08/2020 R = 537 Lorenzo Franco

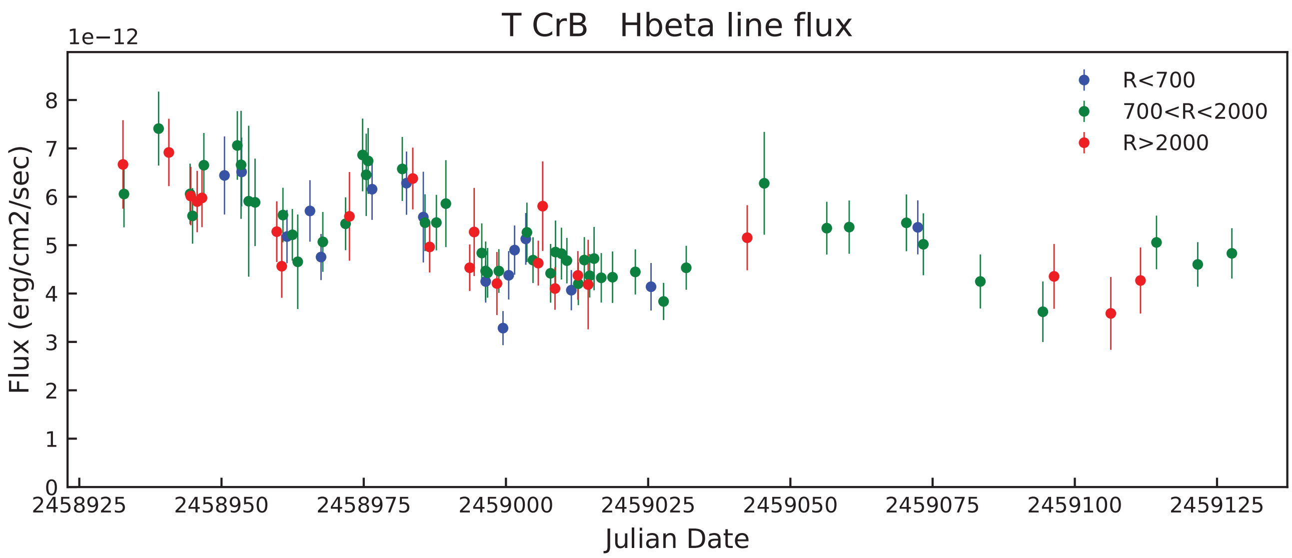
11/08/2020 R = 1014 Pavol Dubovsky
01/09/2020 R = 1045 David Boyd
21/09/2020 R = 1101 David Boyd
29/09/2020 R = 1068 Forrest Sims

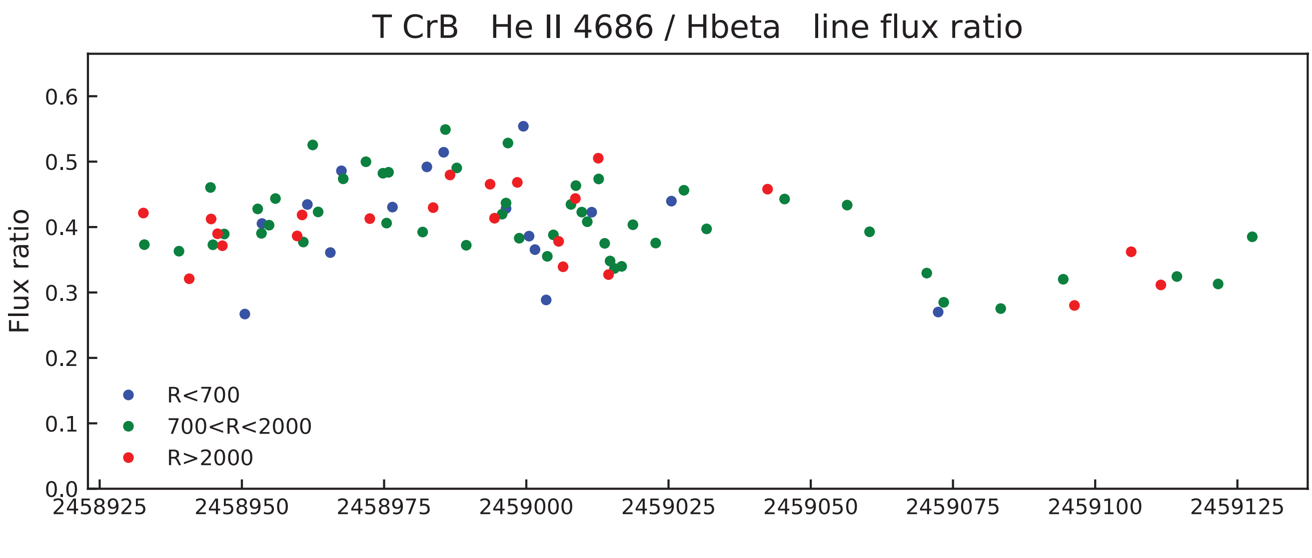


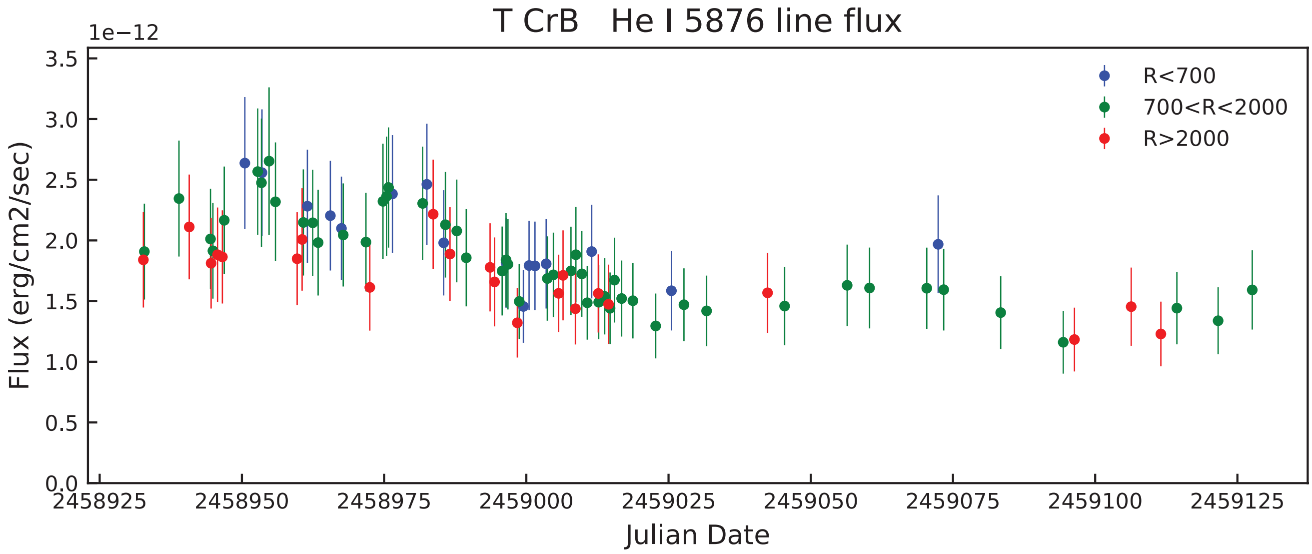
Echelle spectrum (R = 14000) acquired by Tim Lester

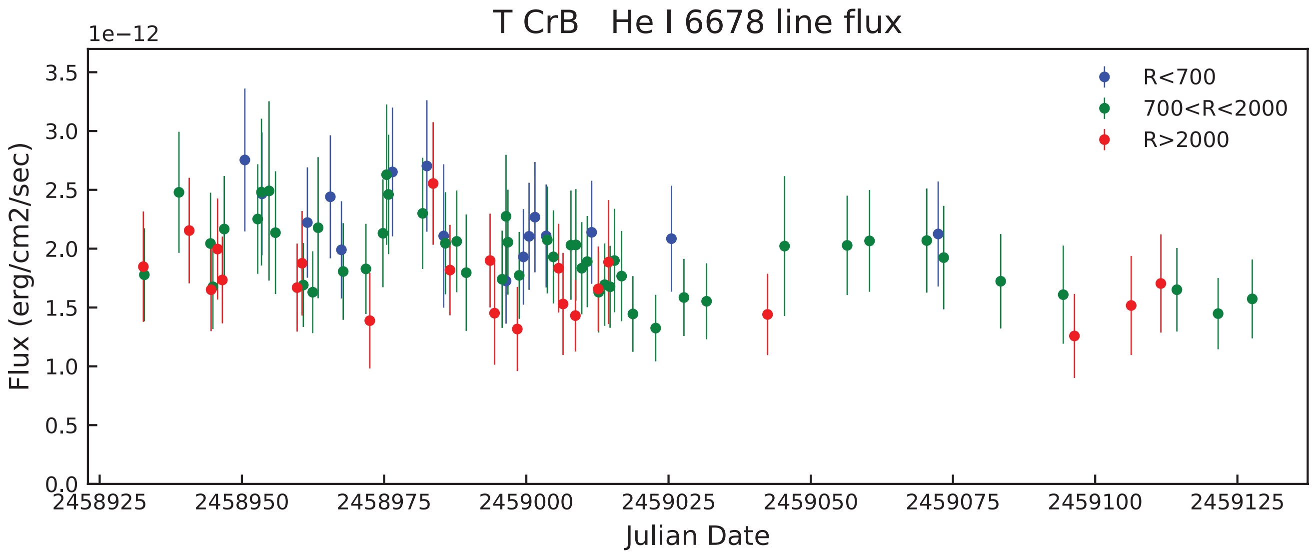


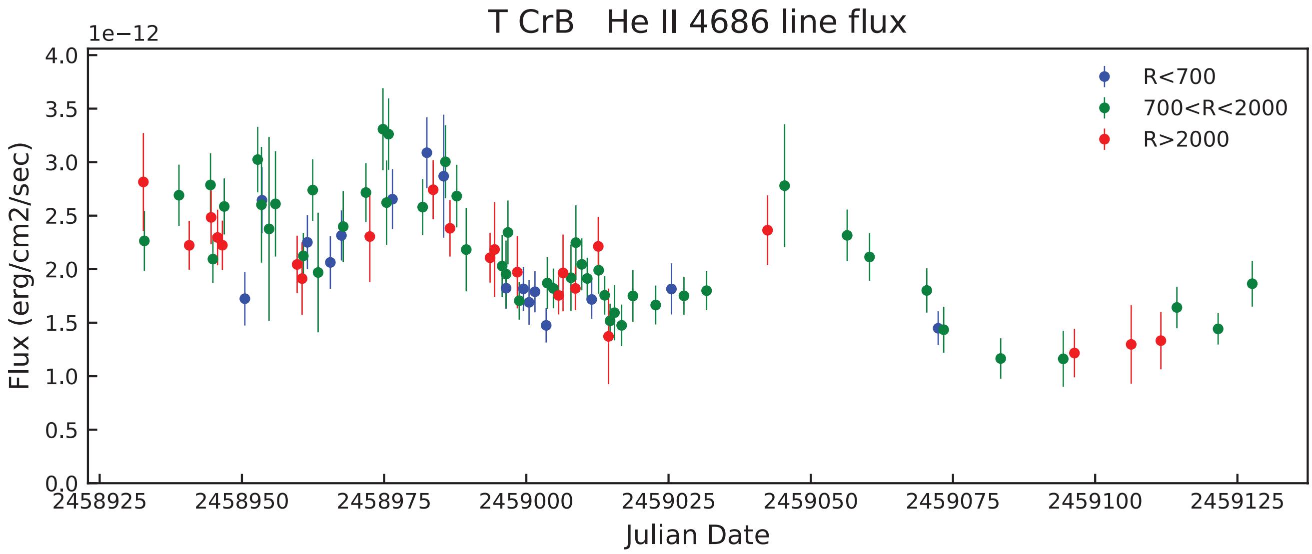

T CrB Halpha line flux
1e−11
Flux (erg/cm2/sec)
Julian Date
R<700
700<R<2000
R>2000


T CrB Hbeta line flux
1e−12
Flux (erg/cm2/sec)
Julian Date
R<700
700<R<2000
R>2000


T CrB He II 4686 / Hbeta line flux ratio
Flux ratio
R<700
700<R<2000
R>2000

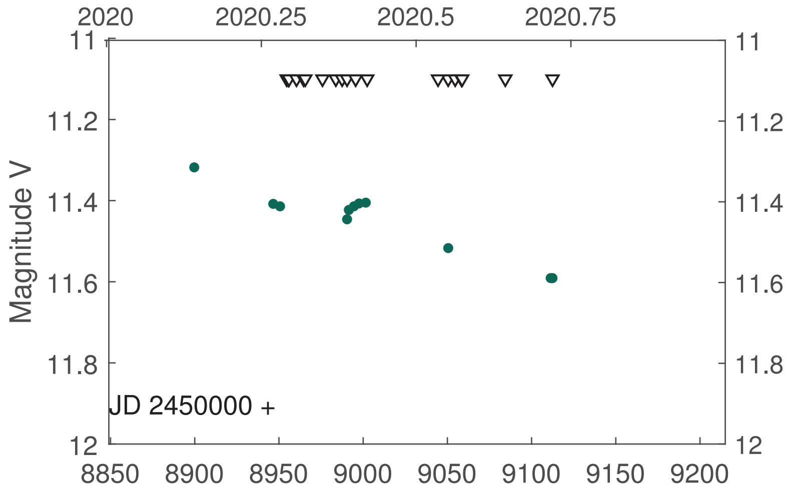

T CrB He I 5876 line flux
1e−12
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flux (erg/cm2/sec)
2458925
2458950
2458975
2459000
2459025
2459050
2459075
2459100
2459125
Julian Date
R<700
700<R<2000
R>2000


T CrB He I 6678 line flux
1e−12
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flux (erg/cm2/sec)
2458925
2458950
2458975
2459000
2459025
2459050
2459075
2459100
2459125
Julian Date
R<700
700<R<2000
R>2000


T CrB He II 4686 line flux
1e−12
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flux (erg/cm2/sec)
2458925
2458950
2458975
2459000
2459025
2459050
2459075
2459100
2459125
Julian Date
R<700
700<R<2000
R>2000

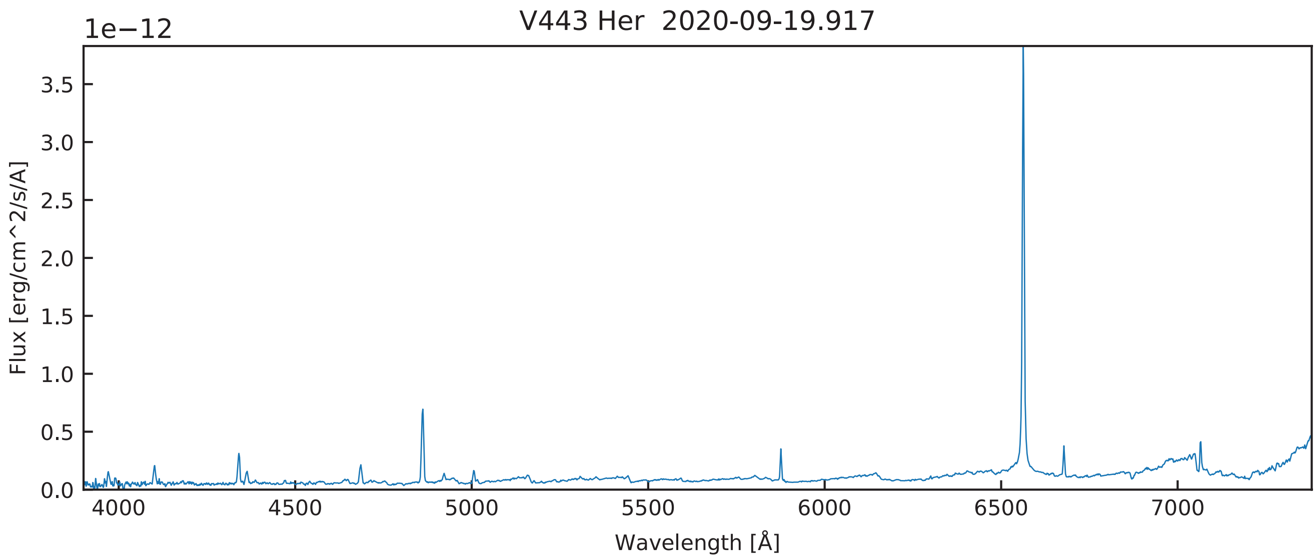
V443 Her

Coordinates (2000.0)	
R.A.	18 22 07.8
Dec	+23 27 19.9
Mag V	~11.5

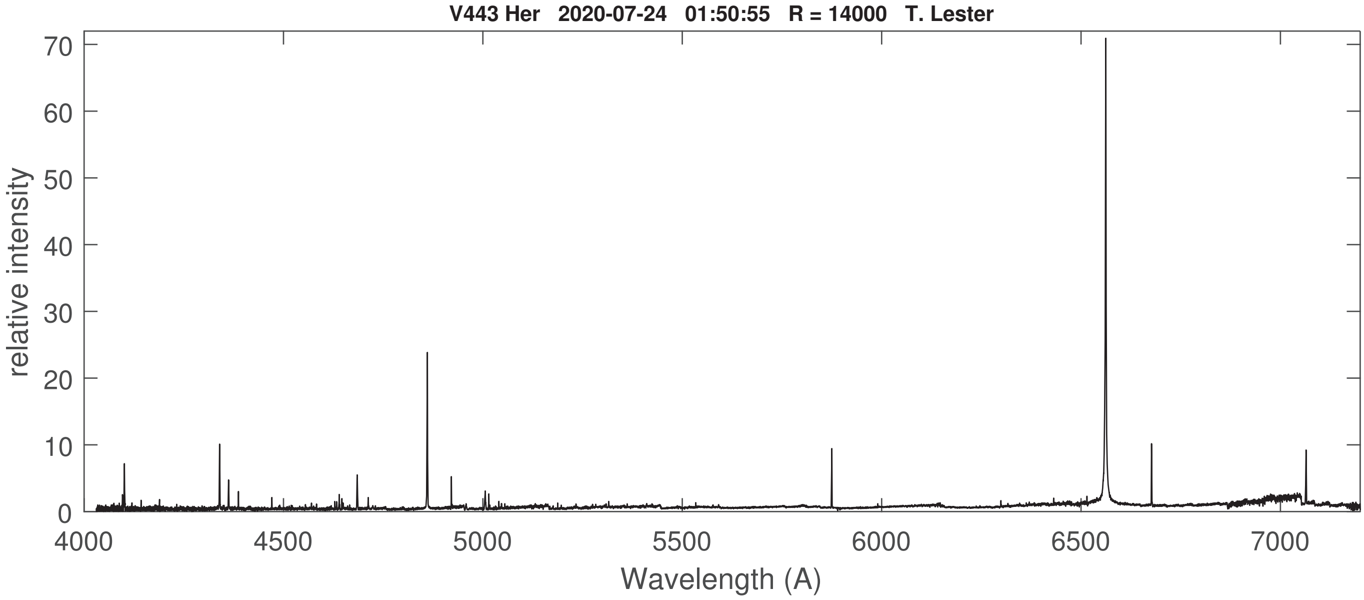


AAVSO V band lightcurve and ARAS spectra (triangles)

01-07-2020 phase = 0.738
01-10-2020 phase = 0.892
(Ephemeris: Fekel & al., 2000)

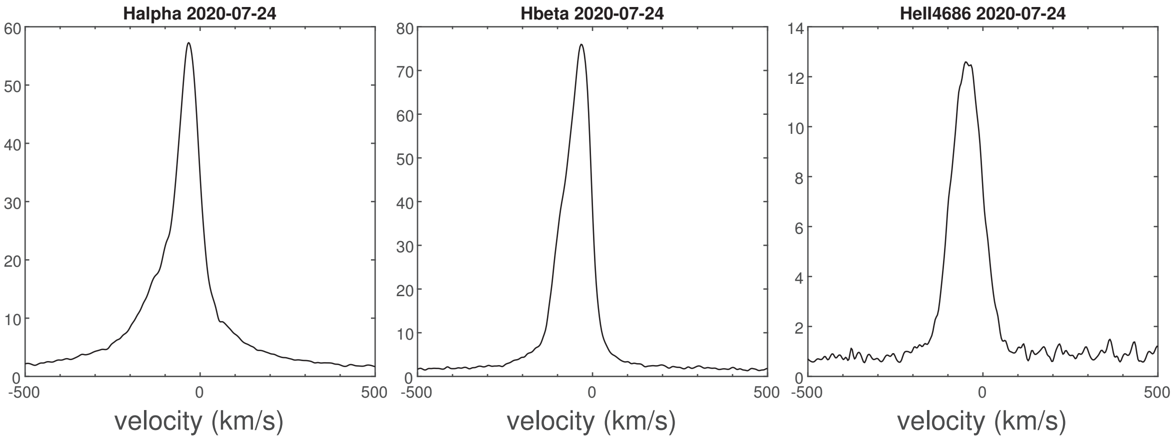


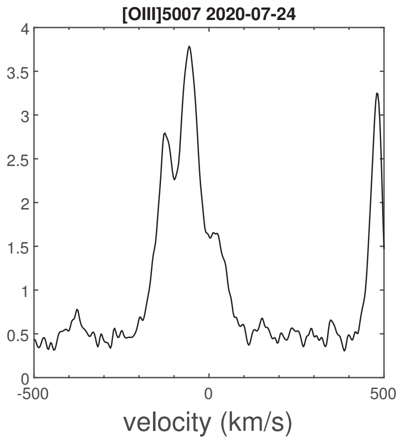
V443 Her Flux calibrated spectrum acquired by David Boyd using a LISA (R = 1000)

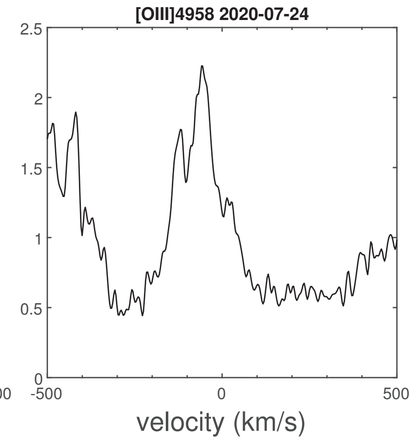


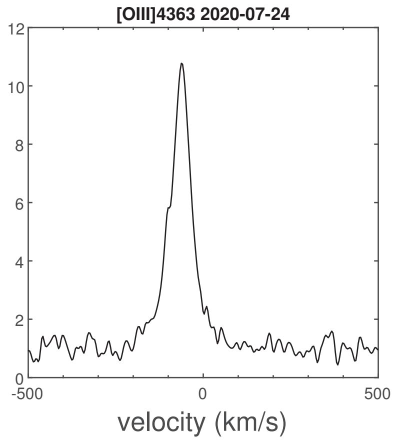
Echelle spectrum secured by Tim Lester

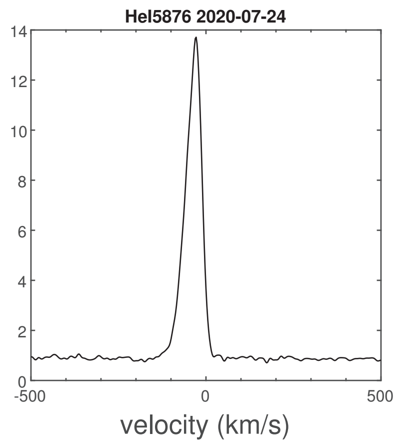
Profiles of the main lines:

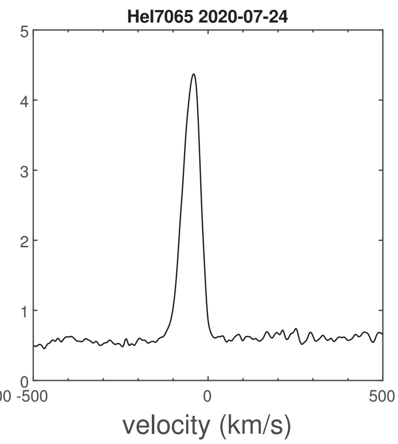


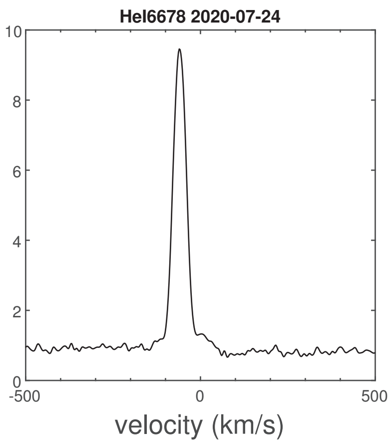

[OIII]5007 2020-07-24
velocity (km/s)

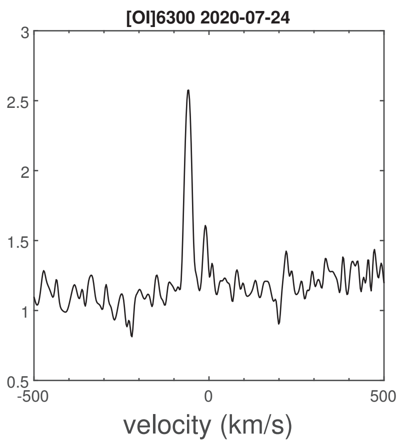

[OIII]4958 2020-07-24
velocity (km/s)

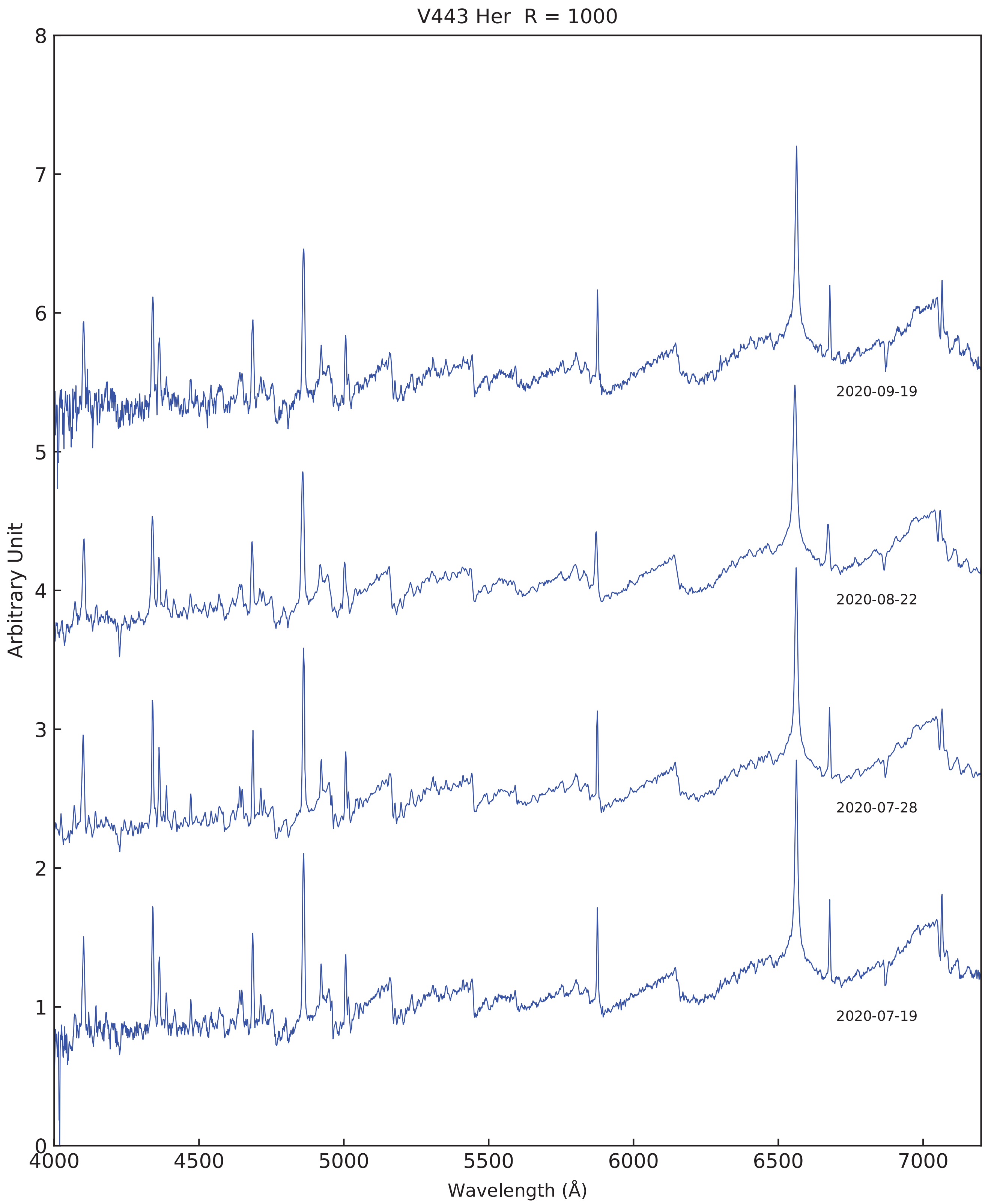

[OIII]4363 2020-07-24
velocity (km/s)


HeI5876 2020-07-24
velocity (km/s)


HeI7065 2020-07-24
velocity (km/s)


HeI6678 2020-07-24
velocity (km/s)

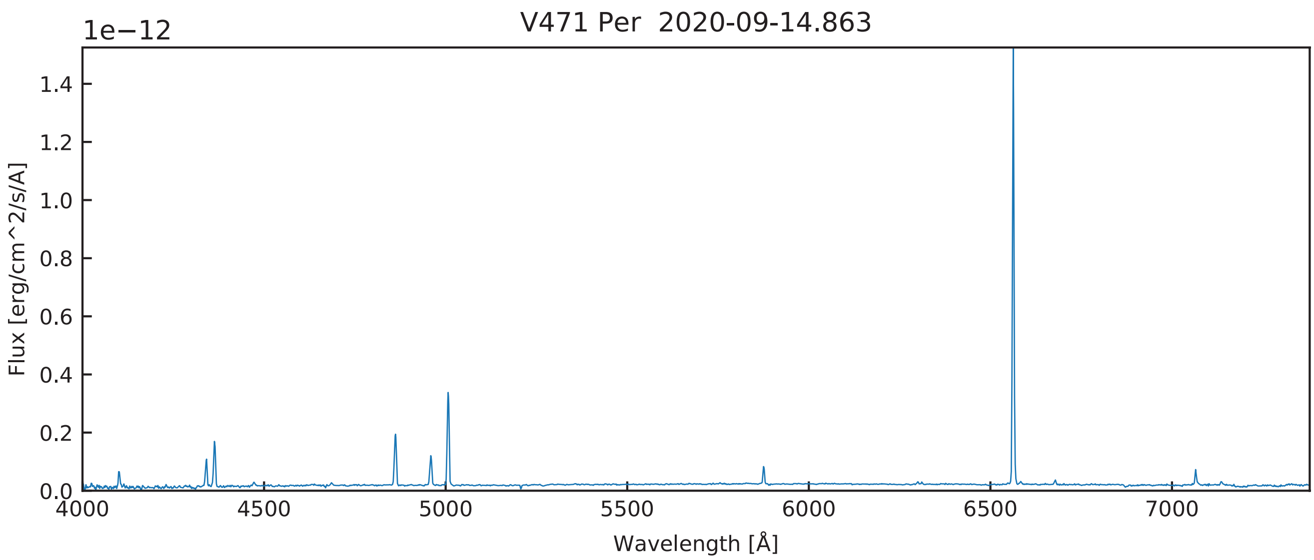

[OI]6300 2020-07-24
velocity (km/s)



Sequence V443 Her during 2020-Q3 with spectra acquired by David Boyd, Fran Campos, Forrest Sims

V471 Per

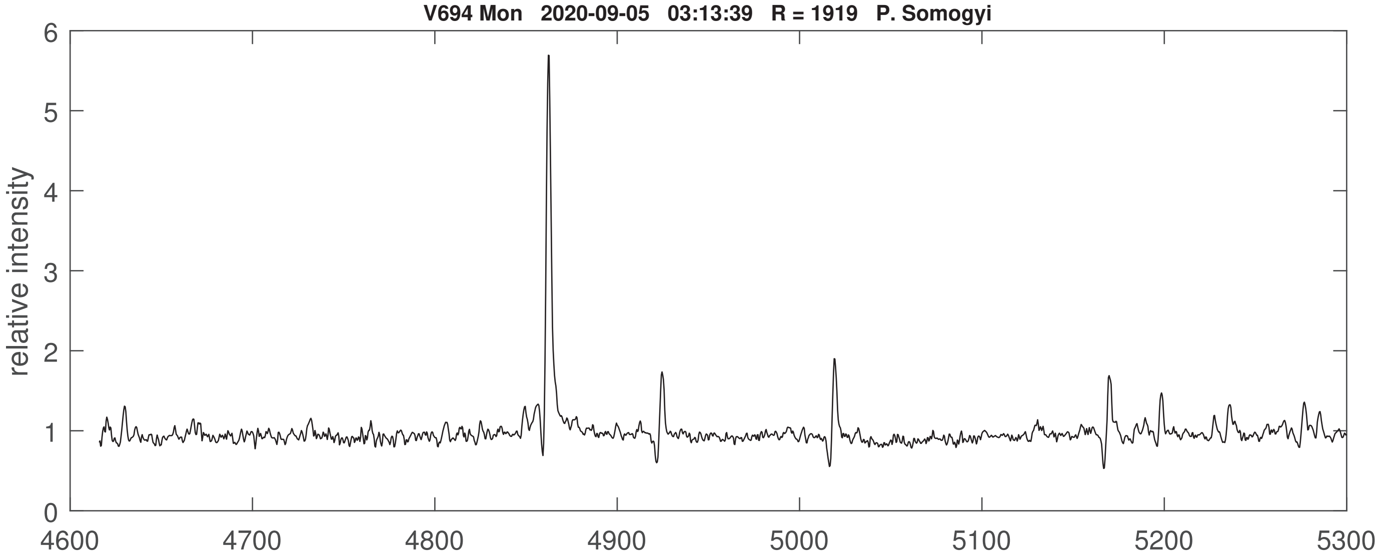
Coordinates (2000.0)	
R.A.	
Dec	
Mag	

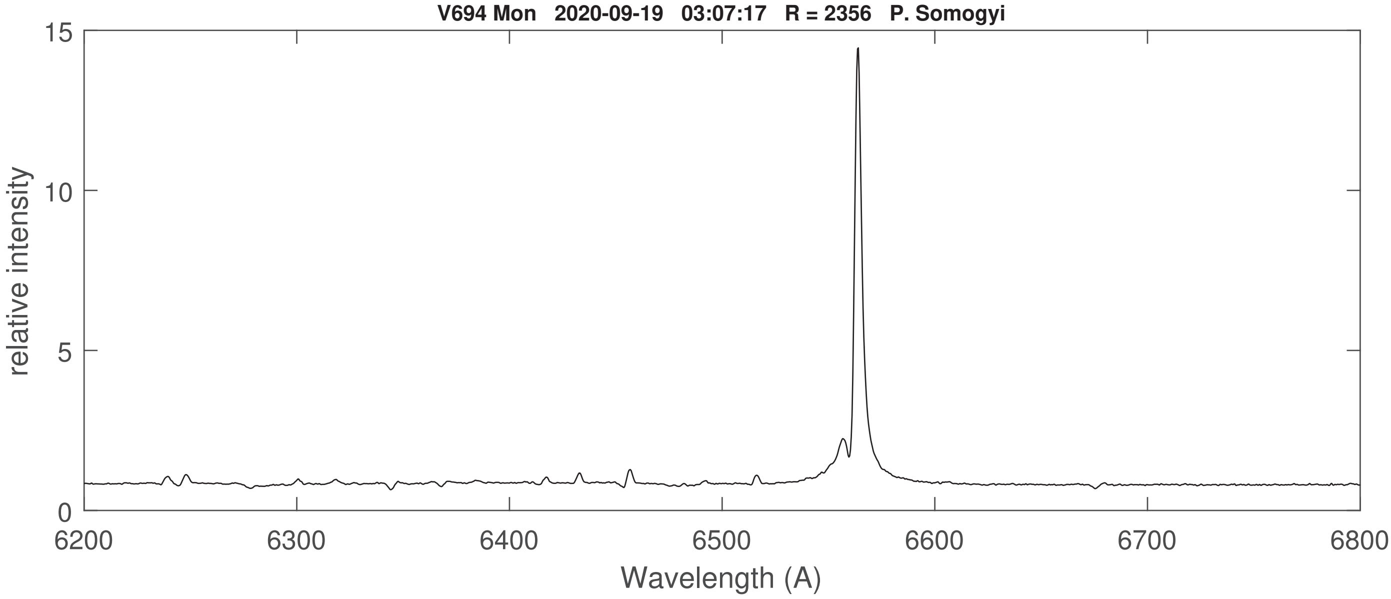


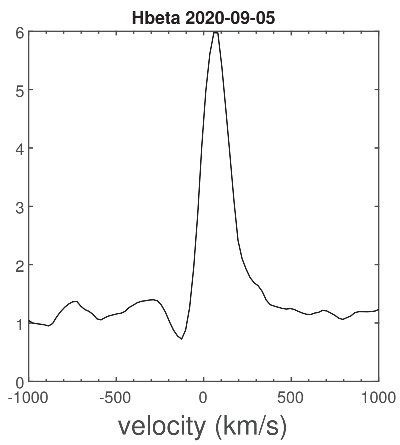
Spectrum acquired by David Boyd with a LISA (R = 1000)

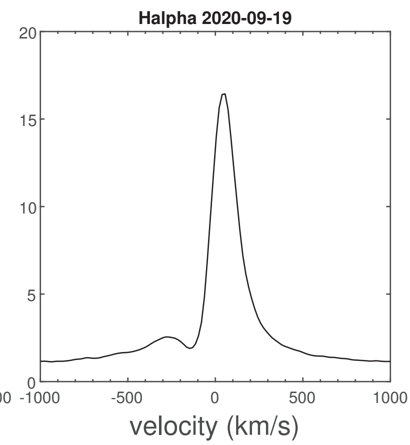
V694 Mon

Coordinates (2000.0)	
R.A.	07 25 51.3
Dec	-07 44 08.08
Mag	



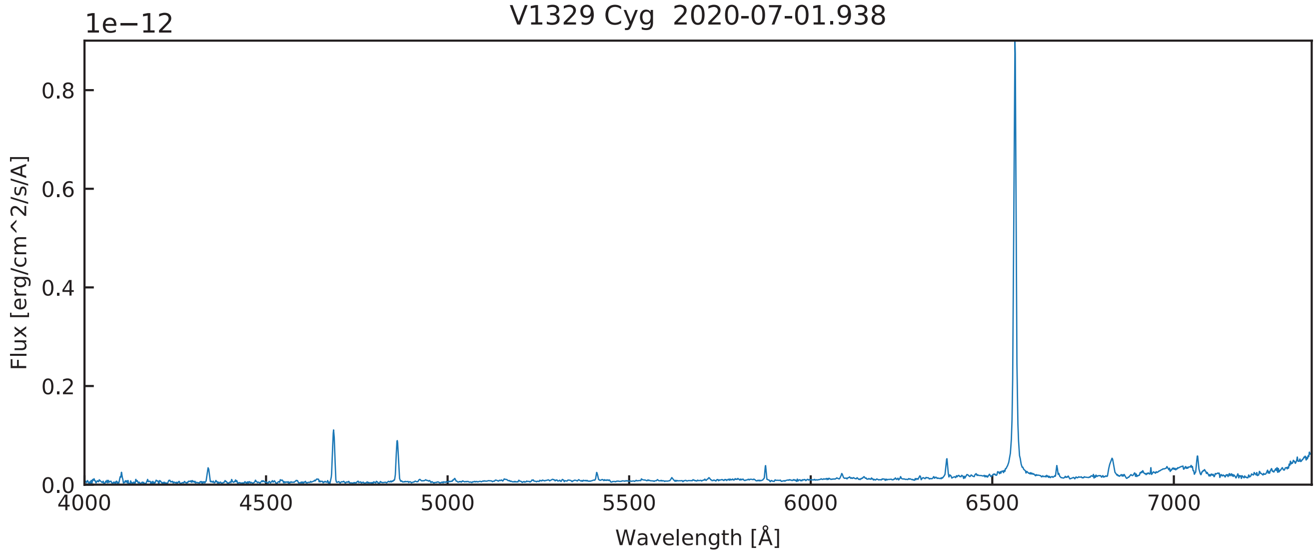


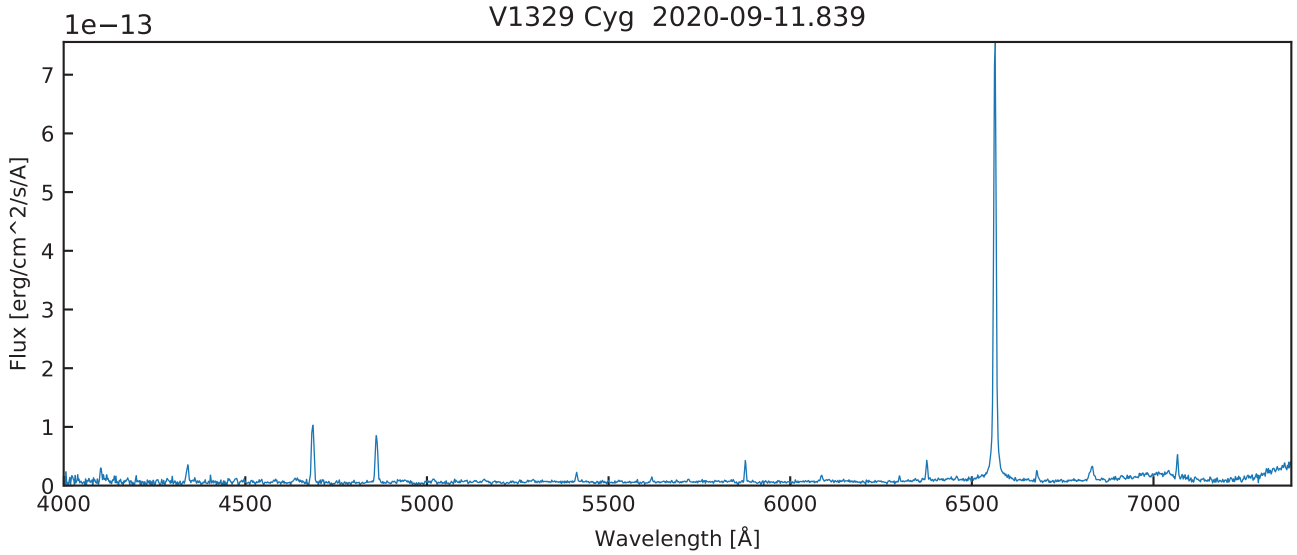




V1329 Cyg

Coordinates (2000.0)	
R.A.	20 51 01.2
Dec	+35 34 54.1
Mag	



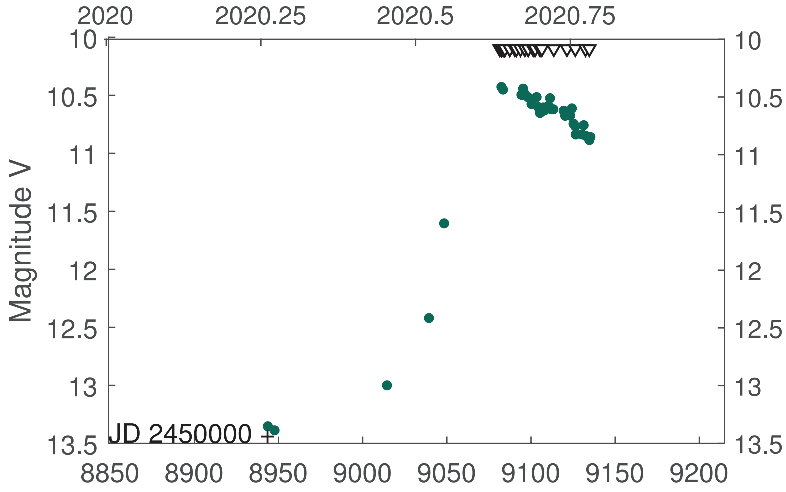


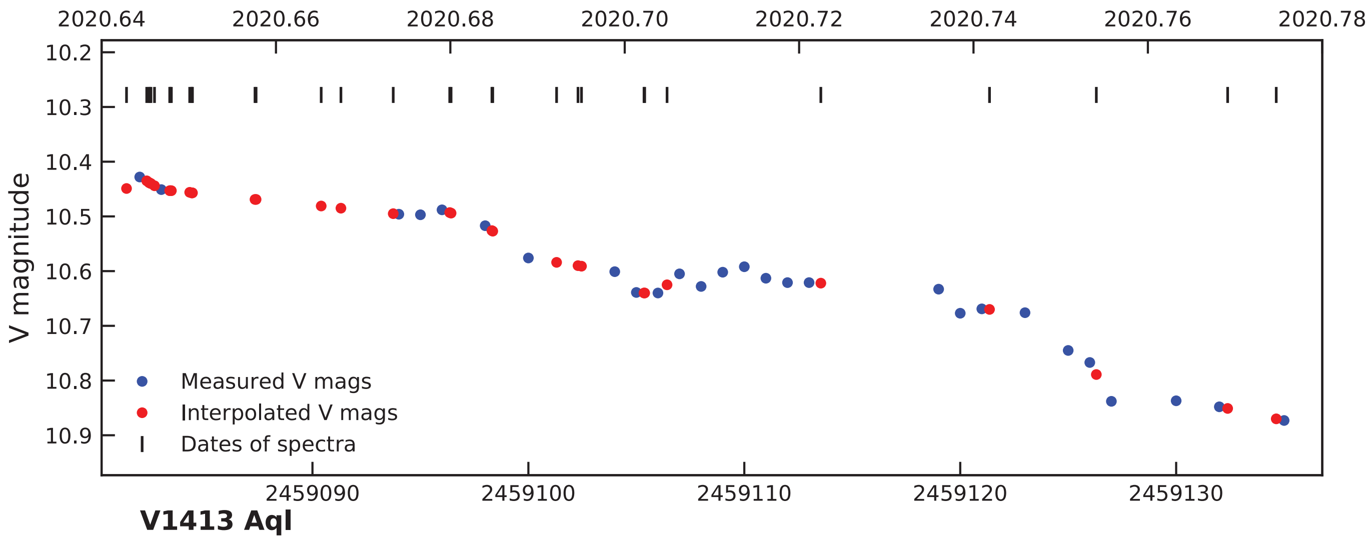
Flux calibrated (V band) spectra obtained by David Boyd with a LISA (R=1000). The V magnitudes are respectively 14.1 and 14.3

V1413 Aql

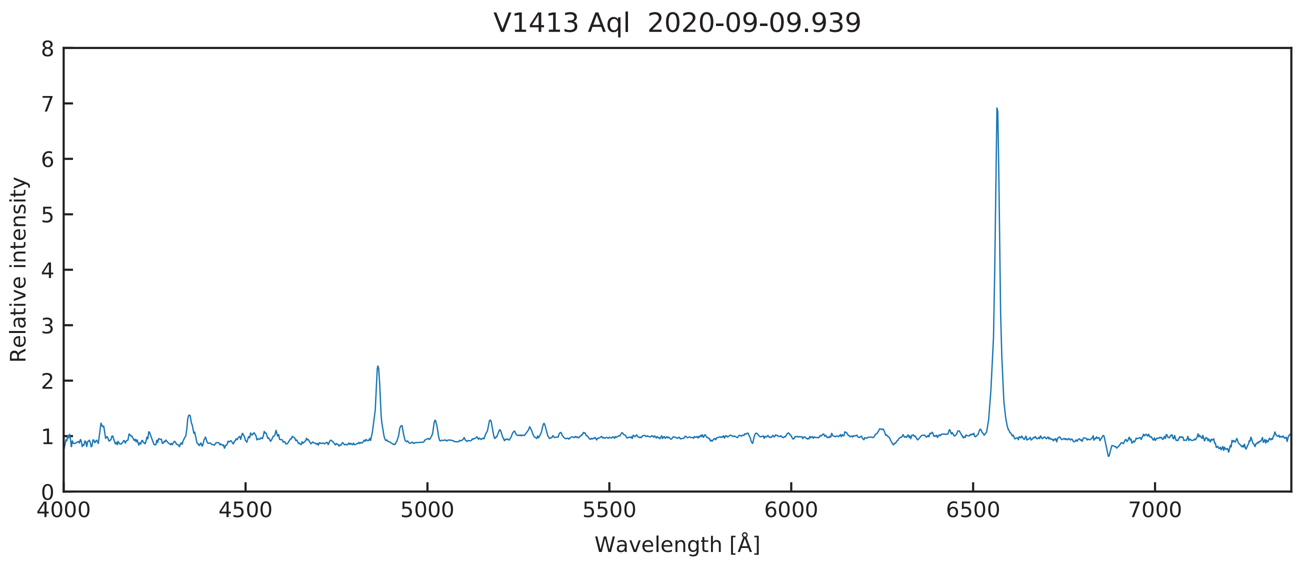
Coordinates (2000.0)	
R.A.	19 03 46.8
Dec	+16 26 17.0
Mag	10.4 - 10.9

Text outburst

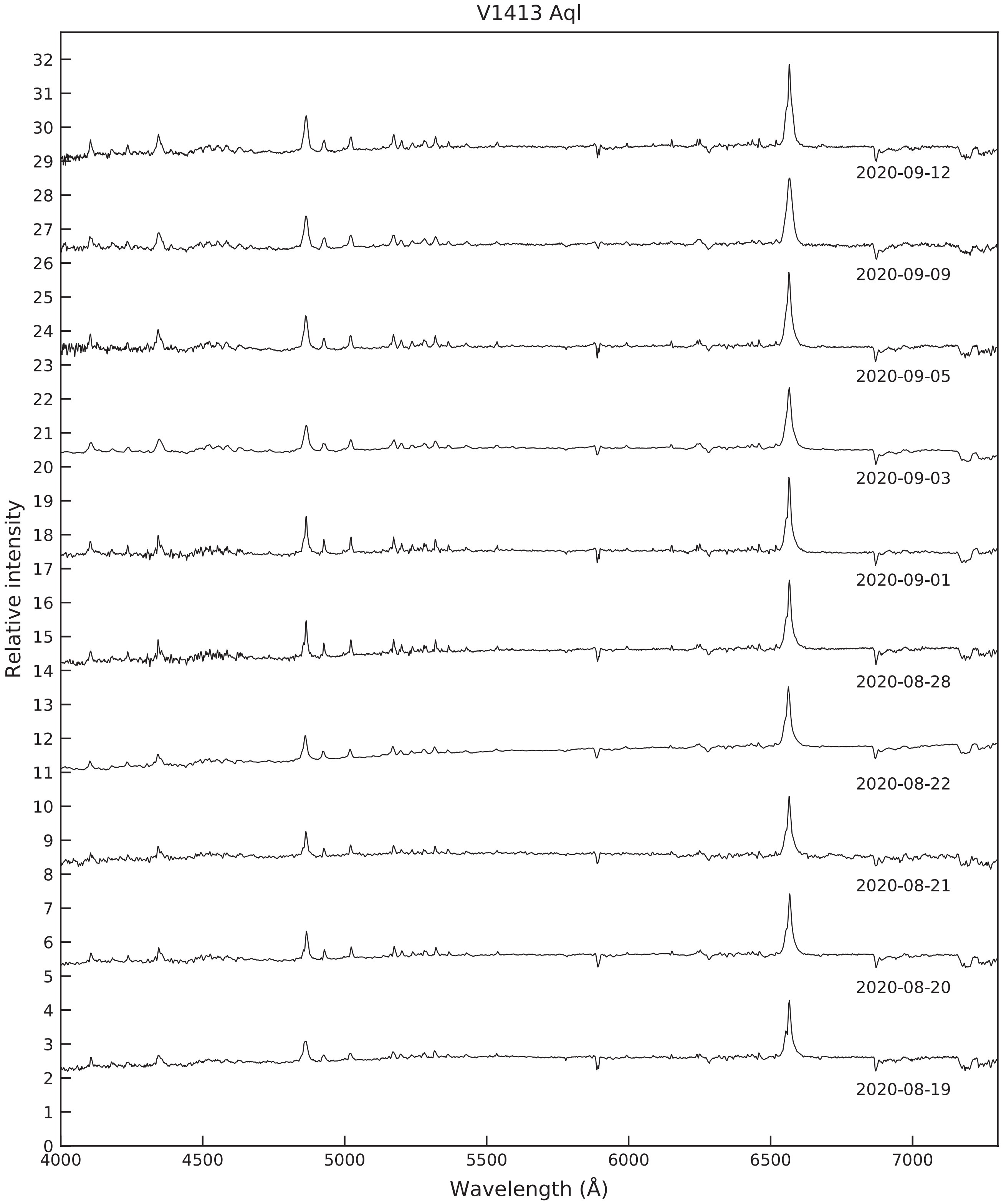




Measured AAVSO V-band magnitudes averaged and interpolated to the dates of ARAS spectra



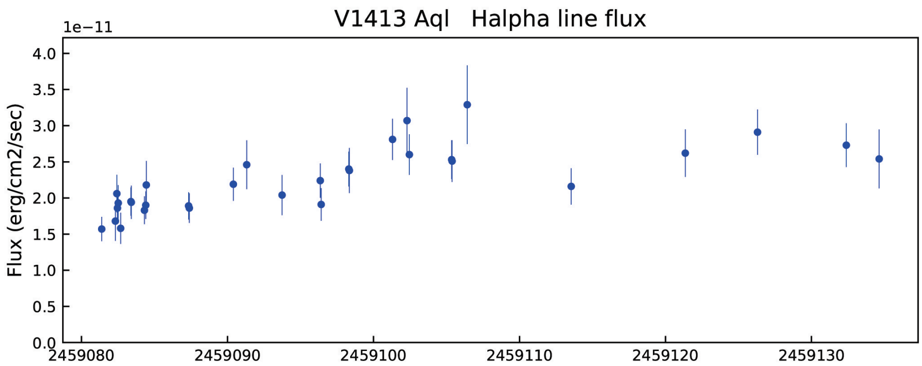
Kevin Gurney Alpy (R = 600)

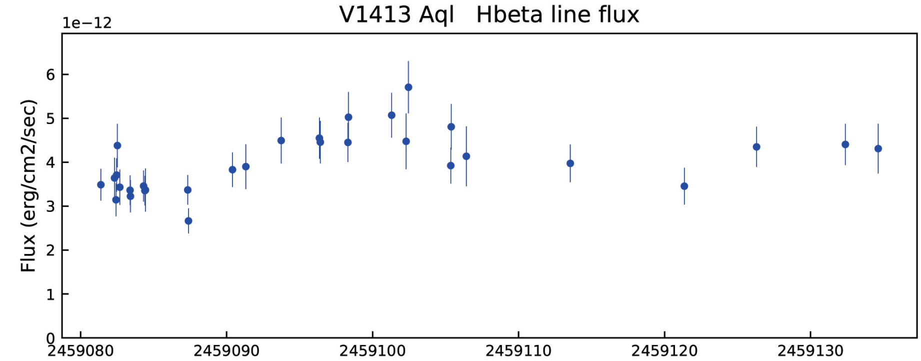


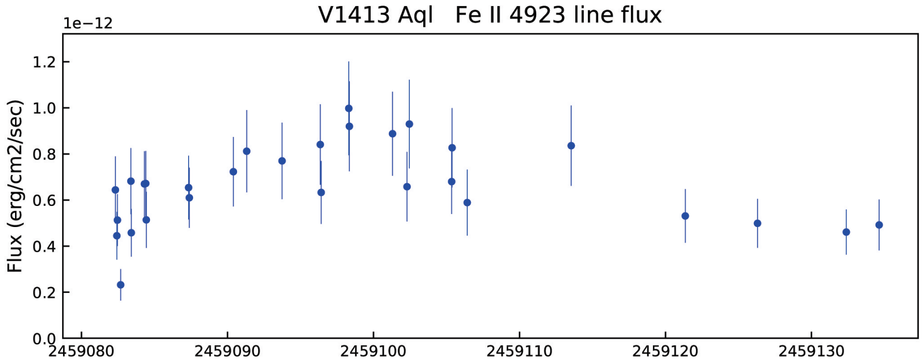
19/08/2020 R = 746 Hubert Boussier
20/08/2020 R = 756 Christian Buil
21/08/2020 R = 566 Sean Curry
22/08/2020 R = 567 Paolo Cazzato
28/08/2020 R = 879 Pavol Dubovsky
01/09/2020 R = 1057 Forrest Sims

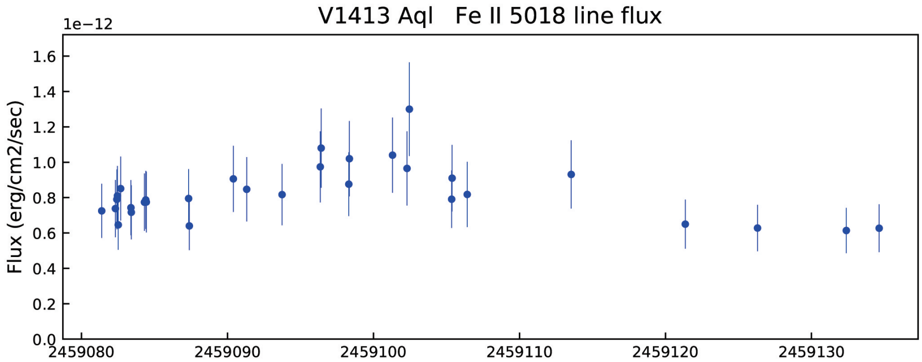
03/09/2020 R = 665 Peter Somogyi
05/09/2020 R = 1000 Jacques Michelet
09/09/2020 R = 577 Kevin Gurney
12/09/2020 R = 1020 David Boyd

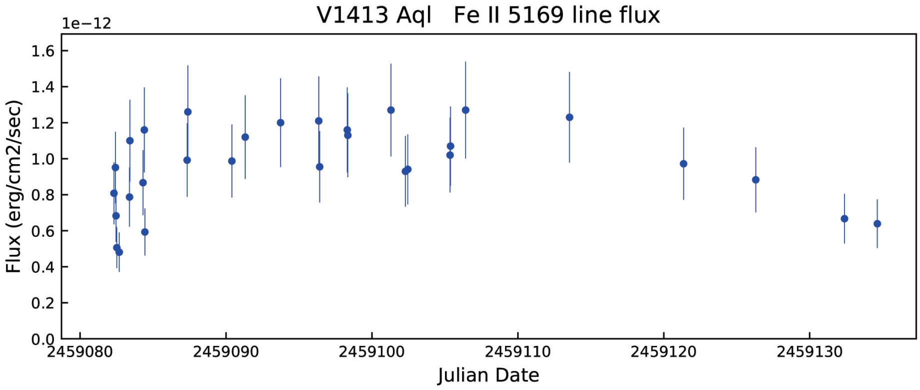
V1413 Aql

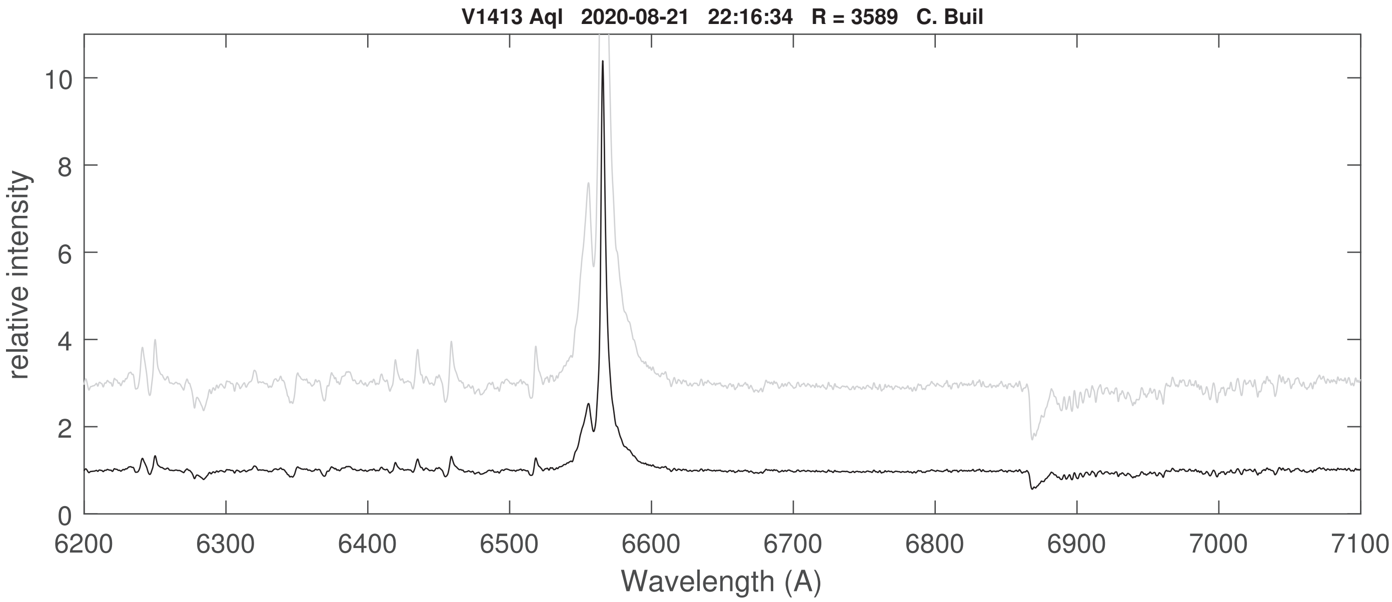

V1413 Aql   Halpha line flux
1e−11
Flux (erg/cm2/sec)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
2459080
2459090
2459100
2459110
2459120
2459130


V1413 Aql   Hbeta line flux
1e−12
Flux (erg/cm2/sec)
0
1
2
3
4
5
6
2459080
2459090
2459100
2459110
2459120
2459130

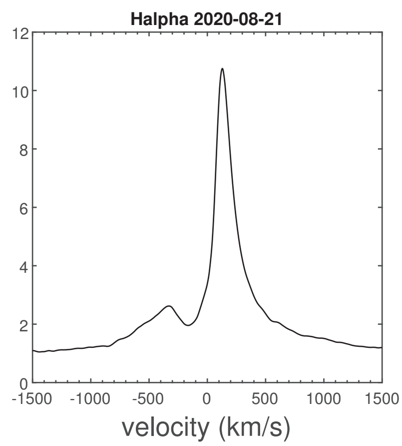

V1413 Aql   Fe II 4923 line flux
1e−12
Flux (erg/cm2/sec)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
2459080
2459090
2459100
2459110
2459120
2459130

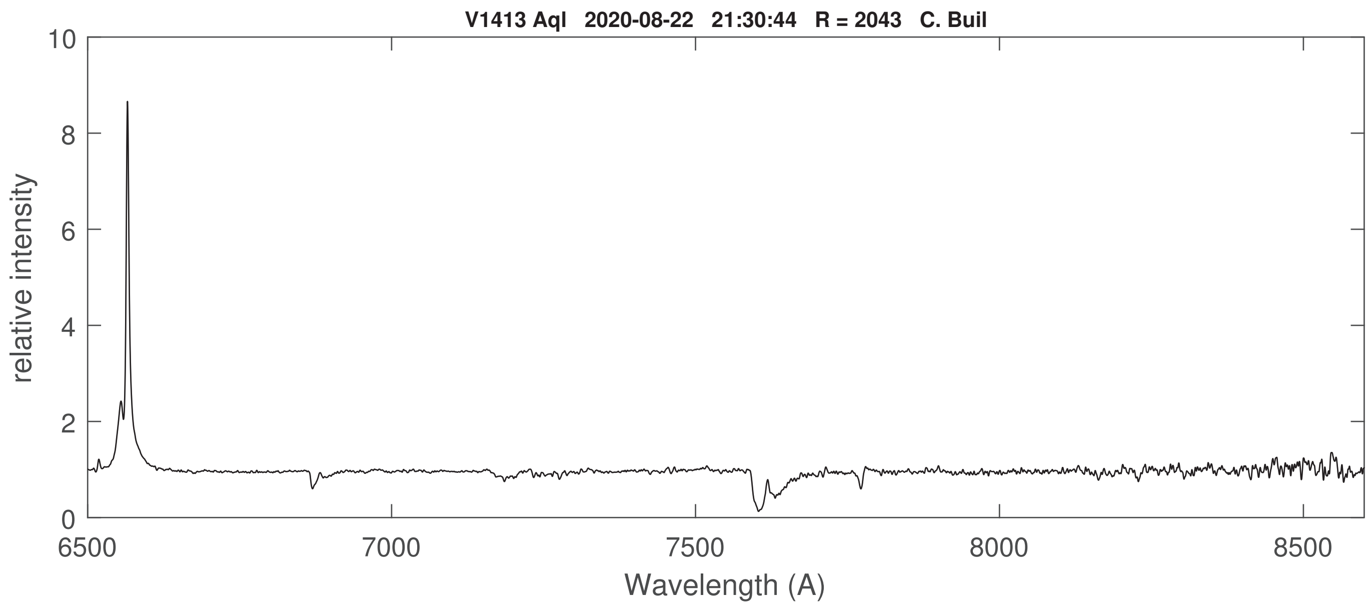

V1413 Aql   Fe II 5018 line flux
1e−12
Flux (erg/cm2/sec)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
2459080
2459090
2459100
2459110
2459120
2459130


V1413 Aql   Fe II 5169 line flux
1e−12
Flux (erg/cm2/sec)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
2459080
2459090
2459100
2459110
2459120
2459130
Julian Date



H alpha range obtained by Christian Buil
with an UVEX prototype (R= 3600)

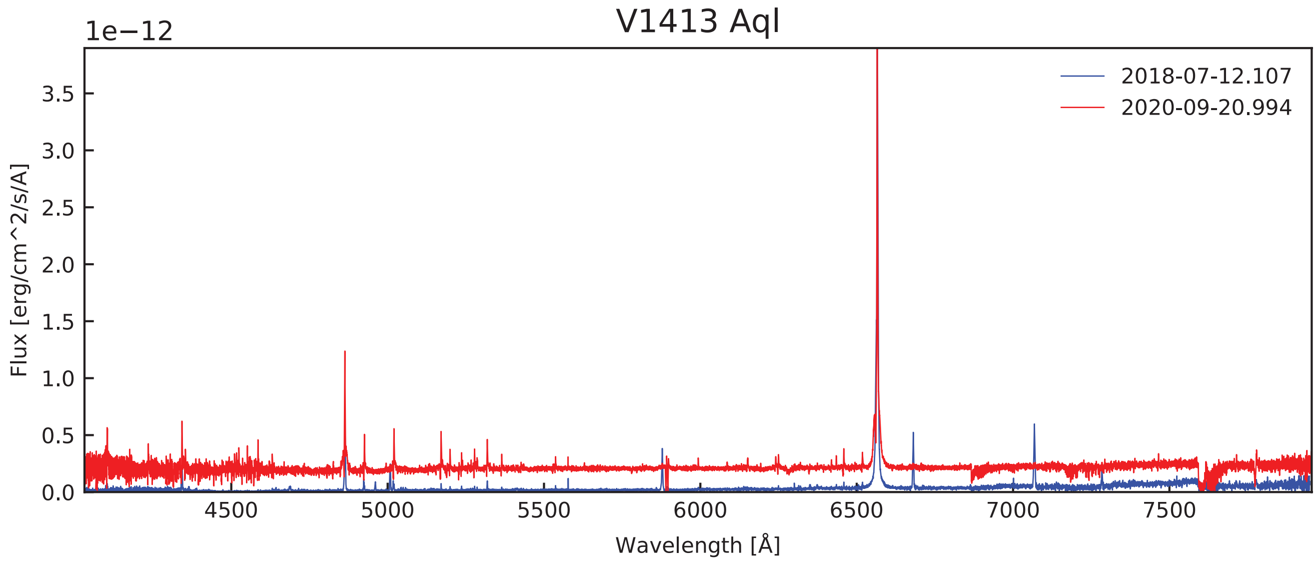


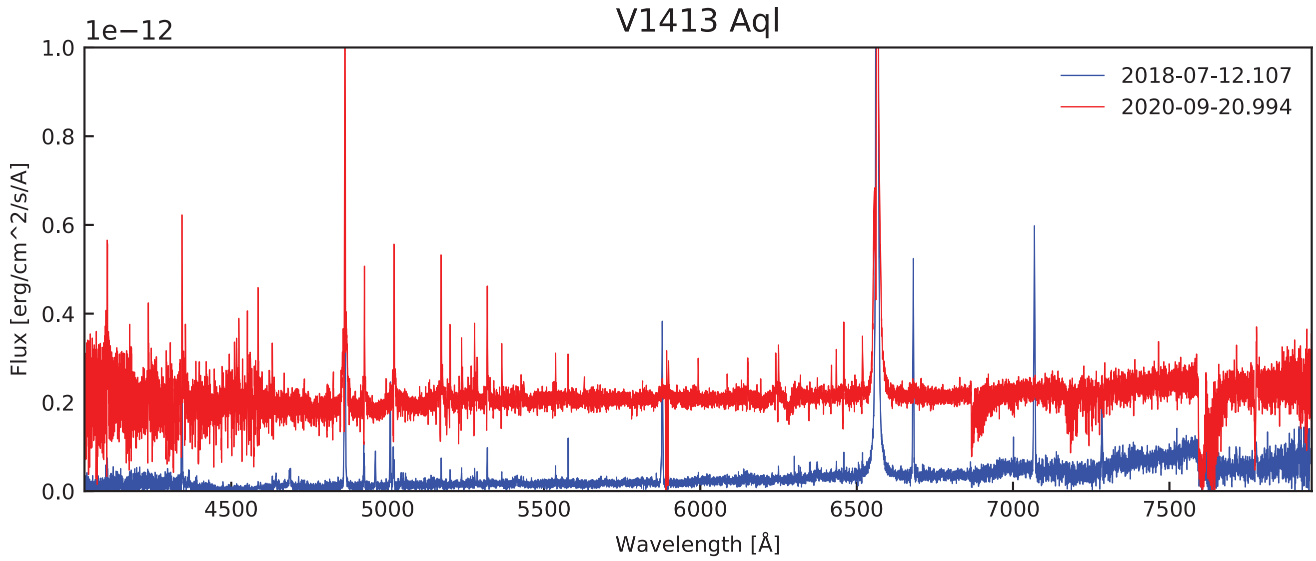


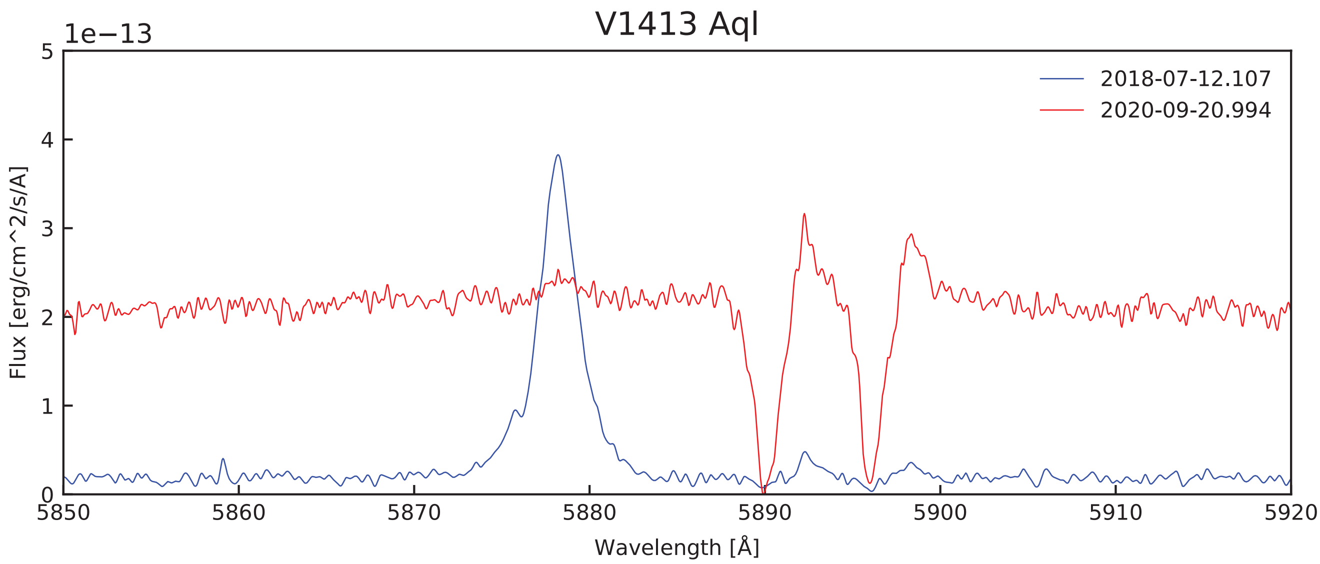
near IR range (R= 2000)

V1413 Aql

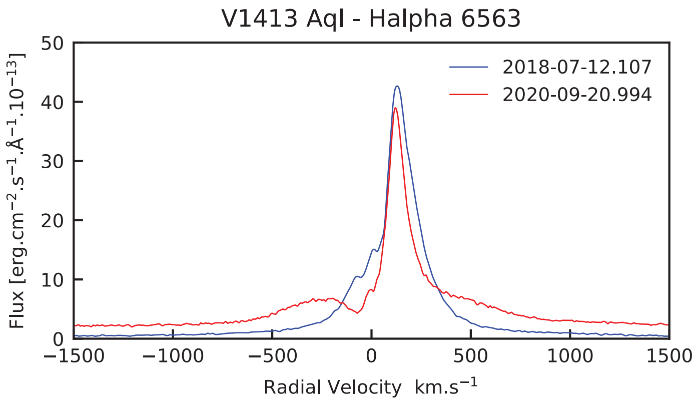
Comparison of the spectra of V1413 Aql in quiescence (2018-07-12) and during the 2020 outburst. The spectra acquired by Tim Lester (R = 14000) were calibrated in flux using AAVSO V band data (resp. V = 11.89 (GCO observer) and V = 10.62 (DGRA observer). The phase (Min. B) of the two spectra are respectively 0.864 and 0.709 (Munari, U., 1992, A&A 257, 163)

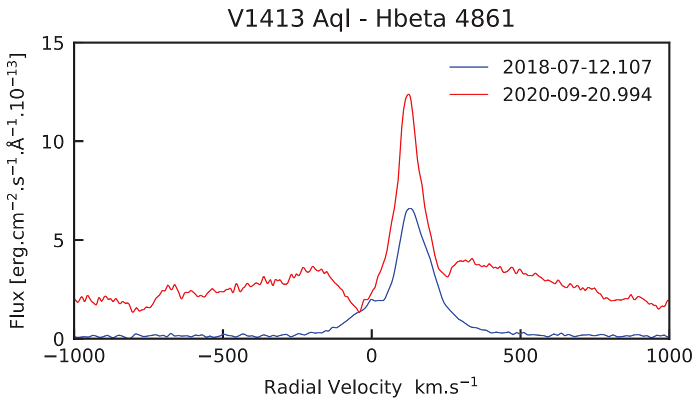


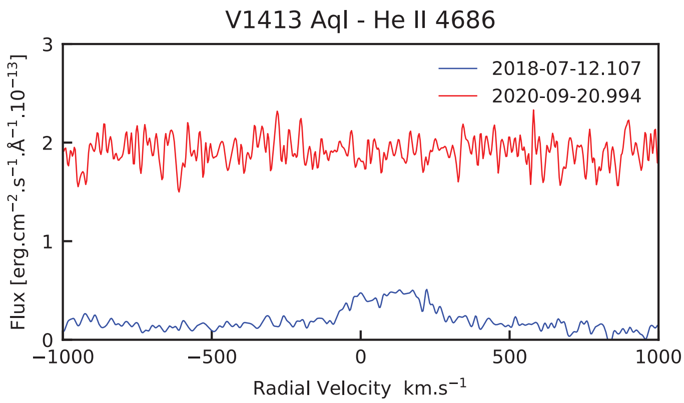


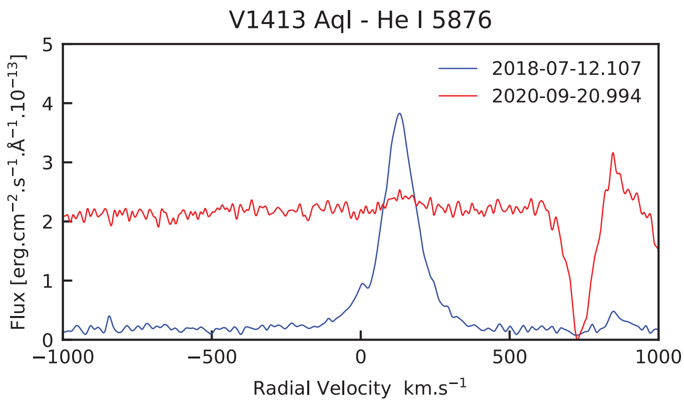


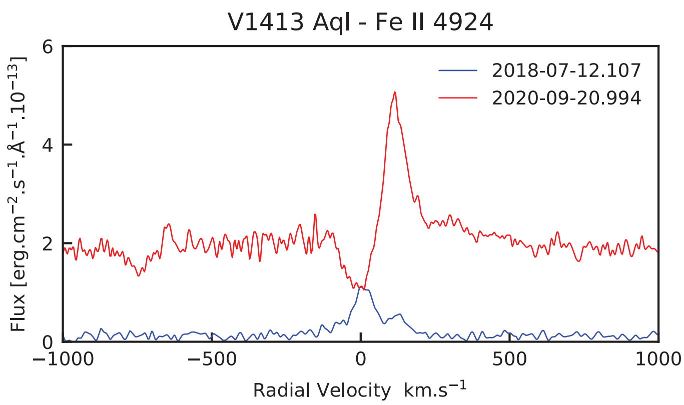
Na I D range. The He I 5876 triplet has disappeared. The absorptions of Na I D are almost saturated.

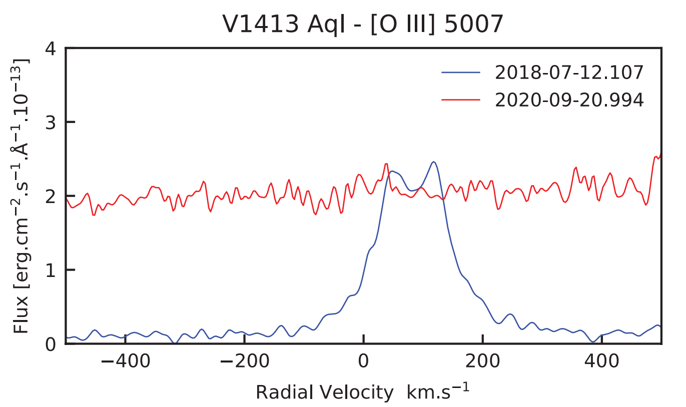

V1413 Aql - Halpha 6563
2018-07-12.107
2020-09-20.994
Flux [erg.cm^{-2}.s^{-1}.Å^{-1}.10^{-13}]
Radial Velocity km.s^{-1}


V1413 Aql - Hbeta 4861
2018-07-12.107
2020-09-20.994
Flux [erg.cm^{-2}.s^{-1}.Å^{-1}.10^{-13}]
Radial Velocity km.s^{-1}

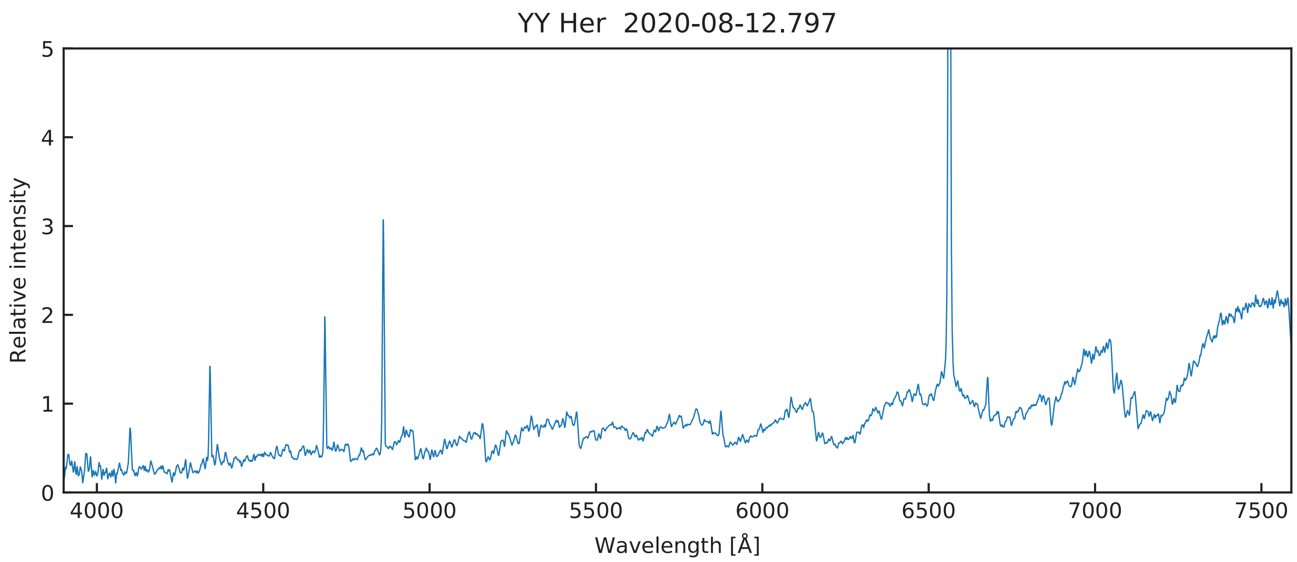

V1413 Aql - He II 4686
2018-07-12.107
2020-09-20.994
Flux [erg.cm^{-2}.s^{-1}.Å^{-1}.10^{-13}]
Radial Velocity km.s^{-1}


V1413 Aql - He I 5876
2018-07-12.107
2020-09-20.994
Flux [erg.cm^{-2}.s^{-1}.Å^{-1}.10^{-13}]
Radial Velocity km.s^{-1}

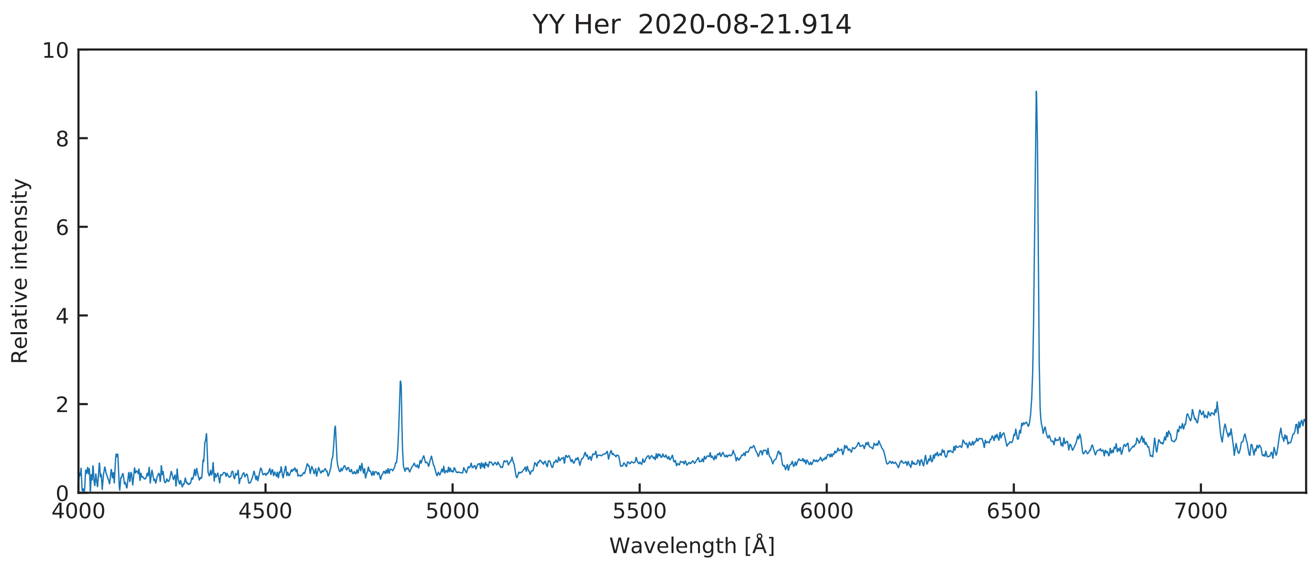

V1413 Aql - Fe II 4924
2018-07-12.107
2020-09-20.994
Flux [erg.cm^{-2}.s^{-1}.Å^{-1}.10^{-13}]
Radial Velocity km.s^{-1}


V1413 Aql - [O III] 5007
2018-07-12.107
2020-09-20.994
Flux [erg.cm^{-2}.s^{-1}.Å^{-1}.10^{-13}]
Radial Velocity km.s^{-1}

Coordinates (2000.0)	
R.A.	18 14 34.19
Dec	+20 59 21.18
Mag V	13.1-13.6



YY Her spectrum acquired by Pavol Dubovsky with a LISA R = 1000

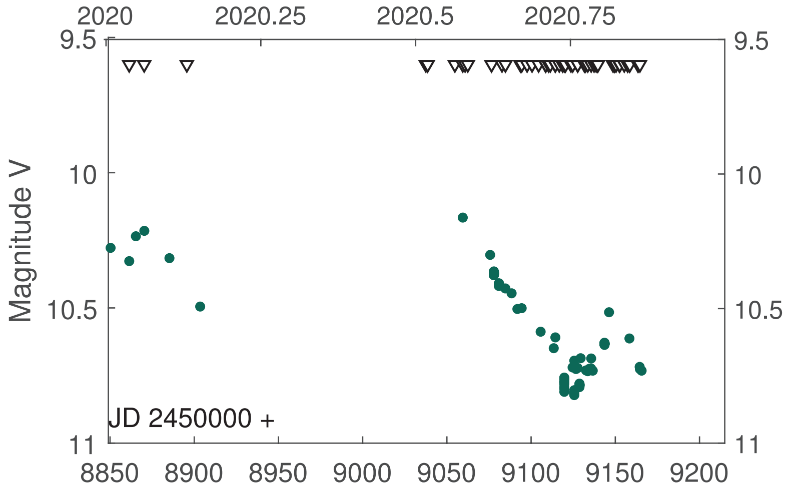


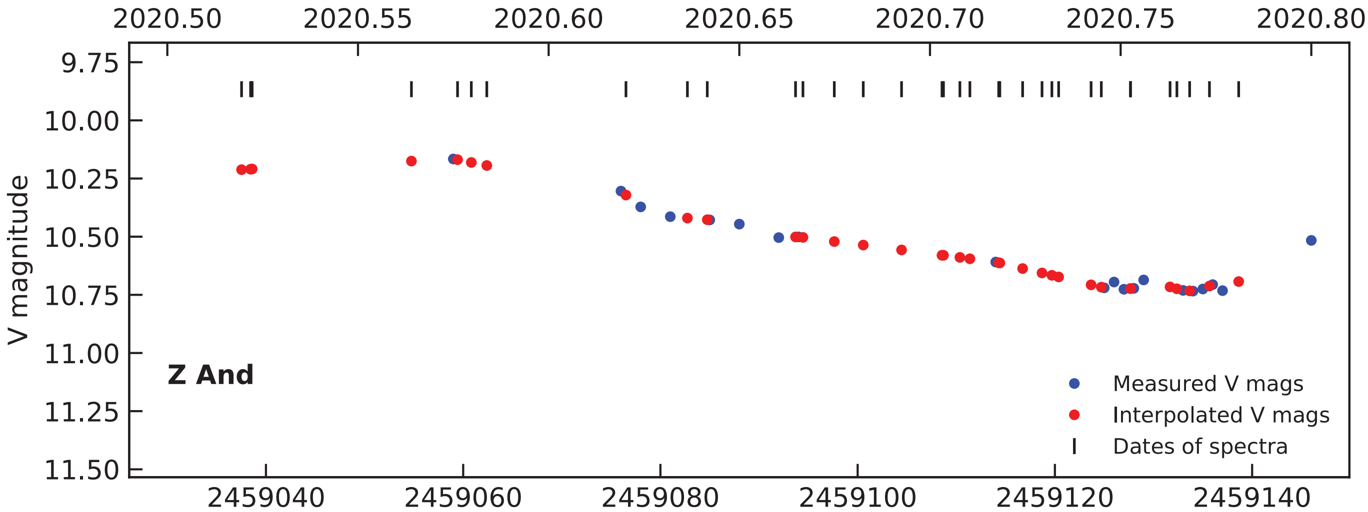
Fran Campos used a DADOS 200 l/mm to obtain this spectrum

Z And

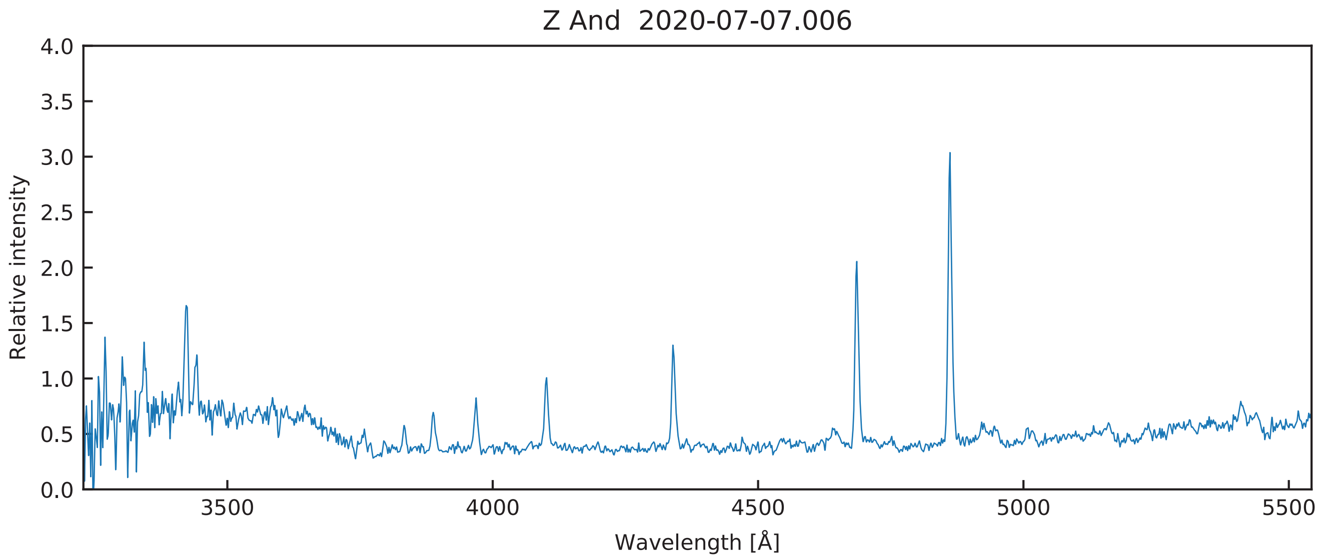
Coordinates (2000.0)	
R.A.	23 33 40.0
Dec	+48 49 06.0
Mag V	

01-07-2020: Phase = 0.556
01-10-2020: Phase = 0.678
(Fekel+, 2000)

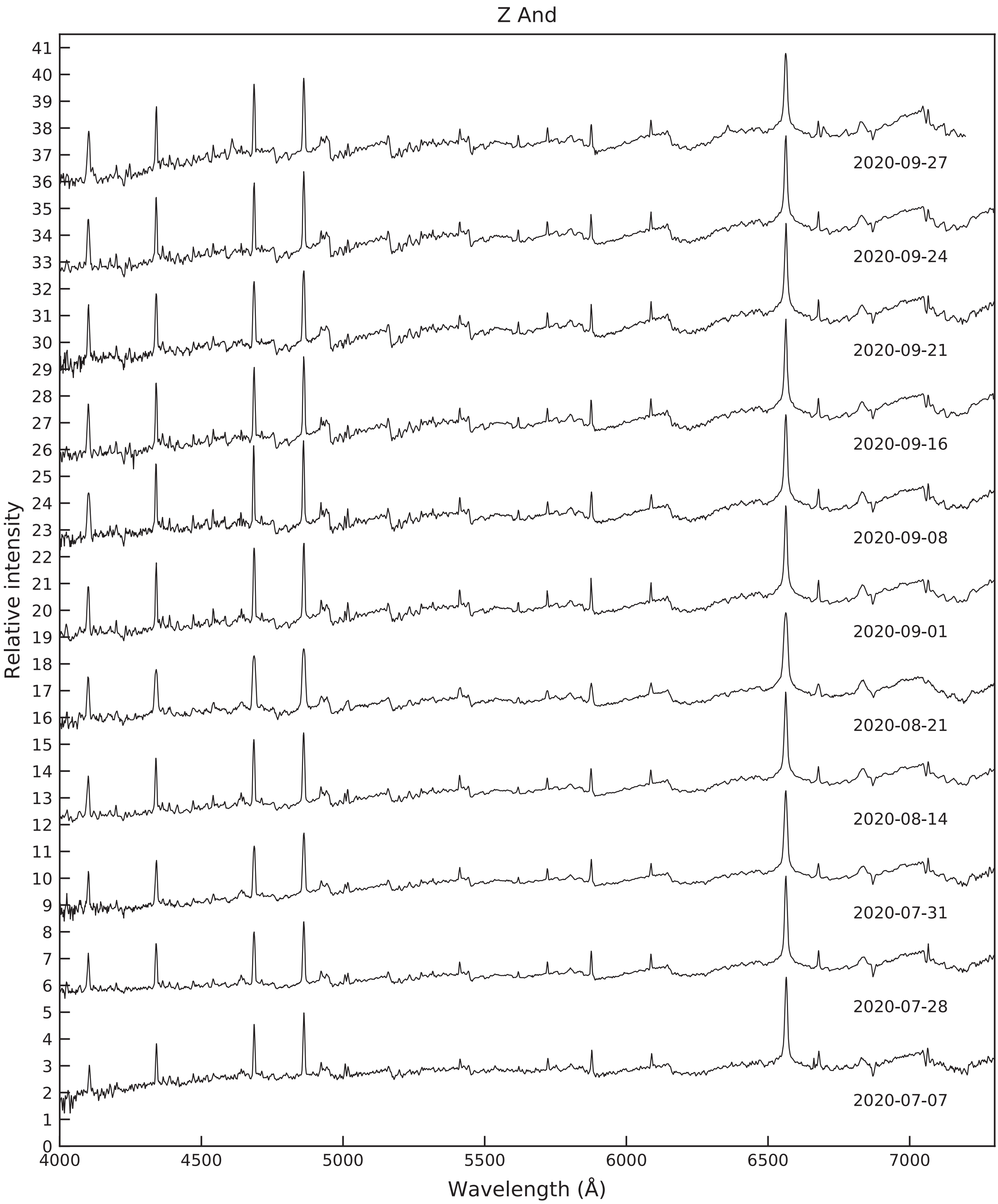




Measured AAVSO V-band magnitudes averaged and interpolated to the dates of ARAS spectra.

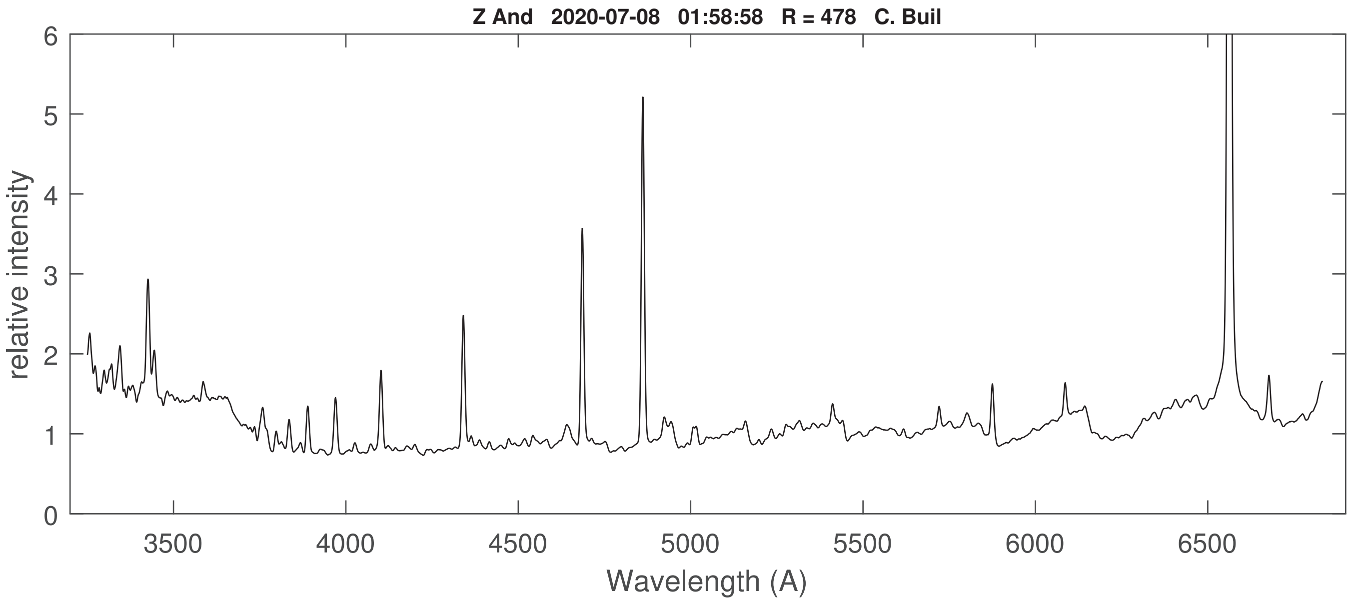


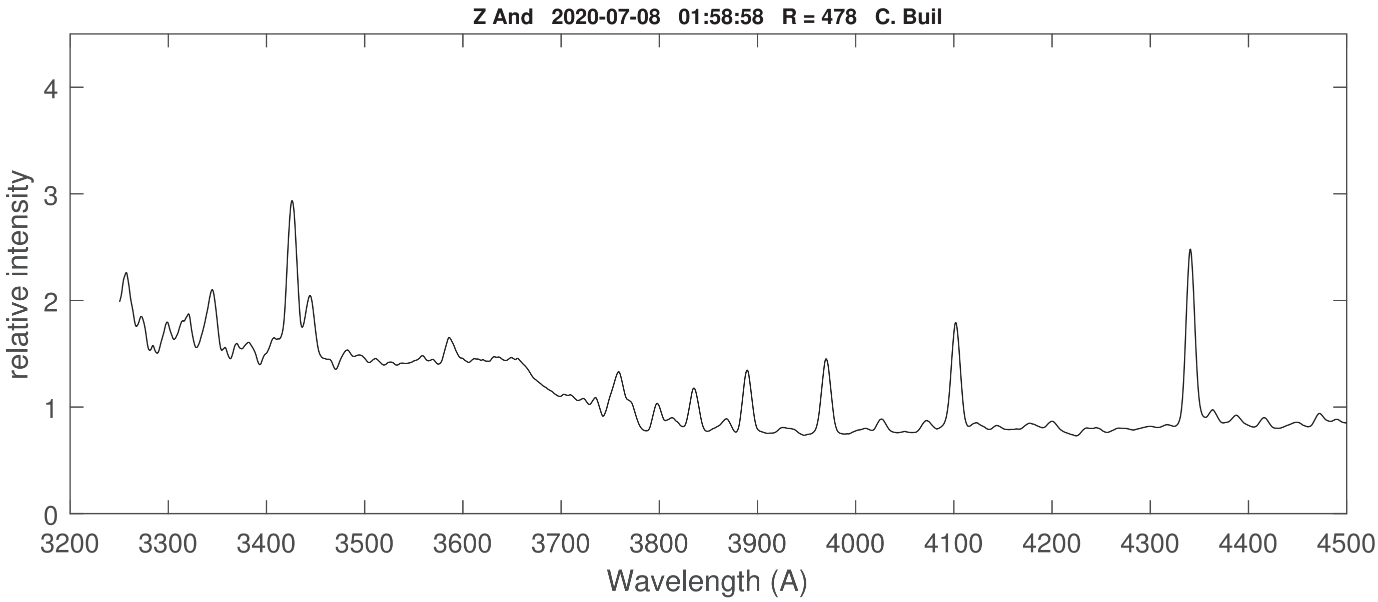
Z And spectrum acquired by Ibrahima Diarrassouba with a UVEX prototype



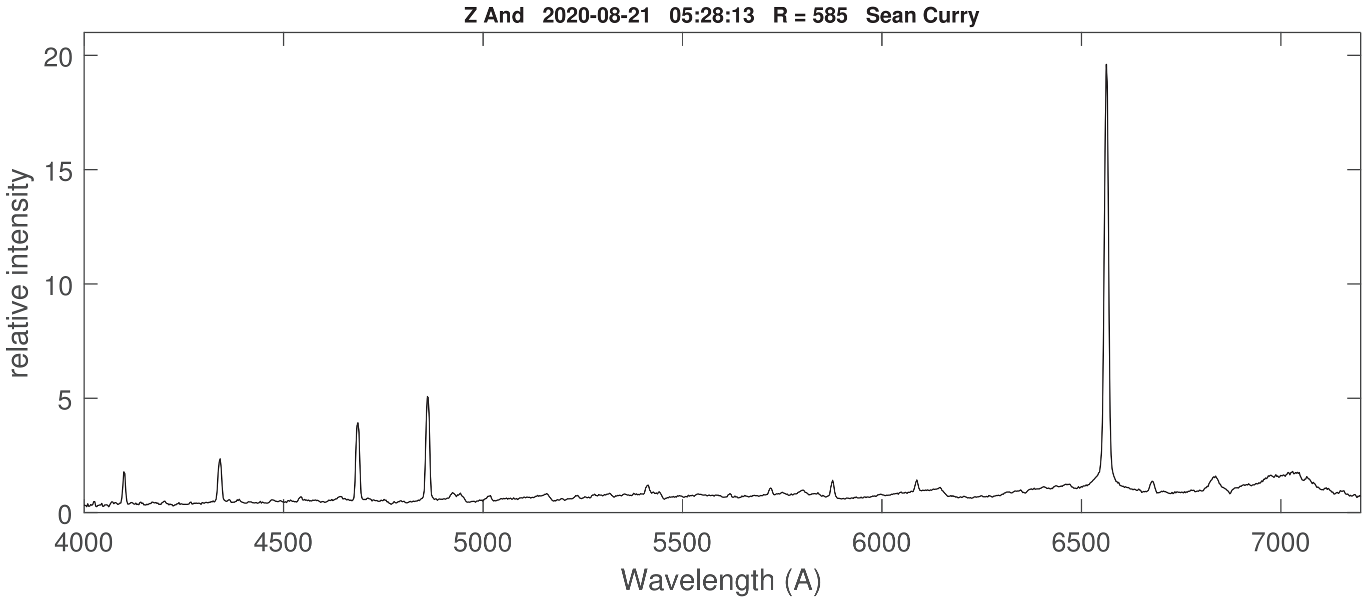
07/07/2020 R = 931 Tomas Medulka
28/07/2020 R = 1149 David Boyd
31/07/2020 R = 1000 Jacques Michelet
14/08/2020 R = 949 Pavol Dubovsky
21/08/2020 R = 585 Sean Curry

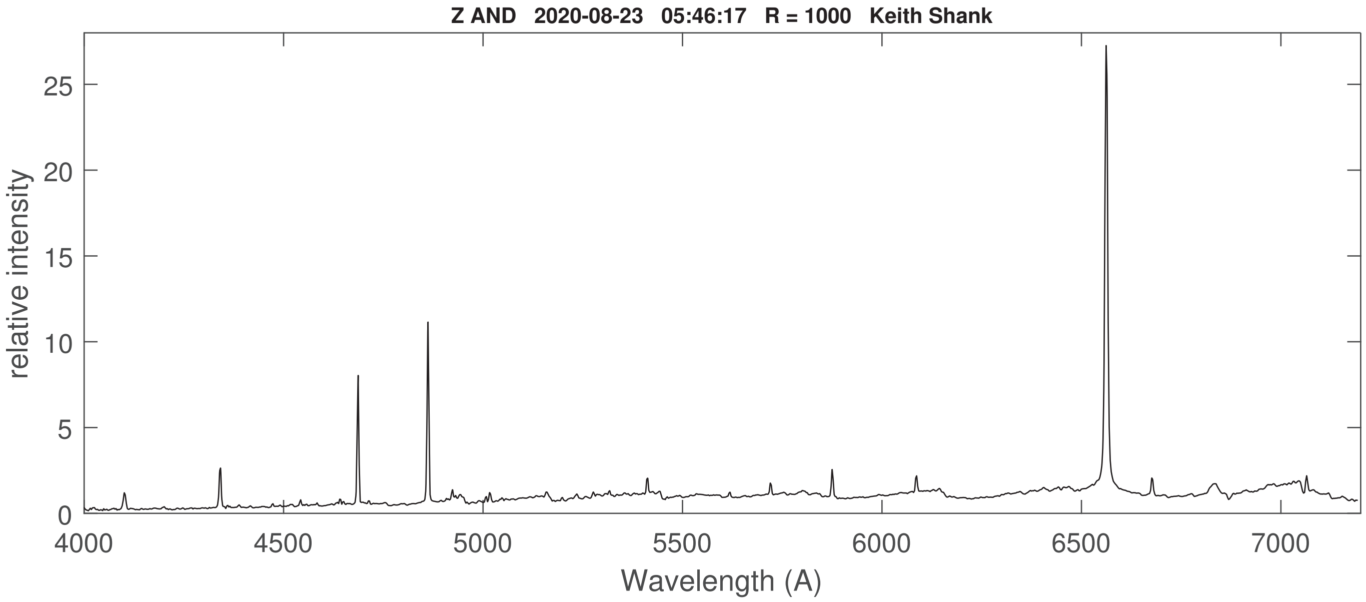
01/09/2020 R = 1061 Forrest Sims
08/09/2020 R = 903 Tomas Medulka
16/09/2020 R = 1071 Forrest Sims
21/09/2020 R = 1123 David Boyd
24/09/2020 R = 1059 Forrest Sims
27/09/2020 R = 1000 Keith Shank





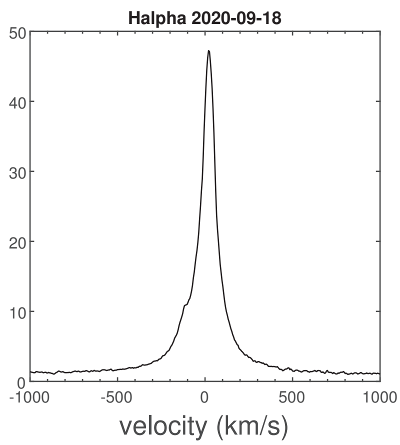
Z And near UV secured by Christian Buil with the prototype UVEX.

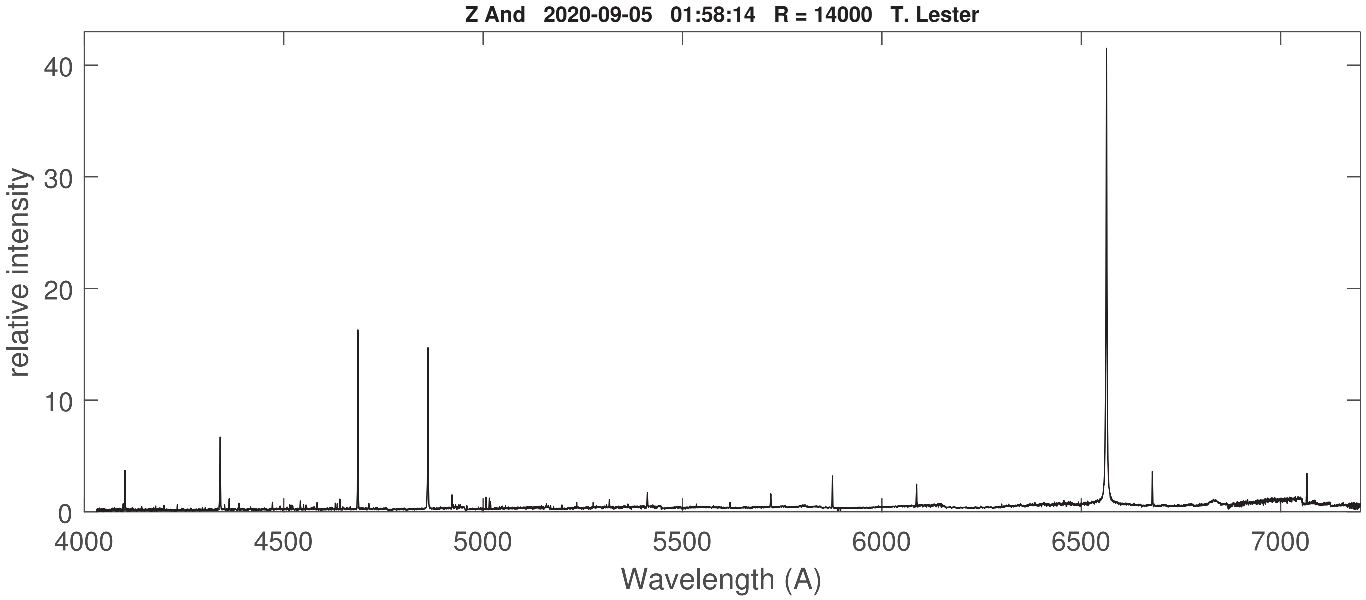


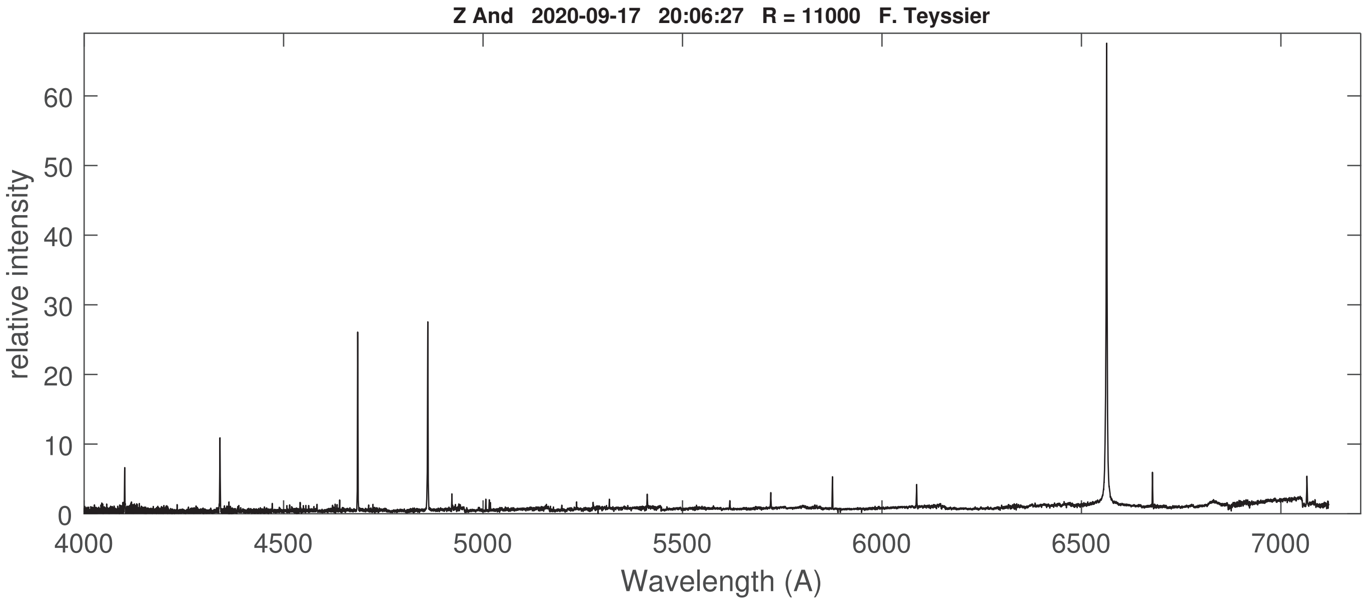


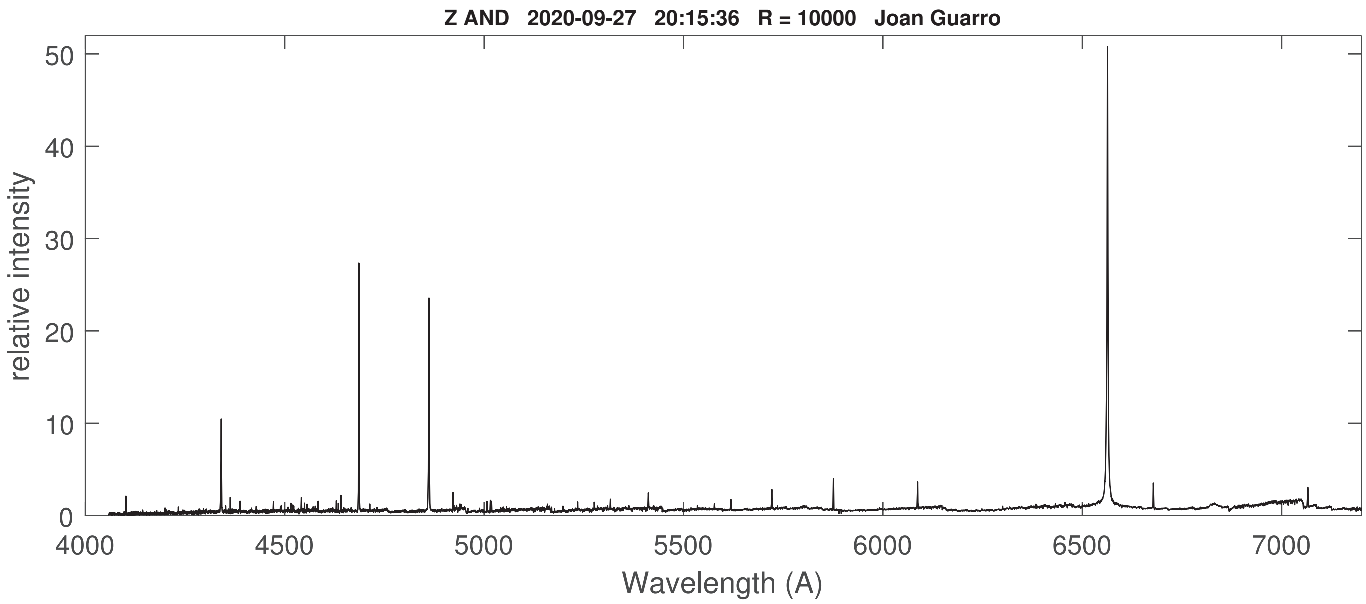
Z And spectra respectively acquired by Sean Curry using an ALPY600 and Keith Shank using a LISA (R=1000)

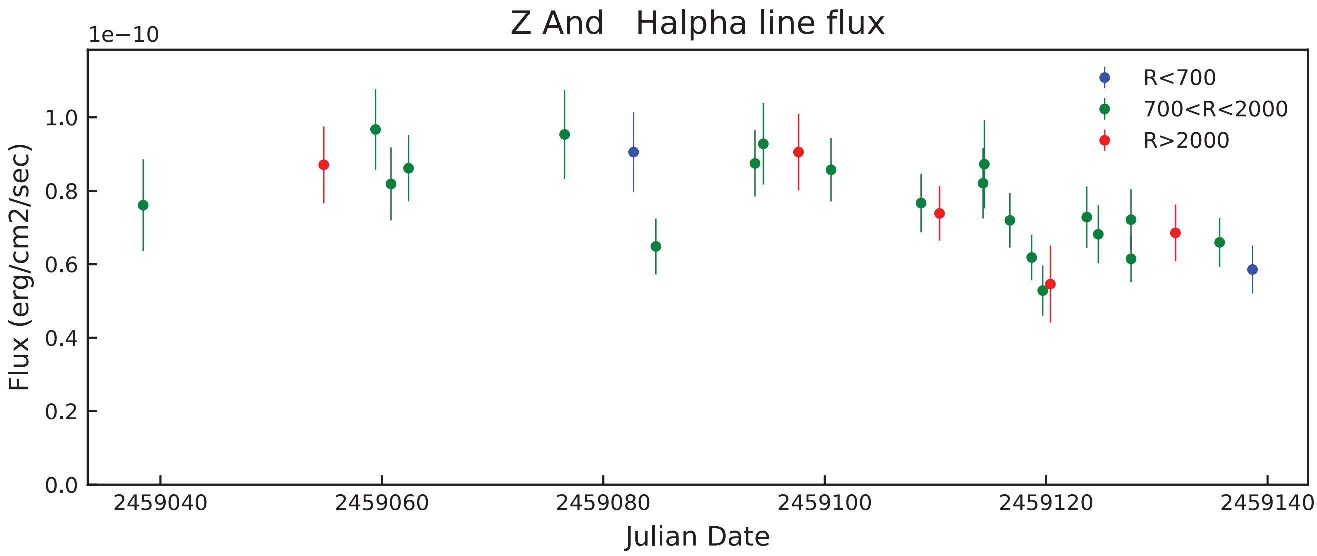
Hα profile acquired by Jack Martin using a Lhires III 2400 l/mm (R = 18000) mounted on a SC14

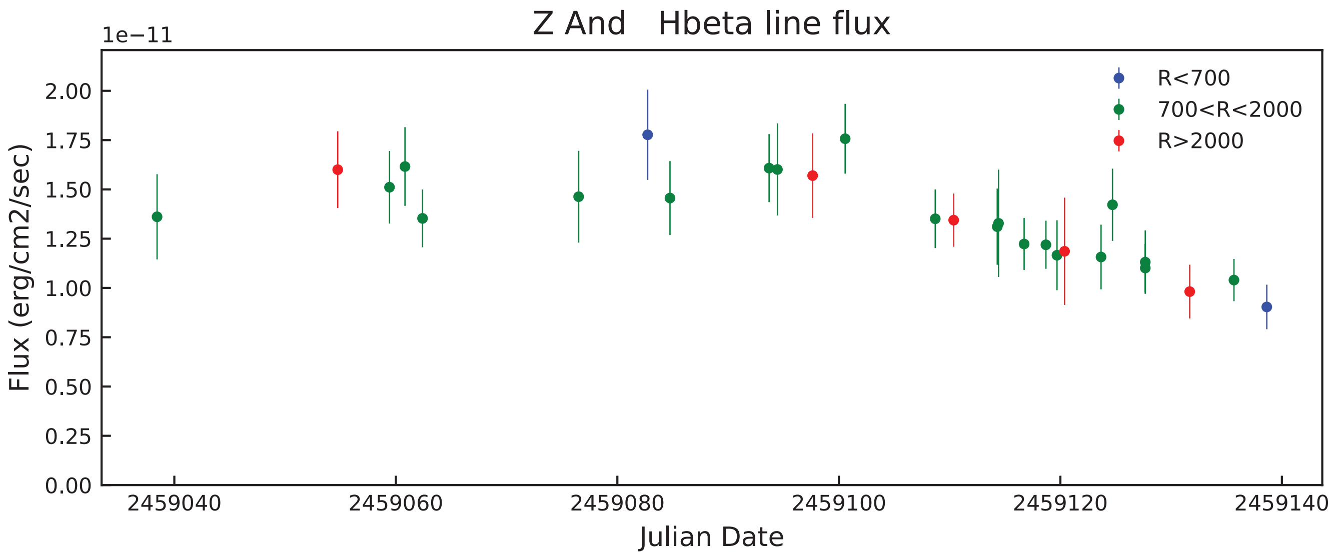


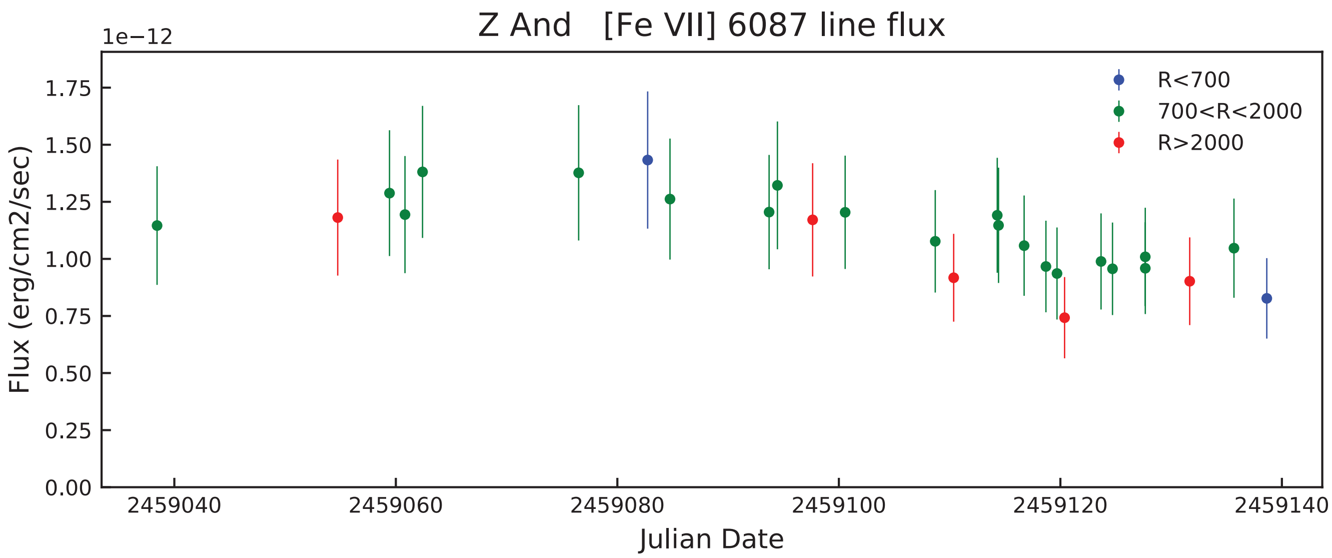

Z And 2020-09-05 01:58:14 R = 14000 T. Lester
relative intensity
0
10
20
30
40
4000
4500
5000
5500
6000
6500
7000
Wavelength (A)

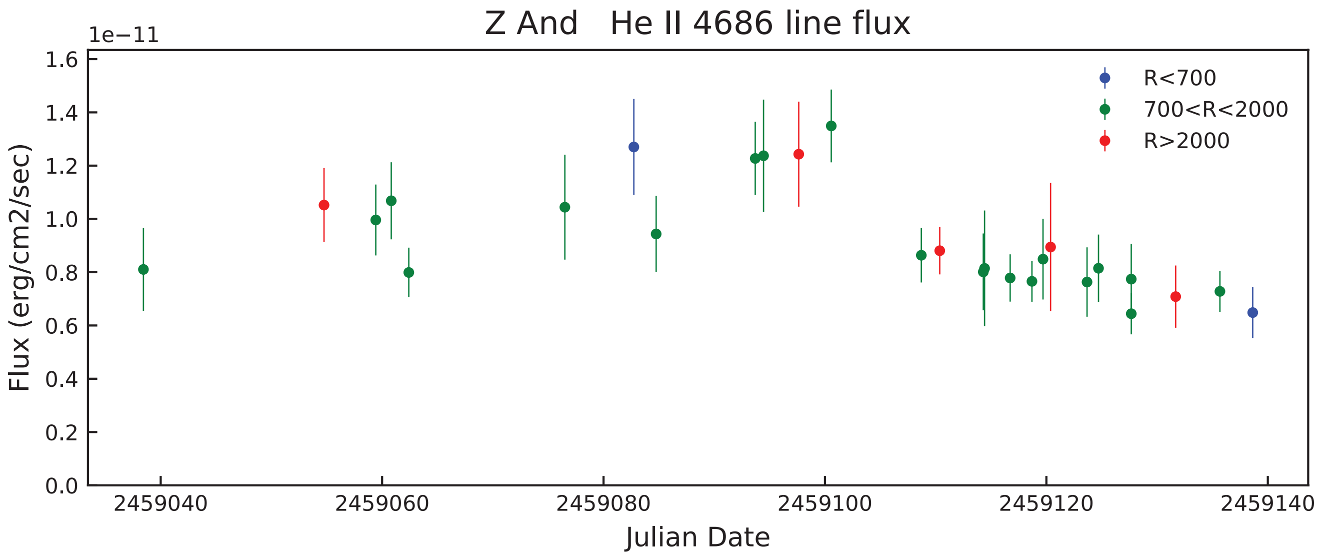

Z And 2020-09-17 20:06:27 R = 11000 F. Teyssier
relative intensity
0
10
20
30
40
50
60
4000
4500
5000
5500
6000
6500
7000
Wavelength (A)

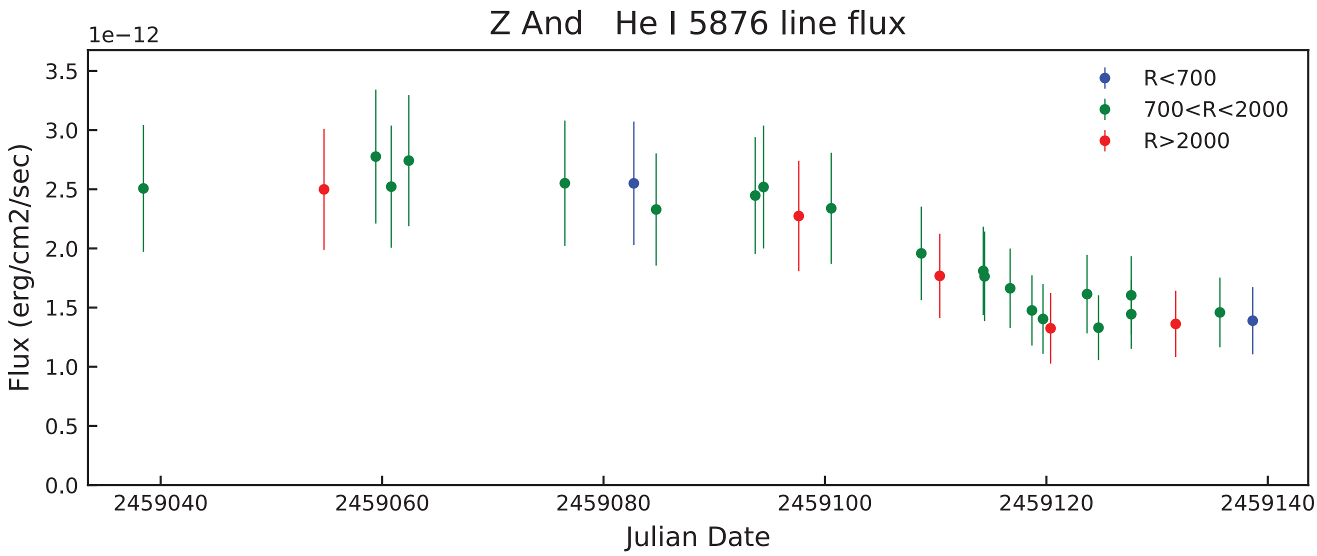

Z AND 2020-09-27 20:15:36 R = 10000 Joan Guarro
relative intensity
0
10
20
30
40
50
4000
4500
5000
5500
6000
6500
7000
Wavelength (A)

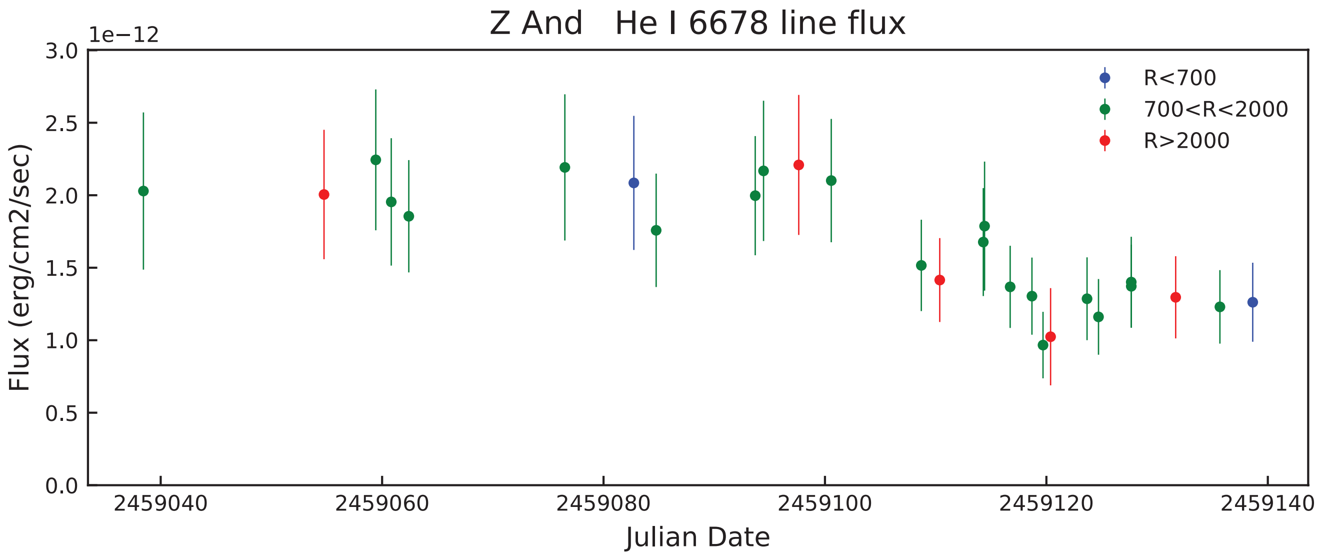

Z And Halpha line flux
1e−10
1.0
0.8
0.6
0.4
0.2
0.0
Flux (erg/cm2/sec)
R<700
700<R<2000
R>2000
2459040
2459060
2459080
2459100
2459120
2459140
Julian Date

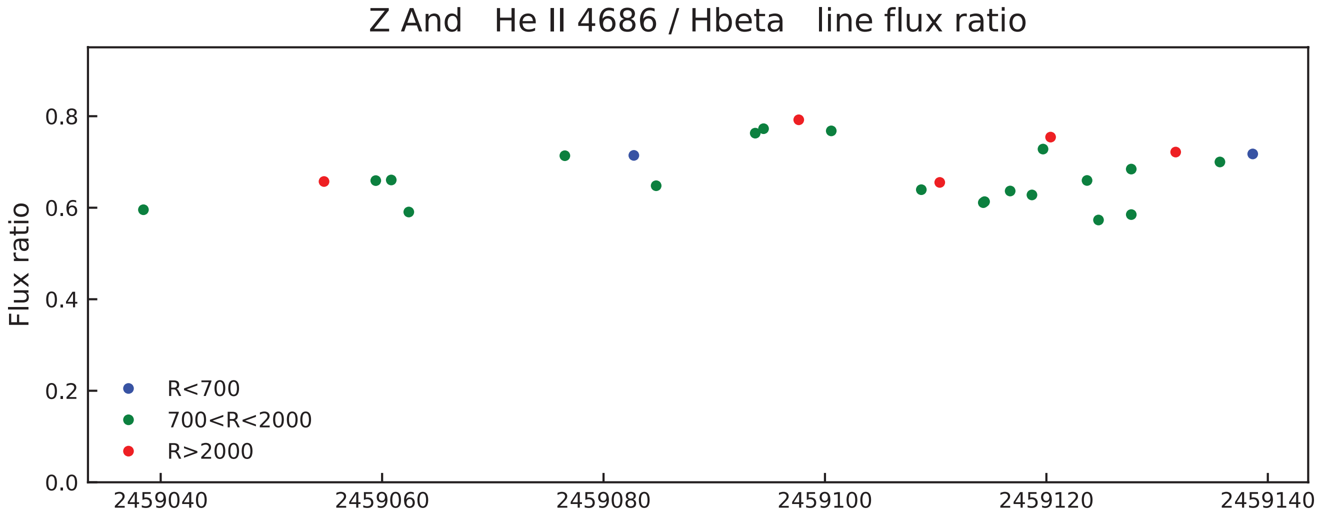

Z And Hbeta line flux
1e−11
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
Flux (erg/cm2/sec)
R<700
700<R<2000
R>2000
2459040
2459060
2459080
2459100
2459120
2459140
Julian Date


Z And [Fe VII] 6087 line flux
1e−12
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
Flux (erg/cm2/sec)
R<700
700<R<2000
R>2000
2459040
2459060
2459080
2459100
2459120
2459140
Julian Date


Z And He II 4686 line flux
1e−11
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Flux (erg/cm2/sec)
2459040
2459060
2459080
2459100
2459120
2459140
Julian Date
R<700
700<R<2000
R>2000


Z And He I 5876 line flux
1e−12
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flux (erg/cm2/sec)
2459040
2459060
2459080
2459100
2459120
2459140
Julian Date
R<700
700<R<2000
R>2000


Z And He I 6678 line flux
1e−12
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flux (erg/cm2/sec)
2459040
2459060
2459080
2459100
2459120
2459140
Julian Date
R<700
700<R<2000
R>2000


Z And He II 4686 / Hbeta line flux ratio
Flux ratio
0.0
0.2
0.4
0.6
0.8
2459040
2459060
2459080
2459100
2459120
2459140
R<700
700<R<2000
R>2000

In the context of the New Online Database of Symbiotic Variables (http://astronomy.science.upjs.sk/symbiotics/), Jaroslav Merc required the spectra of several objects .
Jaroslav wrote: *As the latest catalog by Belczynski et al. (2000) is already 20 years old (and Akras et al., 2019 presented only a list of objects with IR information/temperatures and not full catalog), it is needed to have a replacement, which would be suitable for studies of the symbiotic population (in the Milky Way and beyond). Many new objects have been discovered in the last two decades and several candidates appeared as well. The extragalactic part of the database is already finished and I am now working on the galactic part, which is also more interesting for you.*
The first goal was to collect all objects, which were mentioned as confirmed or possible symbiotics in the published literature. The lists are already provided on the website. Now I am collecting all the available information from the literature for these objects. In this way, we will be able to identify objects that are not sufficiently characterized, e.g. for which spectra are completely missing. Another subgoal is, to identify the misclassified objects - the objects, which were supposed to be symbiotic stars (or candidates) in the published papers, but are not. Unfortunately, there are several of these included in various astronomical databases (SIMBAD, GCVS, etc.) and consequently in the lists of symbiotics used in the research... I have prepared various ways to identify such disputable objects in the Database. For their reclassification, the spectroscopic information is desirable.

Note: in the follwing pages the text in italic are Jaroslav's comments.
The campaign can be followed on ARAS forum: http://spectro-aras.com/forum/viewtopic.php?f=37&t=2572

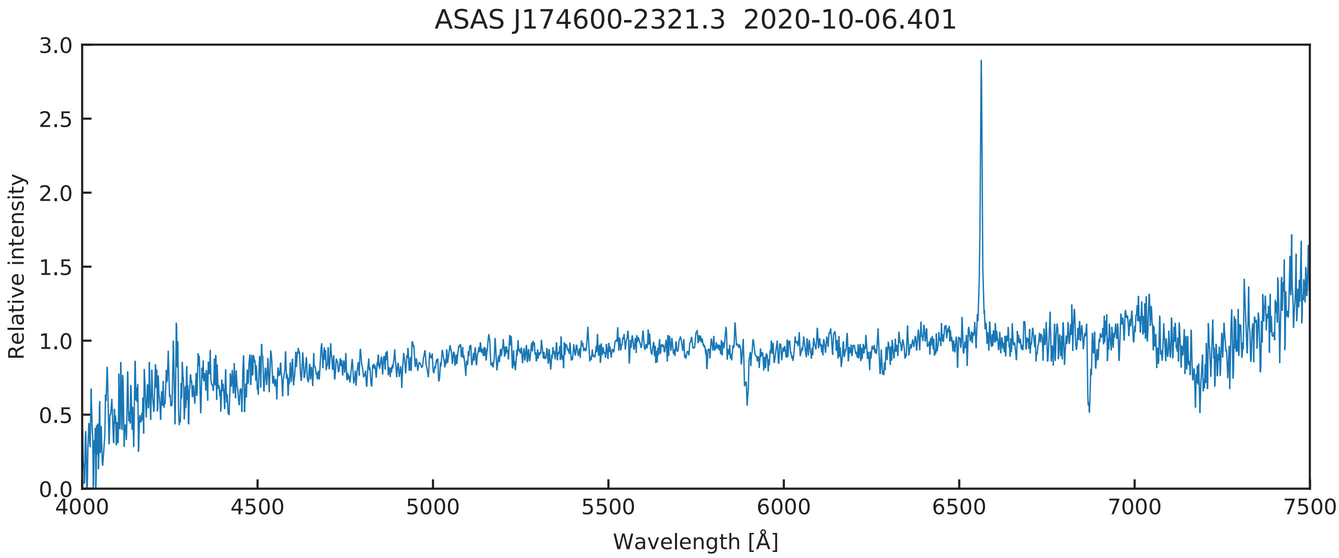
Log of observations

	Object	Date	J.D.	OBS	Resolution	Range (Å)
1	ASAS J174600-2321.3	10/06/2020	2459128.94	VLZ	1153	3800 -7500
2	del Sge	02/06/2019	2458636.54	FMT	11000	4035 -7352
	del Sge	14/06/2019	2458649.41	JGF	9000	3979 -8040
	del Sge	13/08/2020	2459075.36	JGF	9500	3919 -8934
	del Sge	29/09/2020	2459122.38	JGF	9500	4052 -7760
3	EC 19249-7343	30/07/2020	2459060.91	VLZ	895	3801 -7500
	EC 19249-7343	30/07/2020	2459060.97	BHQ	1623	3800 -8000
4	Hen 3-860	19/07/2020	2459049.94	VLZ	1176	3800 -7501
	Hen 3-860	21/07/2020	2459052.02	BHQ	1778	4000 -8000
5	Hen 3-204	30/07/2020	2459060.99	VLZ	913	3801 -7500
6	HH Sge	12/07/2020	2459043.47	IBR	677	3380 -6038
	HH Sge	21/07/2020	2459051.57	CBO	502	3750 -7565
7	IRAS 19050+0001	28/07/2020	2459058.86	FAS	1061	4000 -7275
8	PN K1-6	07/09/2020	2459039.77	FAS	1062	3825 -7249
	PN K1-6	09/07/2020	2459040.36	BUI	432	3700 -6799
	PN K1-6	20/07/2020	2459051.5	PCA	538	3801 -7299
9	V1017 Cyg	09/07/2020	2459040.48	BUI	428	3700 -6799
	V1017 Cyg	10/07/2020	2459040.73	FAS	1032	4000 -7276
10	V1988 Sgr	03/10/2020	2459125.94	VLZ	1126	3800 -7400
11	V2204 Oph	30/07/2020	2459061.39	HBO	782	3871 -7379
	V2204 Oph	05/08/2020	2459066.96	VLZ	951	3850 -7500
12	V379 Peg	09/07/2020	2459039.58	BUI	381	3744 -6796
13	V5590 Sge	04/10/2020	2459126.93	VLZ	1067	3800 -7500
14	V562 Lyr	11/07/2020	2459042.46	IBR	564	3550 -6026
	V562 Lyr	19/07/2020	2459049.53	CBO	506	3800 -7395
15	V618 Sgr	30/07/2020	2459061.01	BHQ	1906	3800 -8000

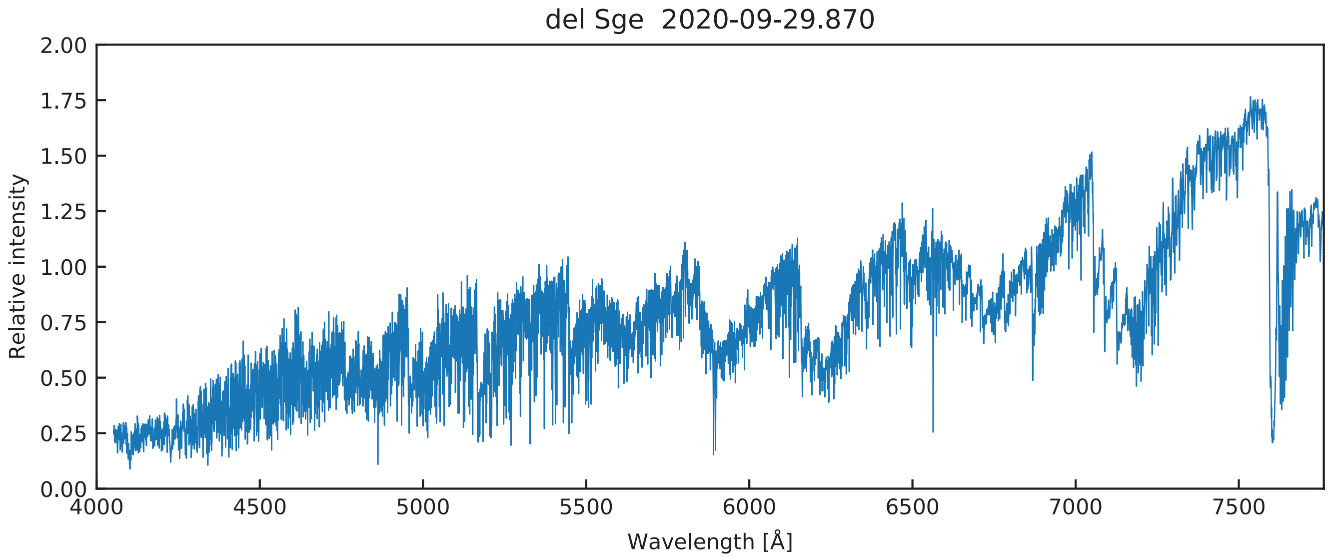
List of Observers

VLZ	Peter Velez
BHQ	Terry Bohlsen
FAS	Forrest Sims
BUI	Christian Buil
PCA	Paolo Cazzatto
IBR	Ibrahima Diabassourra
CBO	Christophe Boussin
HBO	Hubert Boussier
FMT	François Teyssier
JGF	Joan Guarro Flo

ASAS J174600-2321.3 (Sgr, V~13.0): An extremely promising candidate for symbiotic nova, long-lasting outburst, eclipsing system (Hümmerich et al., 2015, https://ui.adsabs.harvard.edu/#abs/2015JAVSO..43...14H/abstract).
Should be monitored if the spectrum will start to appear "symbiotic" (see figure 6.5 in Munari, 2019, https://ui.adsabs.harvard.edu/#abs/2019arXiv190901389M/abstract).

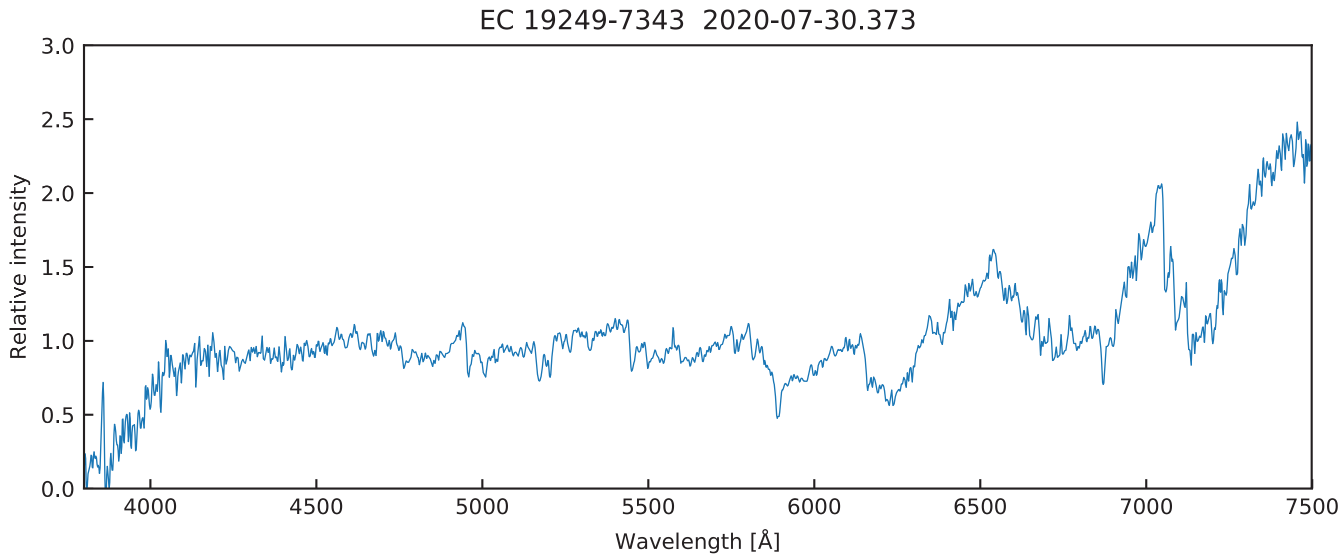


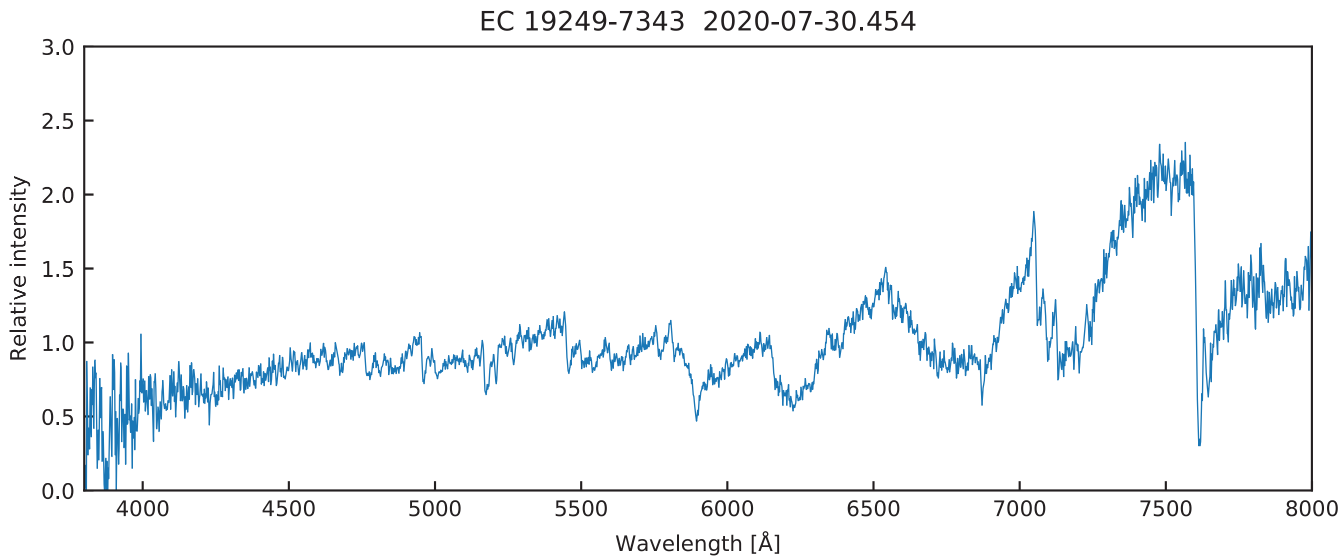
Spectrum of ASAS J174600-2321.3 obtained by Peter Velez with a LISA (R = 1000) del Sge is a bright target, not in Jaroslav's list, but cited in http://astronomy.science.upjs.sk/symbiotics/galactic-symbiotic-stars/misclassified-galactic-symbiotic-stars/



Echelle spectrum acquired by Joan Guarro using an echelle spectrograph (R = 10000)
No emission discernible.

EC 19249-7343, symbiotic star candidate (https://ui.adsabs.harvard.edu/?#abs/2013MNRAS.431..240O), Another very interesting object, although faint (maybe approx 15 mag).

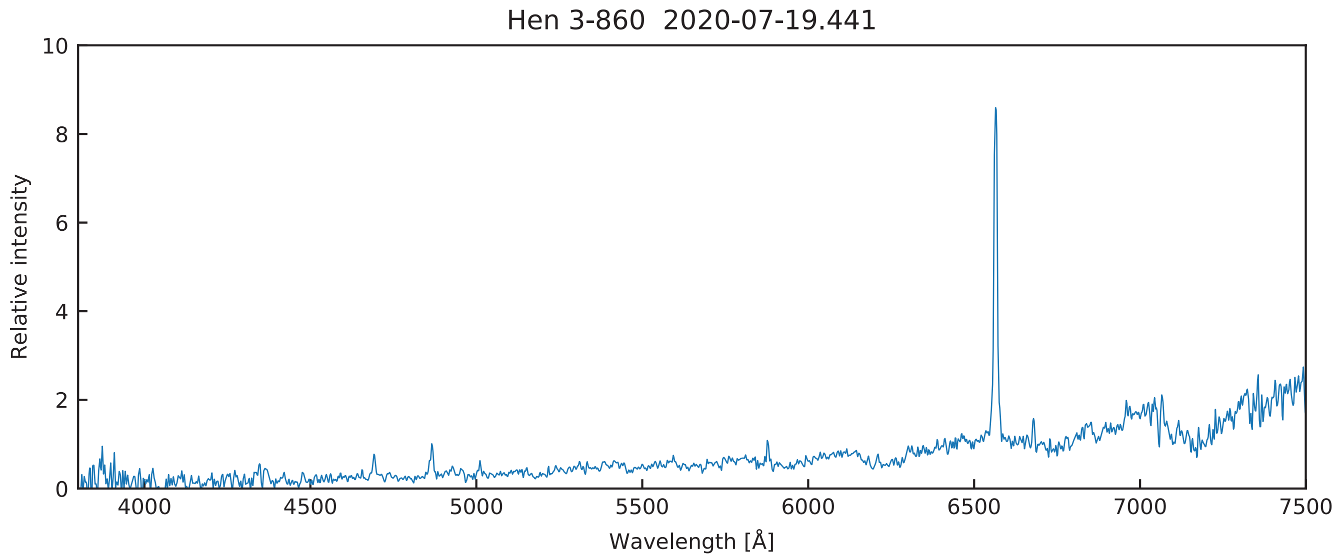


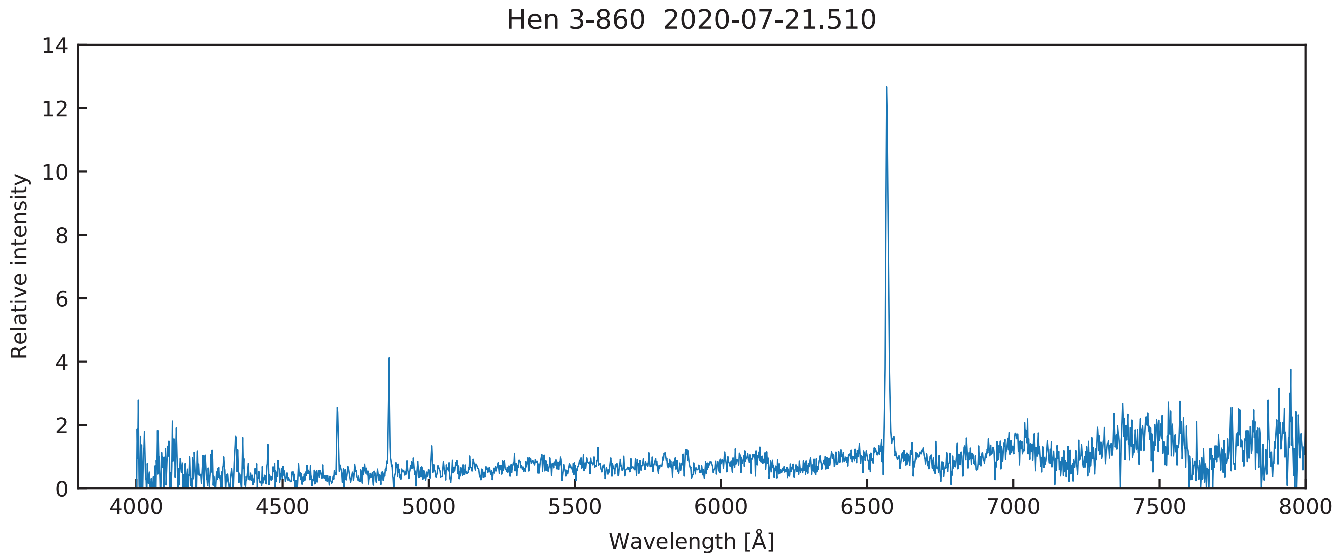


Spectra obtained with a LISA (R = 1000), respectively by Peter Velez and Terry Bohlsen

Hen 3-860

Hen 3-860. Very interesting photometric behavior in 2018-2019. Good quality low-res spectrum could be very potential for a publication.

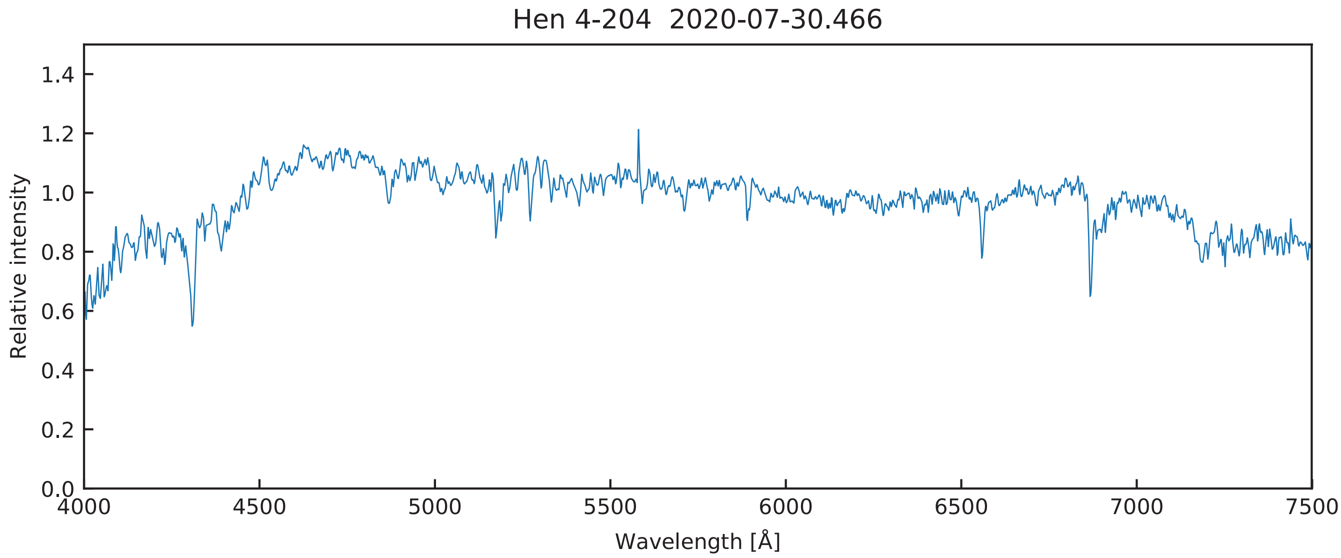




Spectra obtained with a LISA (R = 1000), respectively by Peter Velez and Terry Bohlsen

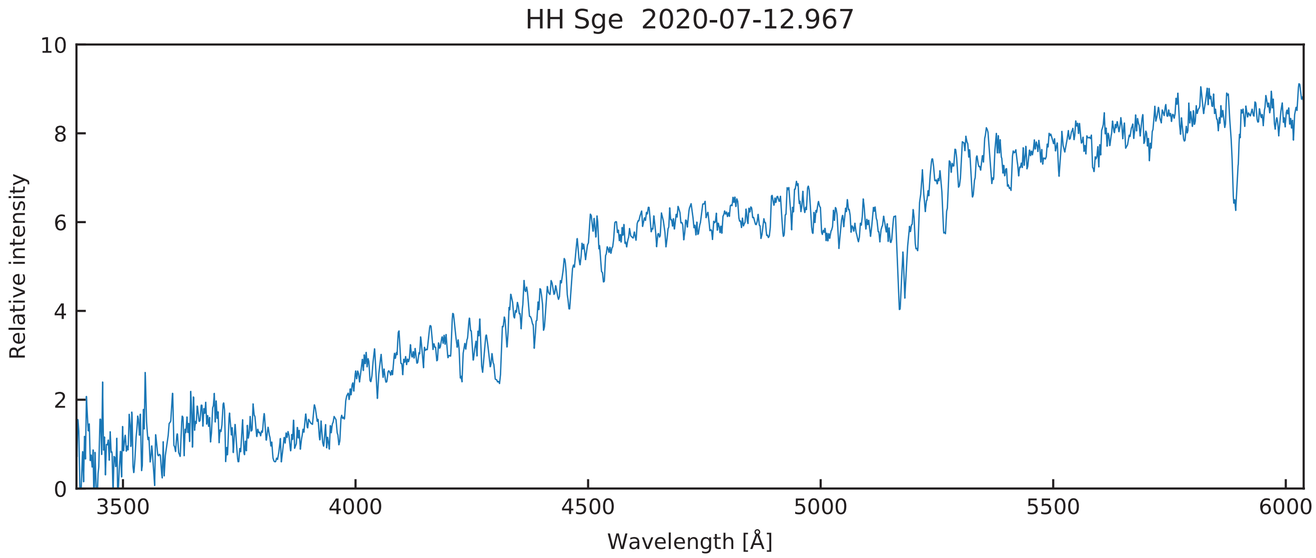
Peter's spectrum confirmed, that it is indeed a symbiotic star.

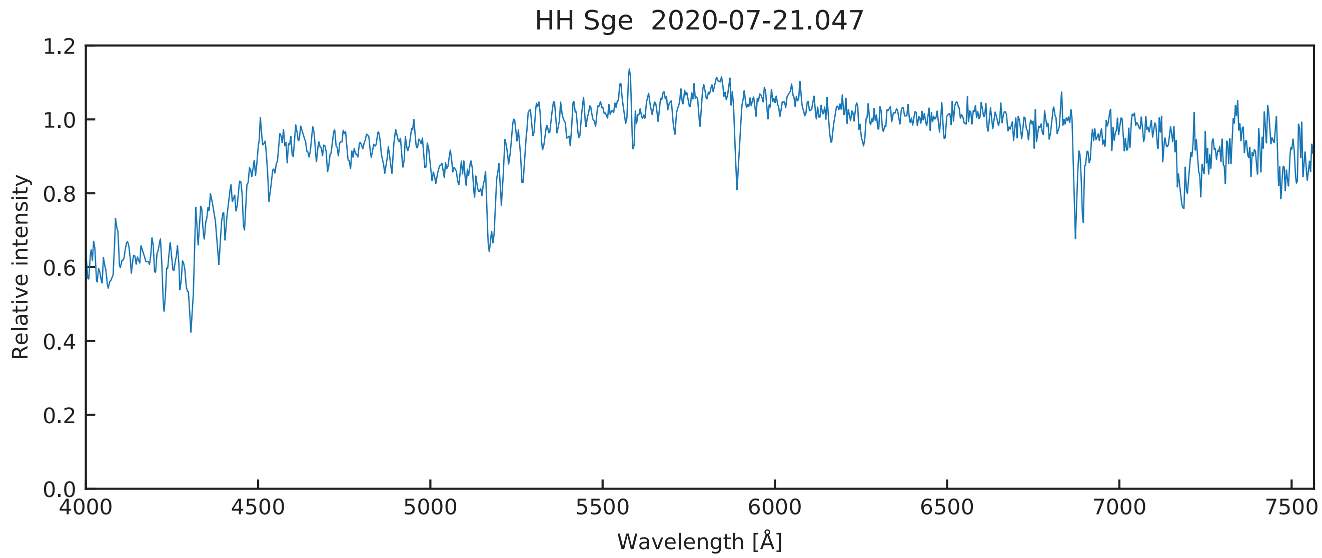
Hen 4-204 (Gru, V~9.7): A bright target for southern observers, which might be a yellow symbiotic star (Vanture & Wallerstein, 2003, https://ui.adsabs.harvard.edu/#abs/2003PASP..115.1367V/abstract).



Spectrum obtained with a LISA (R = 1000) by Peter Velez.

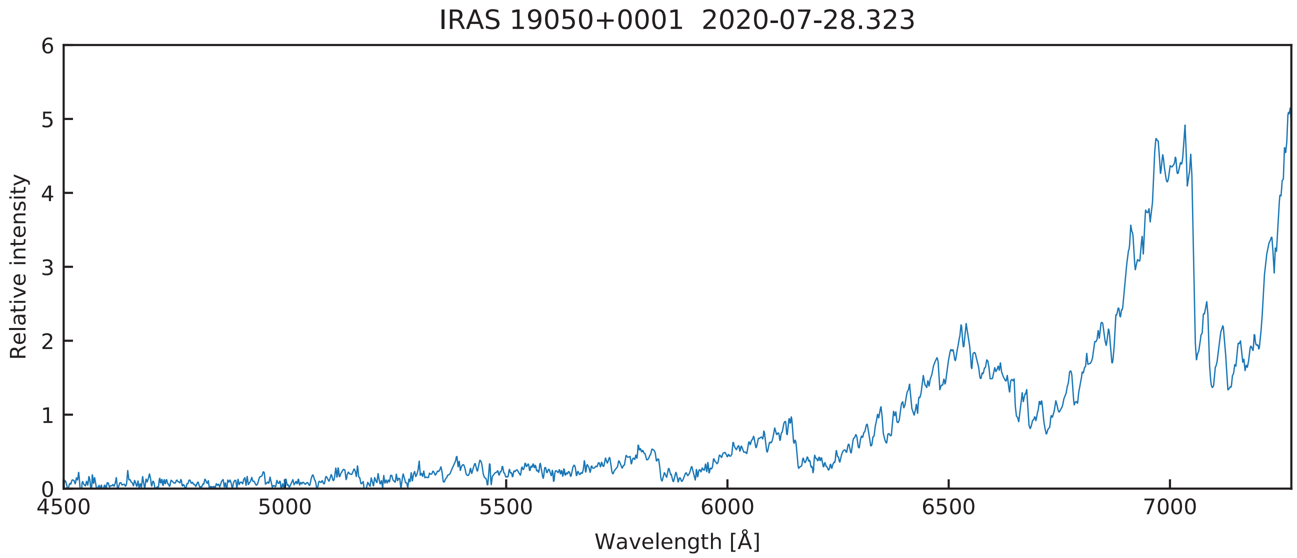
HH Sge (V~11.8): Mentioned as a symbiotic nova in the conclusion section of the paper by Yudin (1987 https://ui.adsabs.harvard.edu/#abs/1987 ... Y/abstract). This was probably a mistyping of HM Sge. On the other hand, the star is classified as a long-period variable, so just to be sure, the non-symbiotic nature of the star should be confirmed with the spectrum.





Spectra obtained respectively by Ibrahima Diabassoura using an UVEX (300 l/mm)
and Christophe Boussin using an Alpy600

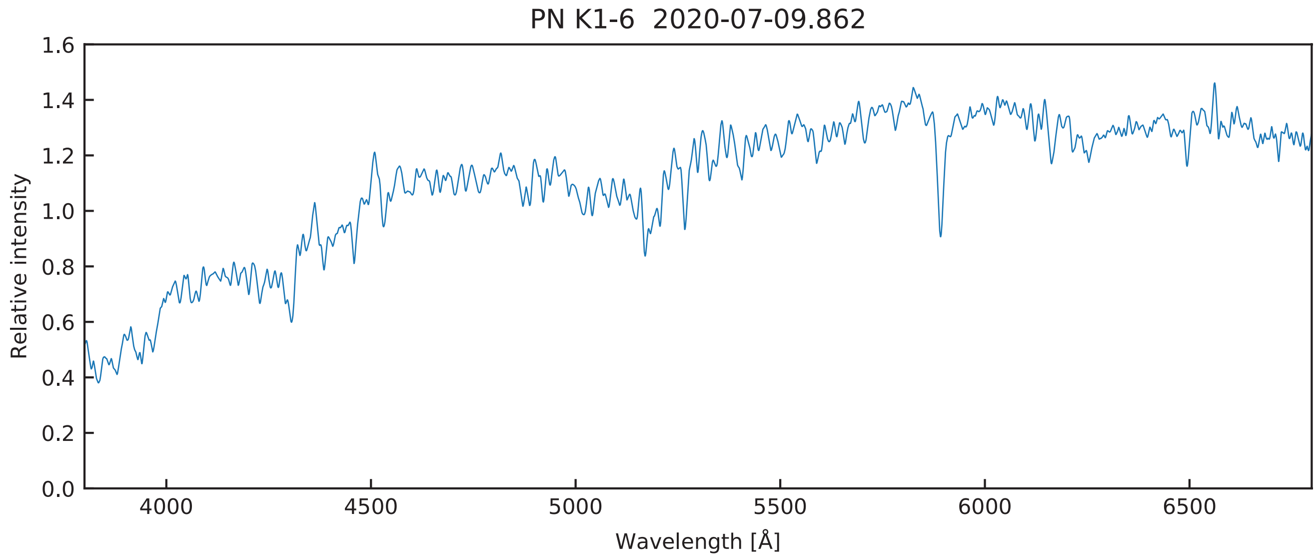
IRAS 19050+0001 (Aql, V~15.0): Another relatively faint object in V, however, it is highly reddened and is extremely bright in the red region and especially in IR. Databases as SIMBAD gives NSV 11749 at this position, which is known as symbiotic binary. This object also appears on the list by Akras et al. (2019). However, NSV 11749 is probably another object, so there is basically no spectroscopic information on IRAS 19050+0001 in the literature.



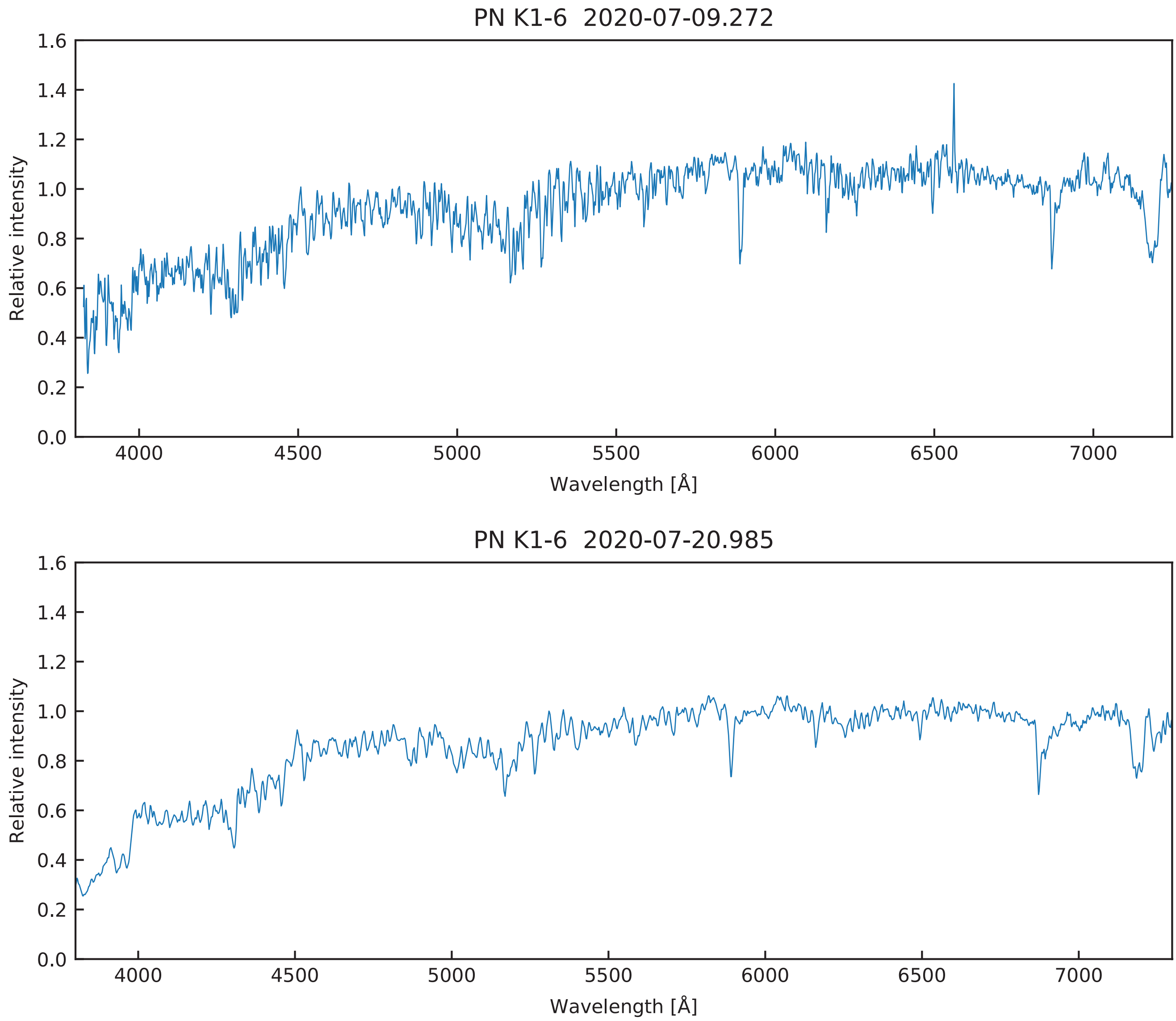
Spectrum obtained by Forrest Sims using a LISA (R = 1000)

PN K 1-6: Interesting planetary nebula, with the variable central star. A possible symbiotic binary in a center. The object was analyzed in this work: https://ui.adsabs.harvard.edu/?#abs/2011PASA...28...83F, however, they had no spectra at the disposal. They actually rejected the symbiotic classification, however, they admitted that they do not have spectra to confirm it. It is quite a bright object in Draco, well observable in this period of time.

Confirmed not to be a symbiotic star by spectroscopic observations, however, the real nature is still puzzling. Spectrum (and brightness assuming the distance 268pc from Gaia) is consistent with K2V star with some excess in the blue region, consistent with the blackbody with a temperature of few tens of thousands K. Object was confirmed to be a PN, so hot pre-WD or WD is expected, several PNe has binary central stars. However, there is a ~21 days variability in the light curves which would rather point to pulsations of a giant star. Moreover, there is another, fainter star in the vicinity of PN K 1-6 with the very same distance and same proper motions, which would suggest that these stars are physically connected... Although it is not a symbiotic star, this object deserves further attention.

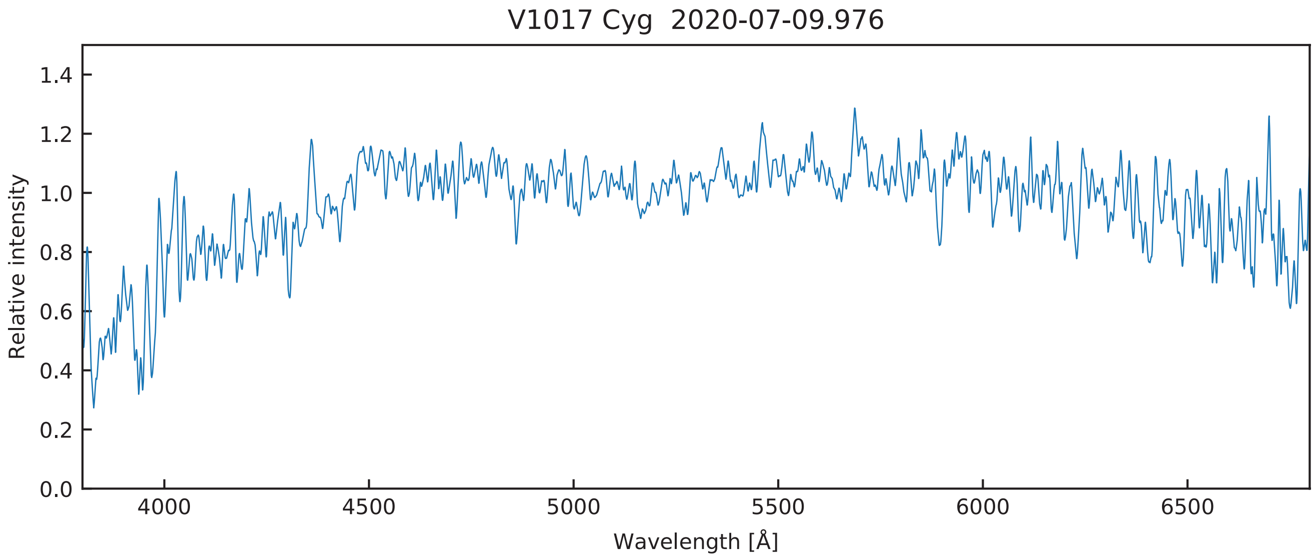


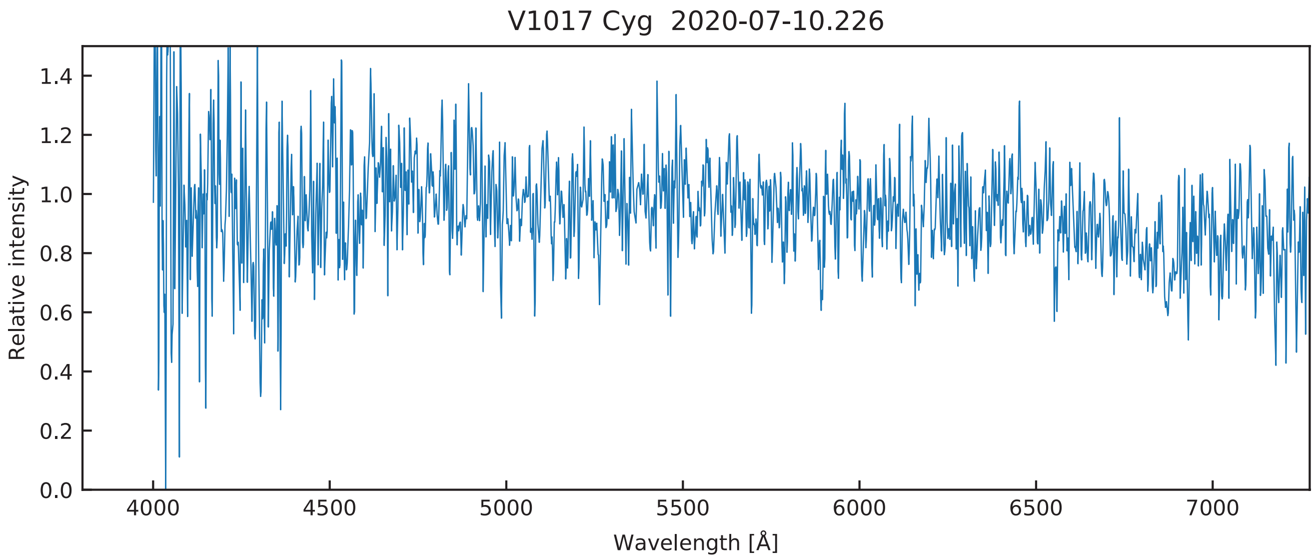
PN K1-6 acquired by Christian Buil (UVEX 300 l/mm R = 430)



PN K1-6 acquired respectivelly by Forrest Sims (LISA = 1000) and Paolo Cazzatto (ALPY R = 600)

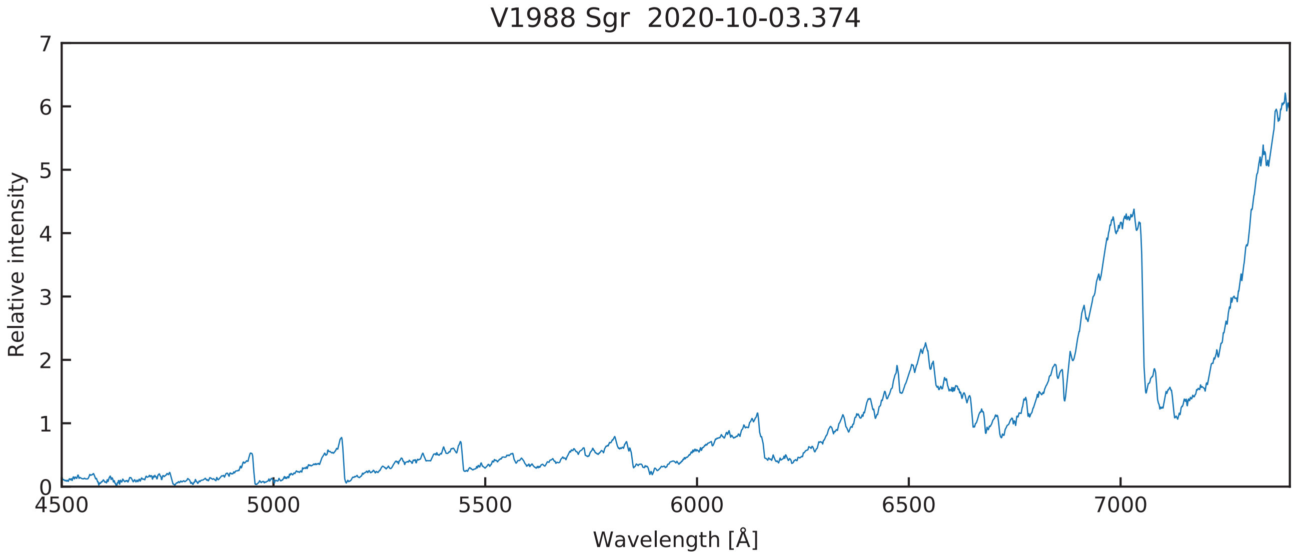
V1017 Cyg: Symbiotic star according to https://ui.adsabs.harvard.edu/?#abs/2007A%26A...469..799S, however, no spectrum. V1017 Cyg: G0-2V, this is more or less consistent with the absolute magnitude calculated using the distance of 1100pc from Gaia. Variability with a period of 0.33 days. Although proposed as a symbiotic binary or RR Lyr, this would be rather a W UMa binary (subtype W).





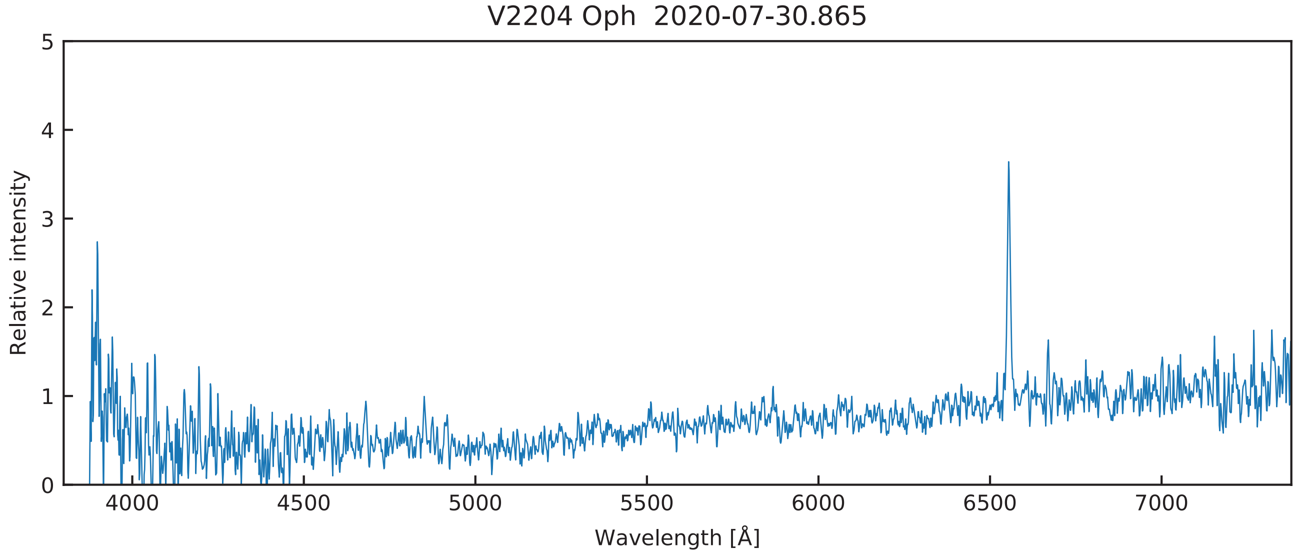
Spectra obtained respectively by Christian Buil (UVEX 300 l/mm) and Forrest Sims (LISA R = 1000)

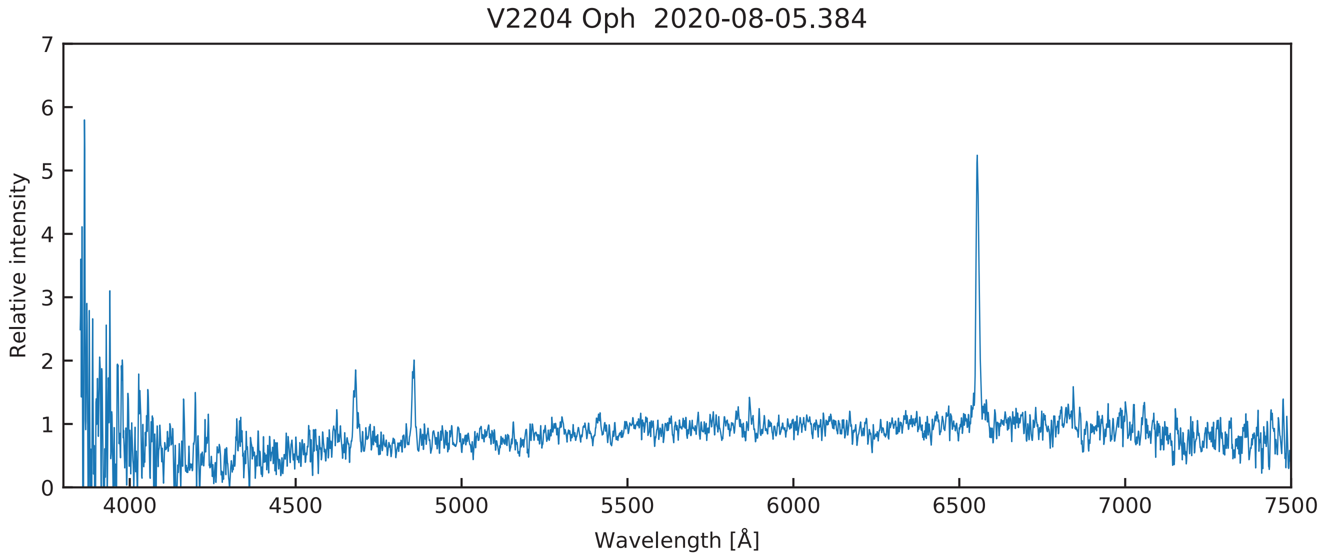
V1988 Sgr (V~12.5): Similar case to V503 Her, no spectrum, suspected in Kenyon's book. Confirmed in SIMBAD, ZAND: in GCVS. Might have been detected in outburst (Hoffleit, 1962, https://ui.adsabs.harvard.edu/#abs/1962AJ.....67..228H/abstract).



Spectra obtained with a LISA (R = 1000) by Peter Velez
No emission lines detected in visible range

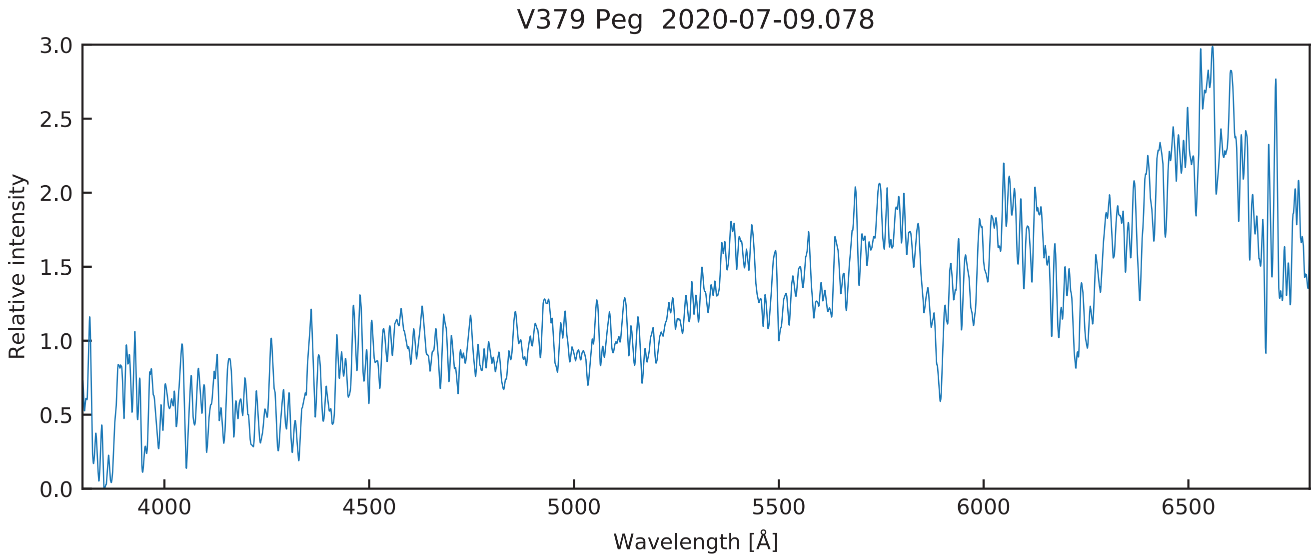
V2204 Oph (V~14.3): Listed as a confirmed symbiotic star in SIMBAD, as ZAND: in GCVS, however, no spectrum is available in the literature. Probably have been observed in outburst by Samus (1983, https://ui.adsabs.harvard.edu/#abs/1983MitVS...9...87S/abstract).





Spectra obtained with a LISA (R = 1000), respectively by Hubert Boussier and Peter Velez
The spectrum obtained by Peter shows clearly He II in emission.

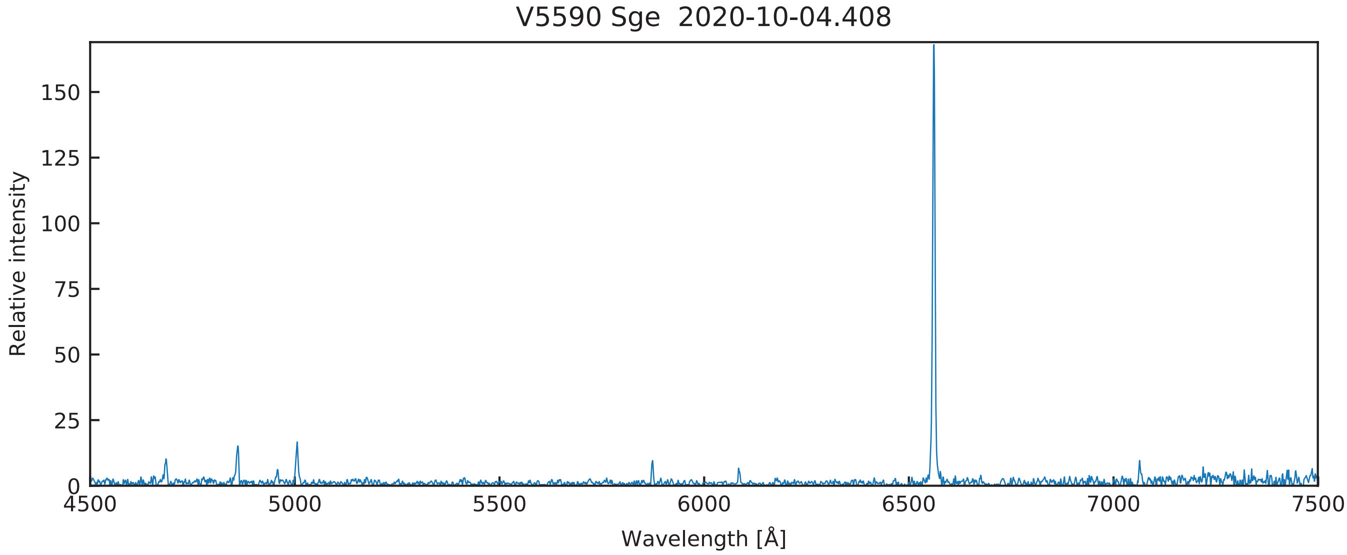
V379 Peg: Symbiotic candidate or a cataclysmic variable. However, there is confusion in the literature, which object is really the one observed in an outburst in the eighties. See the discussion here: https://ui.adsabs.harvard.edu/abs/2003IBVS.5368....1H/abstract. No spectra are available. Most databases point to the red object (e.g. SIMBAD). SIMBAD even classifies the star as confirmed symbiotic binary. However, object in outburst was maybe the blue object with magnitude >18mag. At least you can try to acquire the spectrum of the red star.

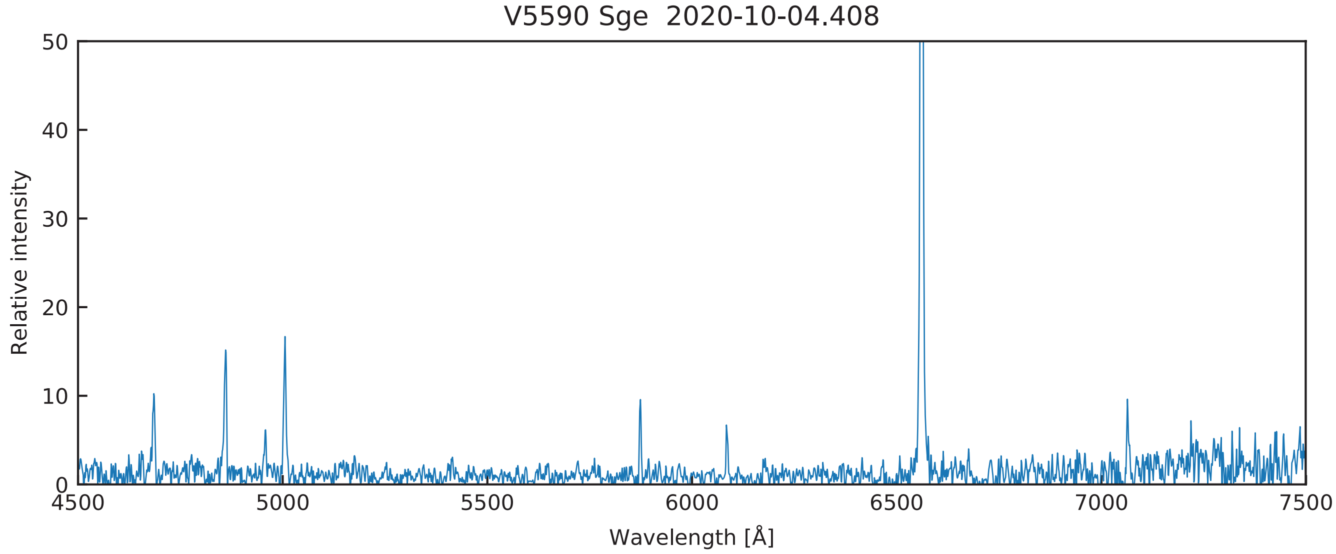


V379 Peg obtained by Christian Buil with UVEX (300 l/mm R = 380).

Although the spectrum has a low signal to noise, it is similar to M2-4V. Luminosity class is confirmed by the photometry assuming the star is located in the distance of 107pc as given by Gaia. Therefore it is rather a dwarf star than a symbiotic binary. Spectrum with a higher signal to noise may reveal some emission lines due to the chromospheric activity of the star.

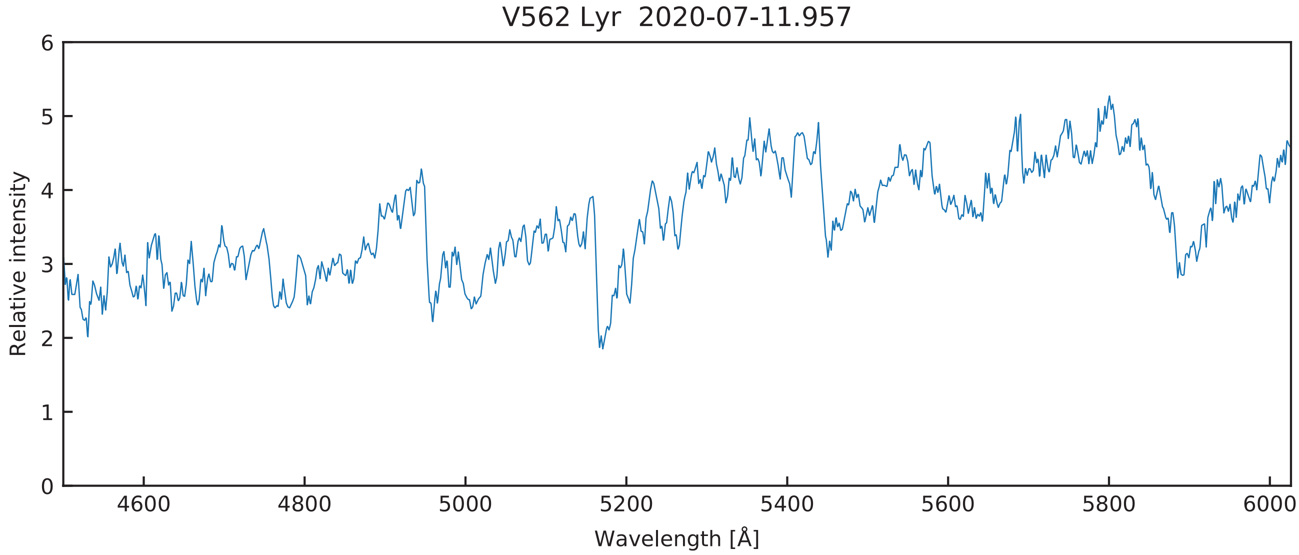
V5590 Sgr (V~13.0): Same case as ASAS J174600-2321.3 , probably a symbiotic nova, detected in prolonged outburst by Nakano et al. (2012, https://ui.adsabs.harvard.edu/#abs/2012CBET.3140....1N/abstract). The progenitor is a Mira variable (Mroz et al., 2014, https://ui.adsabs.harvard.edu/#abs/2014MNRAS.443..784M/abstract).

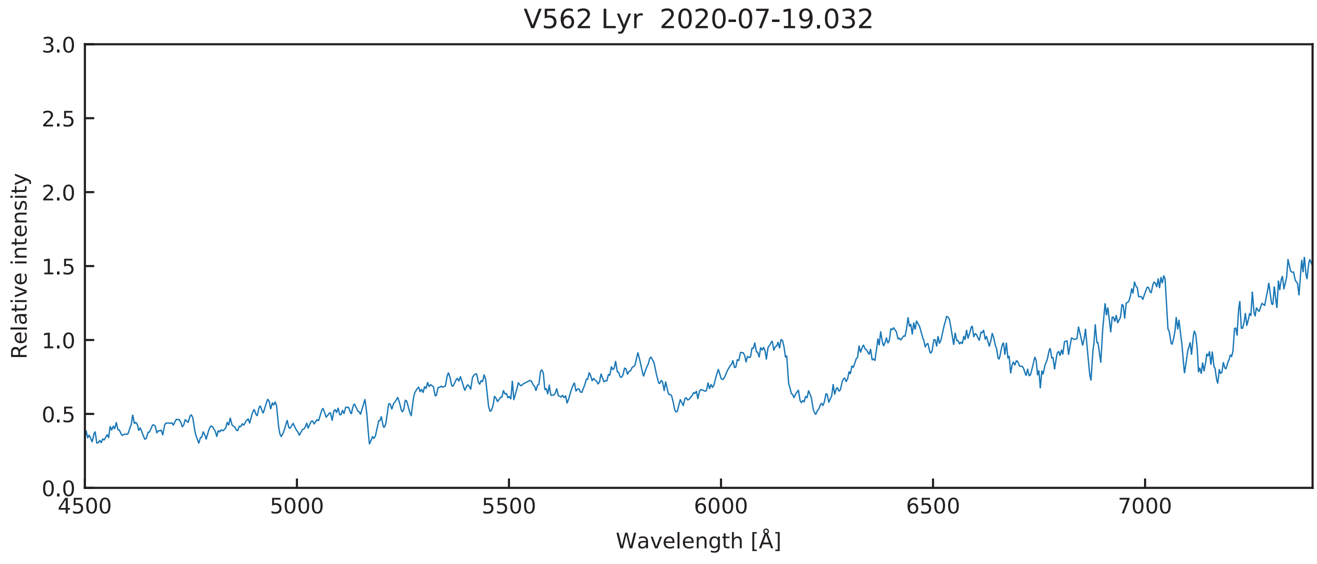




Spectrum secured by Peter Velez using a LISA
Bright lines of [OIII] and He II

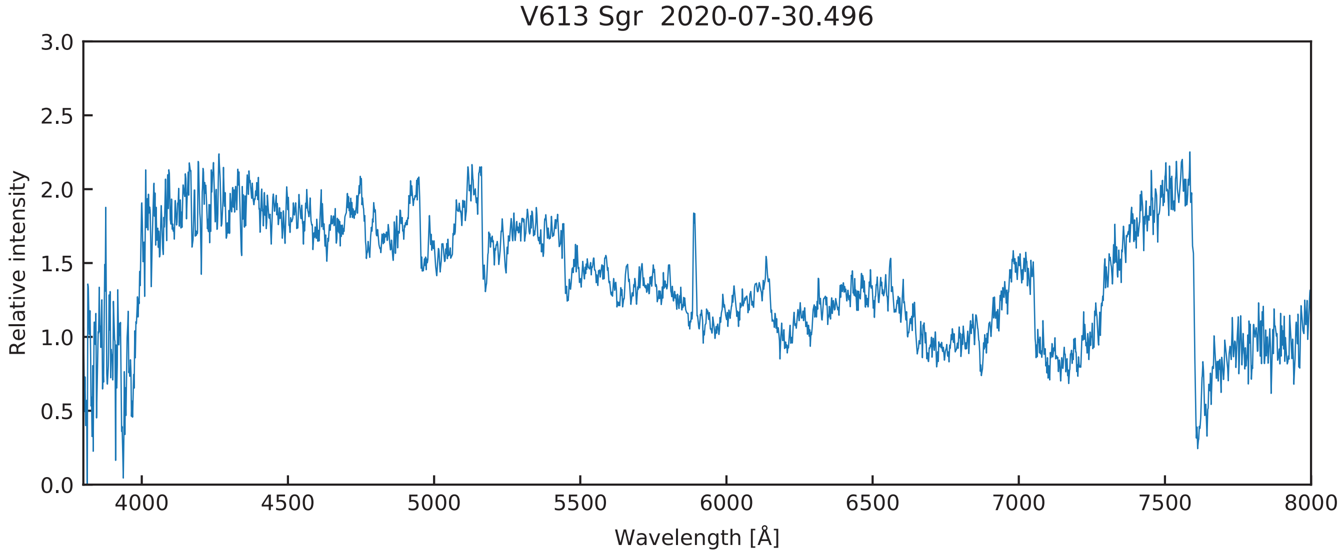
V562 Lyr (V~11.7): Suspected based on the photometric variability by Guilbault et al. (2000, https://ui.adsabs.harvard.edu/#abs/2000IBVS.4926....1G/abstract). No spectrum is available.





Spectra acquired by Ibrahima Diabassoura (UVEX 300 l/mm) and Christophe Boussin (ALPY 600)

V618 Sgr (V~15.3): Rather faint candidate. Suspected by Kilkenny (1989, https://ui.adsabs.harvard.edu/#abs/1989Obs...109..229K/abstract). Unfortunately, there is no spectrum covering the red region, Kilkenny presented only 3500 - 5500A showing several emission lines.



Spectrum secured by Terry Bohlsen using a LISA (R = 1000)

Time series II

Steve Shore

This time we'll go into some further detail about how different period finding algorithms work, and some of their applications and limitations. Although the usual application in astronomy is to photometric time series there's even more, and richer information to be pulled out of spectroscopy. A line profile is both a distribution and more: it's the signature, writ large, of all processes acting in the medium that produces the line. Mean quantities, such as the zero-th moment of the profile (its total integrated flux) and its first moment (the mean velocity), are statistics. These depend on the noise level of the spectrum but they also fail to completely characterize the accessible data. The second moment (the dispersion or variance), and third (skew) are also measurable quantities and these also can vary in time. If they display periodic, or multi-periodic, behavior that can be analyzed by some of the methods I'll discuss. But there are some features of any spectrum that are not at all periodic, think explosions for instance, that are time variable yet for which period searching routines fail spectacularly.

1. Periodicity, non-periodicity, and stochasticity

In mechanics, the one problem that's been understood since Newton chomped an apple is how to compute the motion of two structureless spherical masses around their center of mass in a binary system. The motion is *strictly periodic* with the period, *P*, depending only on the semimajor axis, a, of their common ellipse and the combined masses, (M_1,M_2), of the components. The recovery of Kepler's harmonic law, $\omega^2 a^3 = G(M_1+M_2)$, where the orbital frequency is $\omega\ 2\pi/P$, also called the Keplerian frequency. That this works so well even for binary stars, which are hardly billiard balls, testifies to the relative dominance of the central forces to tides and dissipative effects in the components.

The success of period searching methods in such cases is hardly a surprise because in the mathematical treatment of such systems the orbital motion in time can be replaced by a phase dependence of any measured property. Take the brightness of the system. Depending on their relative sizes and the orbital inclination relative to you, the observer, eclipses will recur on the orbital timescale. It's a problem if there are two such events per orbit but unless the stars have the same radius and surface temperature (hence, the same surface brightness), the primary eclipse can be distinguished from the secondary. This doesn't mean the phase separation is always exactly 0.5 in phase (a complete orbit is defined as the interval [0,1] in phase), the binary may have an excess angular momentum over a circular orbit. Since the observer is sited arbitrarily somewhere in the Universe, the angle of periastron (the distance of closest approach for the components) may not align with the line of sight. The separation in phase then gives additional information about the orbital shape but, and this is essential, it doesn't affect the period search.

1.1 Phase Dispersion Minimization

In this simplest case the procedure is tedious (by hand) but can be rendered almost trivial by machine implementation of an algorithm, the most basic being analogous to the Euclidean method for finding common divisors (hence, prime numbers). You plot the points and just look at their dispersion. Knowing your

Steve Shore

I have to emphasize a point: this assertion of uncorrelated measurements is actually never strictly true.

uncertainties (the word I've always preferred to "errors") you take the ratio of the internal dispersion (the mean uncertainty) to the dispersion of the measures. As a rule of thumb, if the ratio is about 1/3 or less, you likely have a variable. This applies to any measurement but, for now, I'm assuming you're using photometry. Convention - a wonderful, but arbitrary thing - dictates that the 1/3 (a signal-to-noise ratio of 3) for perfectly uncorrelated random uncertainties has a credibility of >99.5% (this is called Gaussian distribution).

Before continuing I have to emphasize a point: this assertion of uncorrelated measurements is actually never strictly true. There are always uncertain calibrations, due to the detector and all other stable components of your system, that are called systematic because, presumably, they don't vary from one measurement to another. These do not add quadratically with the random fluctuations, they're separate and should be so indicated in any analysis you might do (you're familiar with this from David Boyd's discussions of calibration, for instance). Now, having ascertained that you have a real variability in the target, make a guess on the period. That's sometimes not possible with any precision but you have some idea by looking at the extremes. If, for example, you're looking for eclipses, the minima are suggestive. So start with some period, P_0, and phase the data in bins of some reasonable size based on the number of points you have. To coarse a binning can hide the period, making it too fine can overwhelm the statistic with fluctuations. Then fold the data on that period and look at the dispersion per phase bin. Repeat the procedure you used to see if there's variability; take the dispersion of the points in each bin and then take the average of the dispersions. That's it.

The algorithm, called "phase dispersion minimization" (PDM) looks at the period that minimizes the variations in each bin. The formal algorithm was introduced for RR Lyr variables by Laer and Kinman (1965)[1] and is really simple to implement. There are already programs available to do this. The procedure was refined later by Stellingwerf (1977)[2]: and the procedure's been adopted by the Kepler project for period determinations in its massive photometric database. The code the project's developed are public with documentation.

The problem is that photometry can be compromised, even for so simple a thing as two well separated, nearly spherical stars in a strictly periodic binary, by other effects related to the stars themselves. Close binaries of solar type, or more evolved but still cool, have convective outer layers. Normally, such stars are slow rotators. Think of the Sun, it's period is about a month. But because of strong tidal coupling, even if not strong enough to induce bulk distortions in the components, can spin the stars up toward synchronisation if the period of the binary is less than a few weeks. The precise limits are fuzzy for the effect, both in mass ratio and separation, but it's a good rule of thumb that for stars separated by only a few stellar diameters the tidal wave they mutually induce can produce rotation at the orbital period well within the stellar nuclear lifetime. For a binary with a period of a week or two, this is a significant increase in the rotational frequency and that, coupled with the convective motions, appears to suffice for generating an intense magnetic dynamo. Associated with this magnetic activity are starspots, regions that may cover a substantial fraction of the stellar surface (for the Sun it's at most less than a percent, even in intense solar maxima, for these active systems it can reach tens of percent or even saturation).

The best studied systems are called RS CVn stars, after their prototype. They show waves that vary in phase and amplitude in their light curves and these will

[1] https://ui.adsabs.harvard.edu/abs/1965ApJS...11..216L/abstract
[2] https://ui.adsabs.harvard.edu/abs/1978ApJ...224..953S/abstract

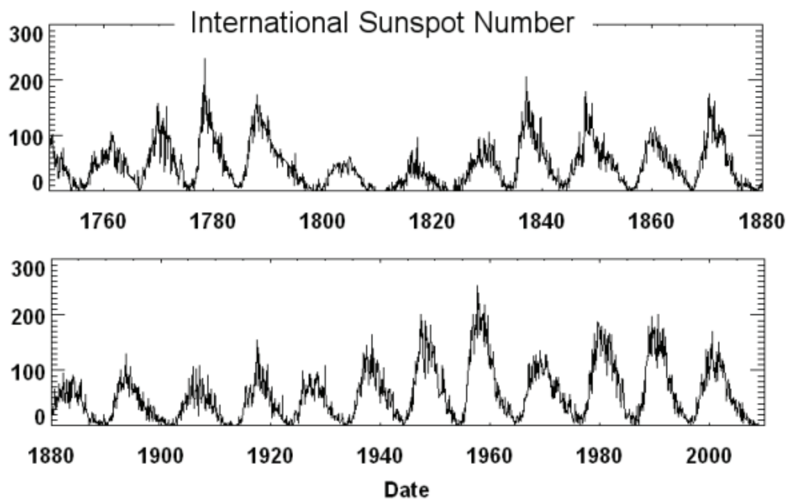


Fig. 1. Sunspot Number

challenge any simple PDM technique.

As the cartoon illustrates (Fig. 1.), these waves also shift between orbits. For the Sun, the largest spot groups can last just a bit more than a single rotation, for these binary systems they persist for dozens but not remaining constant. This may be what you're after so, within a few orbits, the waves can be stable enough that you use the photometry to study their properties. We'll return to these shortly.

Other systems are even more complicated, such as when one of the stars is an intrinsic variable (yes, δ Cep and RR Lyr stars are found in binary systems), or the Mira variables in symbiotics. In that case, the photometry may not yield an unambiguous period by PDM since the phasing of the different contributors may be unconnected. Then more sophisticated methods are called for.

To see that something is variable on a period P you have to sample the signal at least twice per cycle

1.2 Periodograms

The more general method that doesn't require any guessing is to look for the full range of periods that might be in the data and hope that one stands out. The technique is a lot like a signal analyzer: any time variable signal can be decomposed into a series of superimposed waves of different periods with different amplitudes that, when combined, reproduce the data as closely as the uncertainties allow. Think of how your ear detects a sound wave and separates it into a spectrum. You hear tones, but these are superpositions of the vibrations induced on the eardrum and transmitted to the basilar membrane in the inner ear that's then sensed by induction pots that transmit the signal to the central frequency analyzer - the cortex . The incident signal is just a fluctuating pressure in time, not a spectrum.

The spectrum is the result, it's in the signal and recovered by the way it induces the flapping of the membrane. The periodogram mimics this by asking what happens if you search through a range of frequencies. How does each contribute to the signal. A word of warning before continuing: this implies that there is at least one real period in the signal. It might be noise, in which case the spectrum is continuous but without any particular dominant frequency. So you have, again, to be sure the data contains some periodic component.

To simplify a bit what's done, because the details are well implemented in public codes (also from the Kepler project but widely available, the minimum frequency the algorithm can recover is 2/T where T is the length of the sequence in time (say a single night). You know this from CD and DVD readers, the "oversampling" of the reader.

To see that something is variable on a period P you have to sample the signal at least twice per cycle. Otherwise you get the wrong period, an alias. But since the minimum period is T/2 (so more than one cycle per observing window) this gives you a starting value that's directly from the data.

These intervals of visibility are the "window function". They introduce a frequency in any data set, an alias

The method was introduced in astronomy by Schuster (who also wrote down the equation of radiative transfer for the first time) and predates the PDM methods by nearly 60 years[1] and is definitely worth reading for those who want a look at the roots of the business.

The modern variant was introduced by Lomb (1976)[2] and refined by Scargle (1982)[3], who both considered the more astronomically relevant problem of unequal spacing of the data. The problem with the method, as originally presented, is that unlike the ear, except for auditory dropouts, you don't usually have perfect sampling. You know, we have weather to contend with, instrument problems, stomach problems, and a host of random events that interrupt our sequences. So some means is needed for confronting the gaps in the data and that's what the refined methods do. But the basic idea is the same: you span, with equal steps, the range of allowable frequencies and look at where the peaks fall. Then you choose the period, and its harmonics, that maximize the power in the spectral line (yes, that's what you're really seeing!). The clever part of the newer approaches is to also provide a "false alarm" statistic that gives the significance of the period, its probability of being real. An advantage of multiwavelength data, or multifilter photometry, is redundancy. Single sequences, in a single photometric band, can be noisy or misleading, but the correlation between closely spaced filters helps increase the significance.

1.3. Correlation methods

The essence of correlation analysis can be captured by taking a pair of hair combs, each of length L and take a parallel shift between them with uniform steps Δx. Imagine then looking through the superimposed pair at a screen or, better, projecting a light through the pair. This is a variable slit, repeated along the comb. So if the pattern of a comb is C(x), then for each shift Δx you are taking the sum: COR(Δx = f(Sum of all products over length of comb) C(x) * C(x + Δx)g which defines the autocorrelation for each shift Deltax, written simply as $R(\Delta x) =< C(x)C(x + \Delta x) >$ where the angle symbols mean summing, as before. So here you're taking the data and shifting it relative to itself. If it were completely periodic, as for a good comb as long as you don't over-run the edges or cut them out { you see the overlap go from perfect to not at all. If the comb is, say, a set of 1's and 0's, then the product goes from 1 to zero for each position x but the sum will go from 0 to max where max is a positive number. If you take the variations relative to an average, though, the correlation can turn to anticorrelation: the value of R may be negative. Take two sign curves with a period known and shift a train of them relative to itself and you'll see that the correlation goes from positive to negative regularly and with the same period. Now add noise, or even real, intrinsic source fluctuations. Now there may still be a peak in the correlation function, in fact there must be at zero-lag, but then the correlation will drop off as the shift becomes greater. You know this very well, the twinkling of starlight that causes path deviations because of refractive index uctuations in the atmosphere. Your eye correlates these paths within a cone (solid angle) of your vision. So you're adding together signals with different phase shifts coming from all directions (the angles being the same as the displacements) and the product (of the light amplitudes) becomes the point spread function or seeing. Where the signals decorrelate to your eye, that's the width of the point source that you call seeing. The same holds when correlating two different signals against each other. The example of the periodogram window I've just dis-

[1] https://ui.adsabs.harvard.edu/abs/1906RSPSA..77..136S/abstract (this is available from JSTOR or from https://bayes.wustl.edu/Manual/)
[2] https://ui.adsabs.harvard.edu/abs/1976Ap
[3] https://ui.adsabs.harvard.edu/abs/1982ApJ...263..835S/abstract

2. Now to the spectroscopic applications

The first useful step, even before trying anything quantitative, is to produce a trailed spectral sequence.

cussed is the cross-correlation of the sampling with a signal as it would come from a perfectly sampled source. The function (window) looks like the ruined comb, the input signal might look like the perfect comb. Calling C the perfect and D the ruined (destroyed) comb, respectively, you can form $\hat{R}(\Delta x) =< C(x)D(x + \Delta x) >$ in the same way. Try it (if you're willing to waste a comb). Again, you have to be careful to not shift so far that you over-run the ends of either comb, so take only that part over which the two continue to overlap (in other words you don't sum over your whole data set, just a portion with "padding" at the ends that gets cut off). Remember, the product of anything with zero is zero so where there is no data the signal much fall off (part of the combs will overlap, but increasingly they won't). This analytical method shows up whenever "coherence" is mentioned, from light (quantum optics) to turbulence to noise studies. It's the most fundamentally physical of the methods I've discussed, you know it well from the idea of an Airy disk (or the resolution of an optical instrument).

1.4. A word of caution about these methods

Periodicity is a requirement of these methods. That is, even if there really isn't any you'll find something.

That's always a danger. On way to understand this is to think about how you're actually observing.

As I tried to explain to some colleagues in particle physics when asking that students be admitted at all hours to our department roof when they said it was permitted only during the day, "astronomers sort of work at night, you know".

There's an inherent sampling periodicity, and it's complex: daily, monthly, seasonal. You can't take spectra when you can't see the source above your horizon, or when it's too near the Sun. That happens periodically and generates gaps in the data set even if the weather is perfect otherwise. These intervals of visibility are the "window function". They introduce a frequency in any data set, an alias. You know an example of this because it's built into the geocentric world of Ptolemy, the planetary periods are an alias there of the real period because of the annual window from the Earth's motion (the frequencies are observed to be the real one +/- 1/(year).

It's worse for the daily cycle in shorter time series. So you have to remove that first and that's the essential feature of the more advanced periodogram methods: you sample the observations with 1 when the source is observed and 0 when it isn't. The gaps can also be random (stochastic) because of the vicissitudes of weather and equipment, and that also enters as a weighting function. Again, the mathematical details aren't important here, but the concept is. Without proper evaluation of what the sampling introduces, you're working with biased data. So even if there's no real periodicity at all, if you don't account properly for this you'll still see some peaks in the "spectrum" of periods.

But you are spectroscopists and have many more options to explore in what you want to measure and search.

The dynamics matter, the radial velocity is not strongly affected by spots and even streams because the systems are gravitationally bound stars and any dynamics in the system will be governed by the same forces. Streams, disks, even jets (if emerging from one of the components) bear the signature of the orbital motion. That's for one aspect of a binary.

For other problems, such as the variations of lines in a symbiotic or other

So looking for this actually involves properly removing the periodic signals by appropriate averaging and binning

beasts, the same method can be applied even if the meaning of the period is different. You may want to search for evidence related to the accretion process, say the fluctuations of an emission line formed in the disk of a mass exchanging system (think cataclysmic variables). You might be looking for evidence of a stream, or a structure in a wind (perhaps a magnetically structured outflow from a star).

The first useful step, even before trying anything quantitative, is to produce a trailed spectral sequence. This can be a delicate business, depending on the cadence of your observations. To simply stack spectra in order of time isn't enough. Gaps, when you haven't observed, are real and a sort of data themselves. To properly display the sequence, the intervals without data should be left blank even if the resulting plot isn't as pretty, because otherwise you can be misled to seeing temporal structures that aren't real.

It's alway better to plot profiles in velocity rather than wavelength because you need to apply heliocentric corrections when the series spans a significant number of months or years. It also permits a comparison between profiles from very different spectral intervals, for instance He I 6678 with Fe II 5169, or the Balmer lines (these have different graphical resolutions if you use $\Delta\lambda$ instead of ΔV_{rad}), and it also renders your task much easier to identify specific common features in the profiles.

The eye is a wonderful correlator, you can often find a good starting guess for a period using this method that reduces the computational effort.

It also uses the feature of the profile, its structure, that you can't analyze by blind application of the algorithms. Those require numbers, not "images", you have to reduce all of the possibly rich profile information into a few moments (such as the equivalent width (absorption), integrated flux (scaled or absolute), mean radial velocity, full width zero intensity or half maximum).

On the other hand, to follow a single substructure through the time series may not be quantitatively possible without considerable guesswork on where to place a cursor. Radial velocity variations are the most straightforward connection with the photometry, the phasing can be performed on the photometric period. But the dynamics of, for example, the gas in a mass transferring binary system can show phase shifts, fluctuations, and even apparent orbital trajectories that are in conflict with the picture obtained from the light curves.

This was first pointed out in the 1930's by Struve. He noticed that some shell-like stars show V_{rad} curves that seem to be eccentric while the eclipses indicate circular orbits. Going deeper, he noted that there seemed to be a too frequent occurrence of periastrons toward the observer. The clue, and this is a signal of the process, is that gas streaming introduced a bias in the velocities that distorted the derived orbital parameters.

This holds also for cataclysmics, for instance, and even symbiotics. You have to be very careful about systematic, non-orbital contributions in the same way that you have to remove any systematic trends (so called "secular variations") in a photometric time series. Winds, streams, anything that doesn't strictly participate in the motion of the components around the center of mass must be correctly assigned before applying any of the algorithms. But that's why I discussed creating pseudo-images (also called "trailed spectra") to see if such effects jump out at you.

2.1 And if it isn't periodic?

Periodic behavior is a signature of equilibrium, that a system doesn't change in its basic properties. Any strictly periodic process averages to zero net change over a cycle. So while, for example, a Cepheid variable has a large photometric amplitude and, from its radial velocity variations you know the radius changes substantially, its mean brightness remains the same in the "long run".

Actually, that term begs the question. In the long view, stars evolve, binaries change, winds fluctuate. No state of a cosmic system is forever.

But there are two other non-periodic effects that, in some cases, are the signal of that secular change.

One is the drift of a mean. This may be, as in multiple stellar systems, because a third body is present but otherwise inducing a change in your target on only longer times than the interval during which you've been taking data. This perturbation manifests itself as, for example, velocity curve phase drifts, or changes in the orbital parameters. But this is periodic, just that now it's multiply periodic. The variations of the lunar orbit caused by the tidal dissipation by the Earth are not. On the short term the tide (at any location) is periodic, enough so that Kelvin constructed tidal calendars in the 19th century. But on long timescales it isn't, and neither is the Earth's rotation period (as you well know). So looking for this actually involves properly removing the periodic signals by appropriate averaging and binning. One aspect of the physics, the governance of the dynamical equilibrium of the system, is revealed by the period(s) while the openness and irreversibility of other dissipative processes reveal different mechanisms of great importance to understanding how binaries evolve (the transport processes in the interiors of stellar components in close systems that produces the rotational synchronism I described earlier depends on this understanding). So knowing the timescale is important and shouldn't be confused with period.

Other systems show a different, almost equilibrium behavior but not periodicity. Dwarf novae display outbursts (Fig. 2.) that are modeled as arising in the accretion disk around a mass gaining white dwarf in a close binary. The supply of mass changes, the companion being the source, and if the disk goes from a marginally stable or even low energy state to one that's convective (or changes its turbulence) it can suddenly pull up and brighten. This has thresholds for triggering depending on the temperature and density in different annuli of the disks.

But while the reaction has a timescale to run its course, to trigger and then dissipate, the attainment of the triggering state is the central problem. This doesn't have to be periodic. It's not a fluctuation around a stable state, or at least doesn't seem to be.

In quiescence, cataclysmics (including symbiotics and post-novae) flicker. This is a sort of noise. It's low amplitude and you may have even seen it in the data and swept it away with averaging observations.

Actually, this is why I emphasized knowing the systematics of the observations. It may be real and the signal of a physical process occurring on much shorter timescale than the inter-outburst times.

An example that comes to mind is familiar from walks in cities, the haphazard

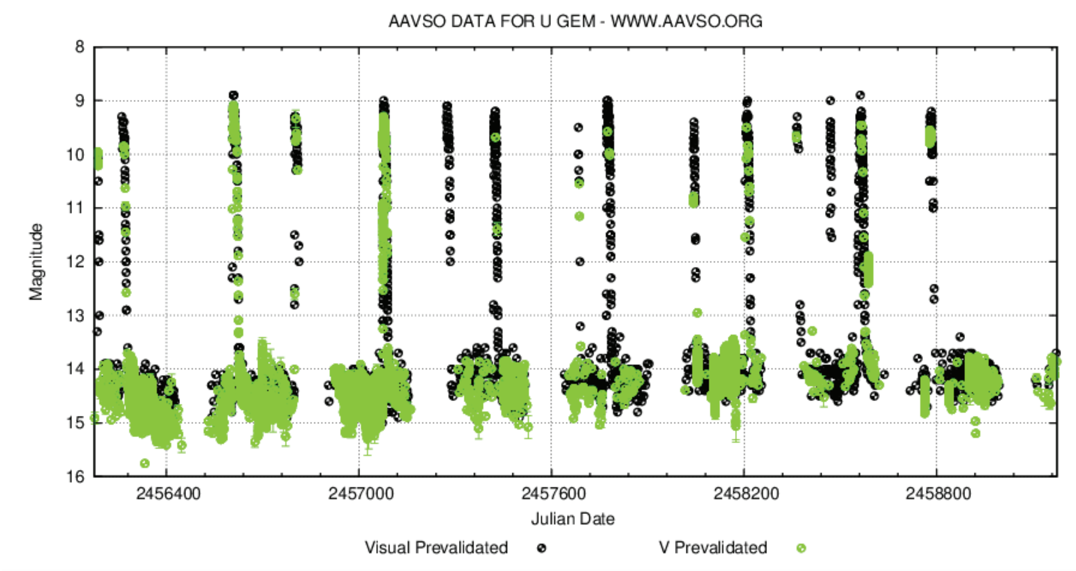


Fig. 2.
Dwarf nova outbursts UG Gem

Courtesy AAVSO

[1] https://ui.adsabs.harvard.edu/abs/1998ApJ...505..344C/abstract

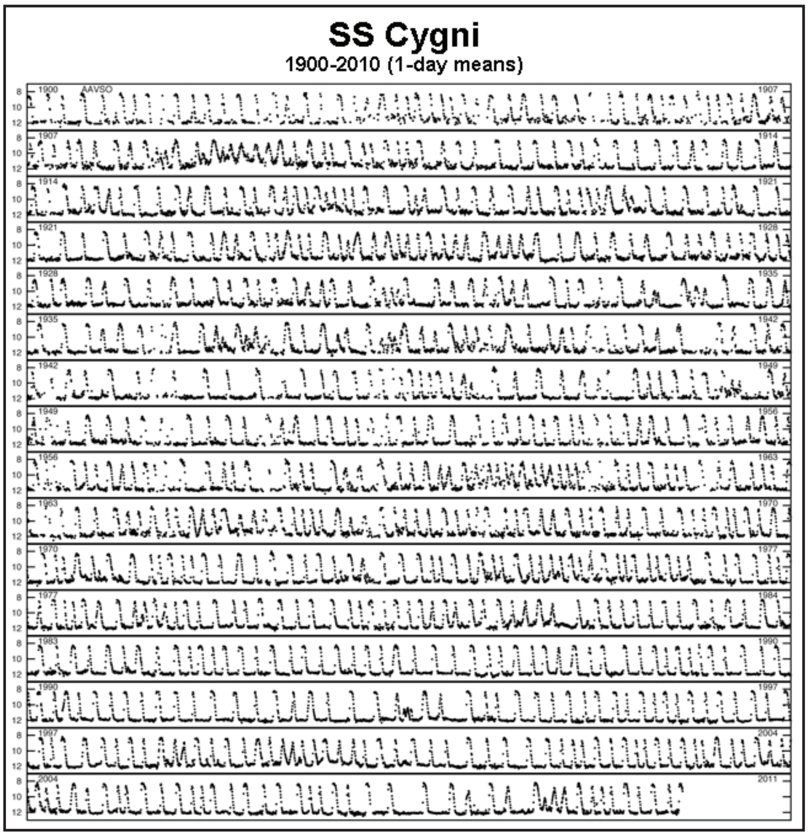


Fig. 3. SS Cygni ligthcurve (Courtesy AAVSO)

on-off cycles of streetlamps. How many of you have been walking under a lamp when it suddenly turns on or off? Watching for some time you might notice that this is only sort of cyclic. The two states can have different durations. The duty cycle (the fraction of time the lamp is on) sometimes changes.

Many dwarf novae are known to show this behavior, the most notorious being SS Cyg[1]. The light curve shows different, but repeatable, outburst profiles with a timescale but not a strict period.

The U Gem light curve (see Fig. 3.) also shows this and illustrates the pernicious effect of the sampling window: gaps can also hide outbursts This is compactly summarized as "absence of evidence is not evidence of absence". Studies of recurrent nova outbursts, such as T Pyx or U Sco, suffer similar lacunae

This noise, this aperiodicity, is an essential property of the driving mechanism, whatever that is (that's for another discussion, I promise). But the "mother of all quasi-periodic astronomical-time series" is clearly the sunspot cycle. The figure (Fig. 1.) shows the data, from NASA/MSFC, of the standardized number of active regions over the past few centuries, a graph with which I'm sure you're familiar.

You see not only the changes from one cycle to another in shape, amplitude, and duration but also the fluctuations during a single peak and the different separations.

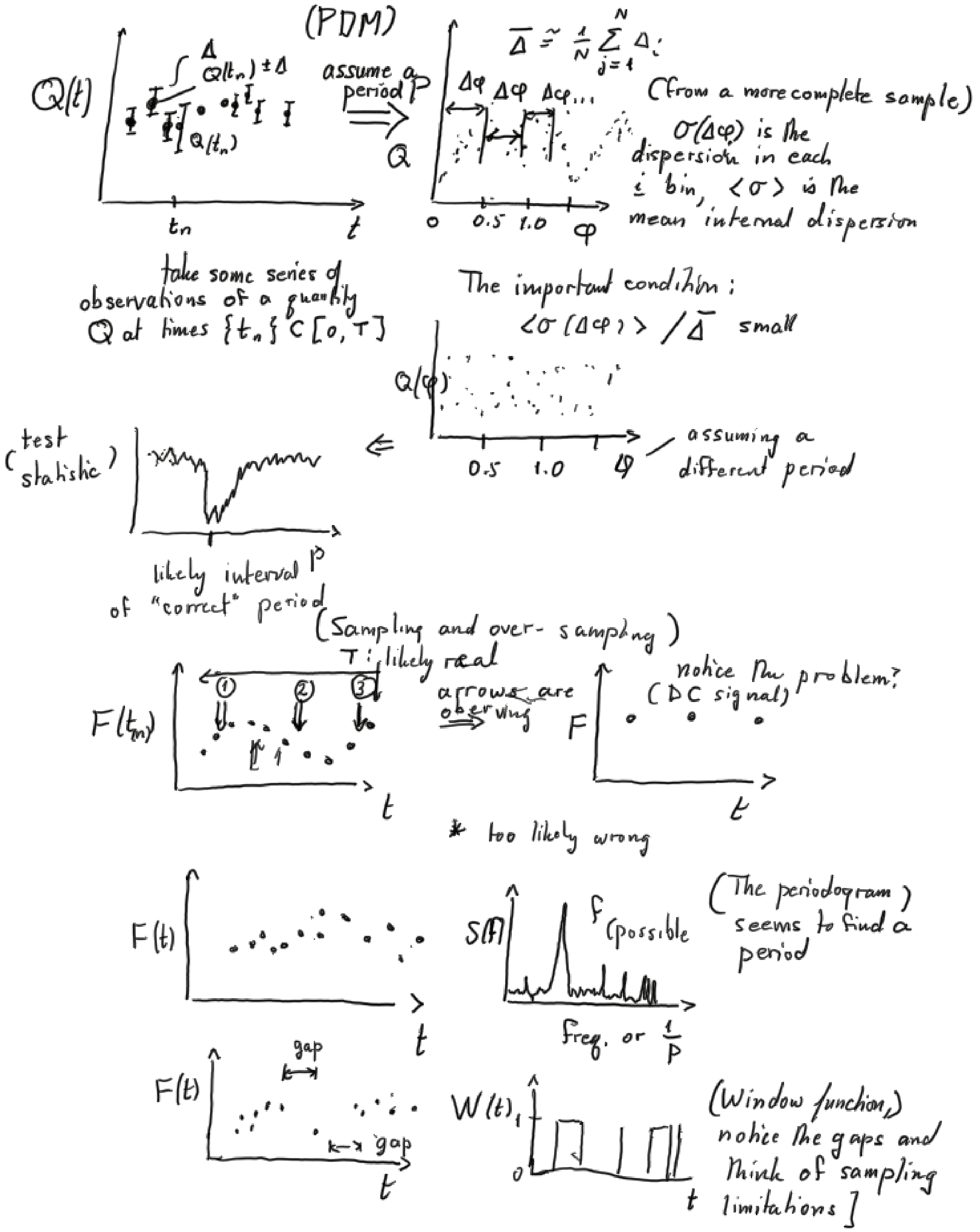
There's a timescale for the cycle, a global mean, but it has a strongly fluctuating contribution. Thus, to connect with my comment above about the RS CVn stars, the action of the dynamo revealing itself in the fine details of a time series. This sort of sequence, so normal for so many cosmic systems, requires more subtle tools than simple period searching and emphasizes the singular importance of time series in astrophysics.

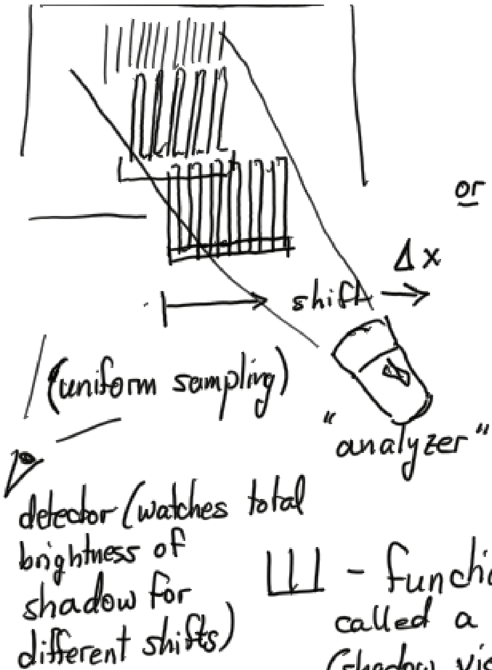
Coda for this issue

I hope this discussion encourages you to dig deeper and sets the importance of persistence in proper context.

We don't perform experiments, we watch the one the Universe is running and, without interruption, we are in a position to extract from a methodically broadbased interrogation real physics. Real understanding. This is remote sensing at its most subtle and a type of observational astrophysics that you are uniquely placed to do.

Steve Shore

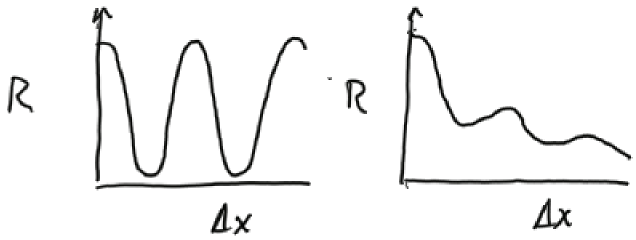

(PDM)
Q(t)
Q(tₙ) ± Δ
Δ
Q(tₙ)
tₙ
t
assume a period P
Q
Δ̄ ≃ 1/N Σ_{j=1}^{N} Δ_j
(from a more complete sample)
Δφ Δφ Δφ...
σ(Δφ) is the dispersion in each i bin, ⟨σ⟩ is the mean internal dispersion
0 0.5 1.0 φ
take some series of observations of a quantity Q at times {tₙ} ⊂ [0, T]
The important condition:
⟨σ(Δφ)⟩ / Δ̄ small
Q(φ)
0.5 1.0 φ
assuming a different period
(test statistic)
likely interval of "correct" period
P
(Sampling and over-sampling)
T: likely real
arrows are observing
F(tₙ)
t
notice the problem? (DC signal)
F
t
* too likely wrong
F(t)
t
S(f)
f (possible
Freq. or 1/P
(The periodogram) seems to find a period
F(t)
gap
gap
t
W(t)
0
t
(Window function) notice the gaps and think of sampling limitations]



or

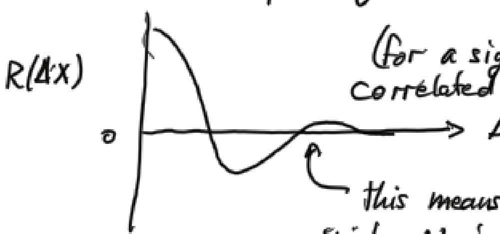
non-uniform (almost random but certainly not good) sampling

Ш - function (Russian letter), also called a comb function, shows (shadow view, sums over all prongs of comb pair for a shift Δx)



case 1 case 2

or possibly



(for a signal that may be correlated but not periodic)

this means decorrelated, think Δt instead of Δx for a photometric or spectroscopic signal.

A coda to the coda: Scientific publication and contributions

Steve Shore

It's time for us all to have a serious discussion about the scientific publication process

The ARAS database is becoming a known, used resource in the broader astronomical community, and like the Be star spectroscopic database and the AAVSO photometric archive, it evinces a commitment to the advancement of astrophysics. Because of the increasing inaccessibility to telescopes because of the limitations present for the large facilities (e.g., ESO), and closures or access limitations fort intermediate (two to four meter), shifting research goals and limited resources, work on what are now seen as bright targets (14th magnitude or brighter) has been deemed low priority.

Spectrographs often take a back seat to other instruments such as imagers. And despite the attempts by Biblical figures to stop the diurnal cycle, there are still at most, only 365 nights per year and very often far less. That's where the role of the small telescope observer enters. You, armed with a spectrograph and careful observing methods, help fill that essential gap.

But, let's be clear: research is not simply the accumulation of data. That's what collectionists do. It's looking at that data, asking questions or trying to piece together an understanding. Even if the immediate goal is to obtain qualitative (overall spectral appearance, for instance) or quantitative results (such as fluxes and line profiles), the process does not stop there. Having the data publicly available is a great benefit but if it's just left to accumulate, the data are like books accumulated in an unopened library or entombed with the owner. All of our discussions over these years have been aimed at this essential part of the activity. It's not that you have to ``do something profound'' with this on your own,. but that in any research that uses your contributions and for which you maybe a co-author you should take an interest in the analysis. At least to the extent that you make sure you have an understanding of how your data is being used and why. That's what colleagues do for each other. It's not that one sends a spectrum, or another sends photometry, and somehow a master chef cooks the dinner and lays it out for the `"professionals" to share. In other words, the results are incorporated in a manuscript sent for publication. It may be an ATel, or a paper for Nature, A&A, ApJ, or whatever journal. The destination isn't the point, the involvement is.

Every journal has a code of ethics. This isn't just window-dressing. These are the standard procedures for evaluating a contribution (on the journal's side) and for assuring the veracity of the data and the authorship. To be specific, using A&A as an example but this holds for all astrophysics journals, on submission the communicating author is asked to affirm that *all* authors have read and approved the paper.

For huge collectives this may be only implicit but even in the very largest there are internal review procedures in which all coauthors participate. That means the collaborators not only throw in a bit to the pot, they also know how it's been stirred. It's *not* a priority thing: this has to do with honesty of publication. The openness is assured if everyone in the effort is informed and gives informed consent to the contents of the paper. You may feel this is excessive, and that it's not important. Or that you can't possibly understand at the necessary level what's in the paper. If that's so, there's something wrong with the paper. You who have provided data have also had to elaborate them, not just playing with pushing buttons but intelligently evaluating the quality. So you *should* want to know how it's being used.

I assure you this is not excessive. As a journal editor (now for A&A as you know, in a previous lifetime for ApJ) I've seen cases of authors accumulating papers and citations for papers they didn't even know existed. In some cases, it's even happened that the paper was submitted, reviewed, and published before one on the author list knew it existed, by which time it was too late to correct the work. It is unethical for someone to be put on a paper without their consent, unethical to submit a paper without the author knowing its contents, and unethical to respond to a referee's criticism without it being discussed among the authors. And by ``unethical'' I mean *not allowed.*

A paper's contents isn't something agreed to in sight unseen. You should, if you're going to be included, ask to see the paper before submission.

But, let's be clear: research is not simply the accumulation of data

Epilogue à l'épilogue: Publication Scientifique et Contribution

Steve Shore

Le temps est venu pour nous d'ouvrir une discussion sérieuse sur le processus de publication scientifique

La base de données ARAS est en train de devenir une ressource connue et utilisée dans la communauté astronomique au sens large, et comme la base de données spectroscopique d'étoiles Be et les archives photométriques AAVSO, elle témoigne d'un engagement envers l'avancement de l'astrophysique. En raison de l'inaccessibilité croissante aux télescopes en raison des limitations présentes pour les grandes installations (par exemple, ESO), et des fermetures ou limitations d'accès pour les intermédiaires (deux à quatre mètres), des objectifs de recherche changeants et des ressources limitées, la recherche sur ce qui est maintenant considéré les cibles lumineuses (magnitude 14 ou plus brillantes) ont été jugées de faible priorité.

Les spectrographes passent souvent au second plan par rapport à d'autres instruments tels que les imageurs. Et malgré les tentatives des personnages bibliques pour arrêter le cycle diurne, il y a encore tout au plus, seulement 365 nuits par an et très souvent beaucoup moins. C'est là qu'intervient le rôle de l'observation possédant un petit télescope. Vous, armés, d'un spectrographe et de méthodes d'observation minutieuses, contribuez à combler cette lacune essentielle.

Mais soyons clairs: la recherche n'est pas simplement l'accumulation de données. C'est ce que font les collectionneurs.C'est étudier ces données, se poser des questions ou essayer de rassembler une comp réhension. Même si l'objectif immédiat est d'obtenir des résultats qualitatifs (aspect spectral global, par exemple) ou quantitatifs (comme les flux et les profils de lignes), le processus ne s'arrête pas là. Produire des données accessibles au public est d'un grand inétérêt. Mais si elles sont simplement accumulées, les données sont comme des livres dans une bibliothèque non ouverte ou enterrés chez le propriétaire. Toutes nos discussions au cours de ces années ont visé cette partie essentielle de l'activité. Ce n'est pas que vous deviez "faire quelque chose de profond '' par vous-même. mais que dans toute recherche qui utilise vos contributions et pour laquelle vous êtes peut-être co-auteur, vous devriez vous intéresser à l'analyse. Au moins dans la mesure où vous vous assurez de bien comprendre comment vos données sont utilisées et pourquoi. C'est ce que font les collègues les uns pour les autres. Ce n'est pas que l'un envoie un spectre, ou un autre envoie de la photométrie, et d'une manière ou d'une autre, un maître cuisinier prépare le dîner et le propose aux «professionnels» pour le partager. En d'autres termes, les résulats sont incorporés dans un manuscrit pour publication.Ce peut être un ATel, ou un article pour Nature, A&A, ApJ ou n'importe quel autre journal. La destination n'est pas le but, l'implication l'est.

Chaque revue a un code d'éthique. Ce n'est pas seulement une vitrine. Ce sont les procédures standard pour évaluer une contribution (du point de vue de la revue), pour assurer la véracité des données et leur paternité. Pour être précis, en utilisant A&A comme exemple, mais cela vaut pour toutes les revues d'astrophysique, lors de la soumission, l'auteur communicant est invité à confirmer que tous les auteurs ont lu et approuvé l'article.

Pour les grands collectifs, cela peut n'être qu'implicite, mais même dans les plus grands, il existe des procédures de révision interne auxquelles tous les coauteurs participent. Cela signifie que les collaborateurs ne jettent pas seulement un peu dans le pot, ils savent aussi comment cela a été remué. Ce n'est pas seulement une priorité: cela relève de l'honnêteté de la publication. L'ouverture est assurée si tout le monde dans l'effort est informé et donne son consentement éclairé au contenu du document. Vous pouvez penser que c'est excessif et que ce n'est pas important. Ou que vous ne pouvez pas comprendre au niveau nécessaire ce qu'il y a dans le journal. Si tel est le cas, il y a quelque chose qui ne va pas avec le papier. Vous qui avez fourni des données, vous avez également dû les élaborer, non seulement en jouant avec des boutons poussoirs, mais en évaluant intelligemment la qualité. Vous devriez donc vouloir savoir comment il est utilisé.

Je vous assure que ce n'est pas excessif. En tant qu'éditeur de revue (maintenant pour A&A comme vous le savez, dans une vie antérieure pour ApJ), j'ai vu des cas d'auteurs accumulant des articles et des citations pour des articles dont ils ignoraient même l'existence. Dans certains cas, il est même arrivé que l'article ait été soumis, révisé et publié avant que l'un des auteurs de la liste des auteurs ne sache qu'il existait, date à laquelle il était trop tard pour corriger le travail. Il est contraire à l'éthique pour quelqu'un d'être mis sur un papier sans son consentement, contraire à l'éthique de soumettre un article sans que l'auteur en connaisse le contenu, et contraire à l'éthique de répondre aux critiques d'un arbitre sans que cela soit discuté entre les auteurs. Et par "contraire à l'éthique '', je veux dire non autorisé. Le contenu d'un article n'est pas quelque chose de convenu à vue invisible. Vous devriez, si vous voulez être inclus, demander à voir l'article avant de le soumettre.

Mais, clairement: la recherche ne se résume pas à une accumulation de données

Traduction : François Teyssier

Illemkódex: Tudományos publikációk és beküldések

Steve Shore

Itt az ideje, hogy komolyan beszéljünk a tudományos publikációs folyamatról

Az ARAS adatbázis kezd ismert, használt forrása lenni szélesebb csillagászati közösségeknek, és a Be csillagok adatbázisához valamint az AAVSO fotometriai archívumához hasonlóan, mutat egy elköteleződést az asztrofizika haladásához. Mivel jelenleg növekszik a teleszkópok elérhetetlensége mert a nagyobb berendezések korlátozottak (pl. ESO), és bezárnak vagy korlátozzák a hozzáférést közbenső távcsövekhez (2-4 méter), így eltolódnak a kutatási célok és a limitált erőforrások olyan munkák felé, ahol a ma fényesnek számító célpontok (14 mag és ez alatti) eddig alacsony prioritásúak voltak.

A spektroszkópok gyakran háttérbe szorulnak a képalkotó eszközökkel szemben. És a bibliai kísérletek ellenére hogy megállítsák a nap-éj ciklust, még mindig csak legfeljebb 365 éjszaka van egy évben, vagy annál jóval kevesebb. Itt kerülnek előtérbe a kis teleszkópos észlelők. Te, spektroszkóppal és gondos észlelési módszerekkel felfegyverkezve, segíthetsz kitölteni ezt az alapvető hiányt.

De, legyünk világosak: a kutatás nem csupán adatok felhalmozása. Azt a gyűjtők csinálják. Hanem ezen adatok megvizsgálása, kérdések feltevése vagy a részletek összerakása megértésig. Még ha a közvetlen cél az egy kvalitatív kinyerés (pl. spektrum kép) vagy kvantitatív mérés (pl. flux és vonal profilok), az elemzési folyamat itt még nem áll meg. Az adat nyilvánosan elérhetővé tétele az egy nagy eredmény, de ha csak engedjük felhalmozódni, úgy az adatok mint könyvek csak halmozódnak a könyvtárakban anélkül, hogy bárki is kinyitná, vagy a szerzővel együtt kerülnek a sírba. Az összes vitánk az utóbbi néhány évben erről az igen lényeges tevékenységről szólt. Ez most nem arról szól, hogy "csinálj valami mélyrehatót" te saját magad, hanem amennyiben bármely kutatás felhasználja az eredményeidet, és netalán társszerzővé is válsz, akkor érdeklődést kellene mutatnod az analízisben. Legalább annyira, hogy megérted, hogyan használják fel az adataidat, valamint hogy miért. Ez az, ahogyan kollégák működnek együtt. Ez nem az, hogy valaki beküld egy spektrumot, vagy más fotometriát, és valahogy a főnök megfőzi a vacsorát majd kiteríti az asztalra, megosztva a "professzionálisokkal". Más szóval, az eredményeket kéziratba foglaltan elküldik publikálásra. Ez lehet az ATel, vagy egy tanulmány a Nature, A&A, ApJ vagy akármelyik más folyóiratba. Nem a cél a lényeg, hanem e folyamat részesének lenni.

Minden folyóiratnak van etikai kódexe. Ez nem csak külsőség. Vannak standard eljárások kiértékelni a hozzájárulást (a folyóirat felől) és megbizonyosodni az adatok valódiságáról és szerzői hovatartozásáról. Konkrétan az A&A-t példának tekintve - bár ez a többi lapra is igaz -, beküldéskor a kommunikáló szerzőt megkérik, hogy erősítse meg azt, hogy minden szerző elolvasta és jóváhagyta a tanulmányt.

Nagy kollektíváknak ez lehet hogy csak implicit, de a legnagyobbaknak is belső elbírálási procedúrájuk van, melyben a társszerzők mind részt vesznek. Ez azt jelenti, az együttműködő feleknek nem csak alkalomadtán kell hozzátenniük, hanem azt is kell tudniuk, hogyan kell az egészet mozgásban tartani. Ez nem egy prioritásos dolog: ez a publikáció becsületességéről szól. A nyitottság biztosított, hogyha mindenki informált az erőfeszítésben, és informáltan járul hozzá a tanulmány tartalmához. Most azt gondolhatod, hogy ez túlzás és nem fontos. Vagy hogy feltehetően nem értheted meg a tanulmányt a kellő szinten. Ha így van, akkor valami nincsen rendben a tanulmánnyal. Te aki adatokat nyújtottál, azokat értelmezned is kelett, és nem csak gombokat nyomogatni, hanem intelligensen kiértékelni a minőségét. Szóval azt is kellene akarnod, hogy tudd hogyan használják.

Biztosítalak afelől, ez nem túlzás. Egy folyóirat szerzőjeként (most az A&A-nak mint tudod, ill. előzőleg Apj-nek) láttam olyan eseteket, hogy felhalmozódnak olyan tanulmányok és hivatkozások tanulmányokra, melyekről némely szerzők nem is tudják, hogy léteznek. Néhány esetben az is megesett, hogy az értekezés beadásra került, szemlézték és publikálták, de úgy, hogy a szerzői listán egyvalaki nem tudott róla, és késő lett korrigálni. Az etikátlan, hogy valakinek a munkáját a tanulmányba tegyük a hozzájárulása nélkül, etikátlan beadni a tanulmányt úgy hogy a tartalmát valamelyik szerző nem ismerte meg, és etikátlan az elbíráló kritikájára úgy válaszolni, hogy azt előtte nem vitattuk meg a szerzőkkel. Az "etikátlan" alatt azt értem, hogy nem megengedett. A tanulmány tartalma nem olyan, amivel előre látatlanul egyet lehet érteni. Ha benne vagy a tanulmányban, kérned kell hogy belenézz, mielőtt az beadásra kerül.

De, legyünk világosak: a kutatás nem csak adatok felhalmozása

Fordítás: Peter Somogyi

Eine Coda zur Coda: Wissenschaftliche Veröffentlichungen und Beiträge

Steve Shore

Es ist Zeit für uns alle, eine ernsthafte Diskussion über den wissenschaftlichen Publikation-

Die ARAS-Datenbank wird immer mehr zu einer bekannten und genutzten Ressource in der breiteren astronomischen Gemeinschaft, und wie die BESS (spektroskopische Be-Star) Datenbank und das AAVSO photometrische Archiv, zeigt sie ein Engagement für die Weiterentwicklung der Astrophysik. Die zunehmende Unzugänglichkeit von Teleskopen aufgrund von Beschränkungen für die großen Einrichtungen (z.B. ESO), die Schließungen oder Zugangsbeschränkungen für mittlere (zwei bis Vier-Meter-Teleskope) und sich verändernde Forschungsziele und begrenzte Ressourcen bewirken, dass die Arbeit an den jetzt als hell angesehenen Zielen (14. Größenordnung oder heller) eine niedrige Priorität erhält.

Außerdem treten Spektrographen oft hinter anderen Instrumenten wie z.B. Kameras zurück. Und trotz der Versuche biblischer Gestalten, den Tageszyklus zu stoppen, gibt es immer noch höchstens 365 Nächte pro Jahr und sehr oft weit weniger. An dieser Stelle erscheint die Rolle des Beobachters mit dem kleinen Teleskop. Bewaffnet mit einem Spektrographen und sorgfältigen Beobachtungsmethoden helfen Sie, diese wichtige Lücke zu schließen.

Aber um es klar zu sagen: Forschung ist nicht einfach das Sammeln von Daten. Das ist es, was Sammler tun. Es geht darum, diese Daten zu betrachten, Fragen zu stellen oder zu versuchen, ein Verständnis zu gewinnen. Selbst wenn das unmittelbare Ziel darin besteht, qualitative (z. B. das Gesamterscheinungsbild des Spektrums) oder quantitative Ergebnisse (wie Flüsse und Linienprofile) zu bestimmen, hört der Prozess damit nicht auf. Es ist ein großer Vorteil, wenn die Daten öffentlich zugänglich sind. Aber wenn man sie einfach ansammeln lässt, sind die Daten wie Bücher, die sich in einer ungeöffneten Bibliothek stapeln oder mit dem Besitzer begraben werden. Alle unsere Diskussionen über diese Jahre zielten auf diesen wesentlichen Teil der Tätigkeit. Es geht nicht darum, dass Sie ``etwas tiefgründiges'' damit alleine machen müssen, sondern dass Sie bei jeder Forschung, die Ihre Beiträge verwendet und bei der Sie vielleicht ein Co-Autor sind, ein Interesse an der Analyse zeigen. Zumindest in dem Maße, dass Sie sicherstellen, dass Sie ein Verständnis dafür haben, wie Ihre Daten verwendet werden und warum. Das ist es, was Kollegen für einander tun. Es ist nicht so, dass einer ein Spektrum schickt oder ein anderer Photometrie schickt, und irgendwie kocht ein Meisterkoch das Essen und serviert es den "Profis" zum Genießen. Mit anderen Worten, die Ergebnisse werden zu einem Manuskript verarbeitet, das zur Veröffentlichung geschickt wird. Das kann ein ATel, ein Aufsatz für Nature, A&A, ApJ, oder welches Journal auch immer sein. Das Ziel ist nicht der Punkt, die Beteiligung schon.

Jede Zeitschrift hat einen ethischen Kodex. Das ist nicht nur Augenwischerei. Es sind die Standardverfahren für die Bewertung eines Beitrags (auf Seiten der Zeitschrift) und um die Wahrhaftigkeit der Daten und der Autorenschaft zu gewährleisten. Speziell mit A&A als Beispiel, aber das gilt für alle Astrophysik-Zeitschriften, wird der übermittelnde Autor bei der Einreichung gebeten, zu bestätigen, dass alle Autoren die Arbeit gelesen und genehmigt haben.

Bei großen Kollektiven mag dies nur implizit sein, aber selbst in den allergrößten gibt es interne Review Verfahren, an denen alle Co-Autoren teilnehmen. Das bedeutet, dass die Mitarbeiter nicht nur einen Teil in den Topf geben, sondern sie wissen auch, wie er gerührt wurde. Dies ist keine Sache der Priorität: Das hat mit der Ehrlichkeit der Veröffentlichung zu tun. Die Offenheit ist gewährleistet, wenn jeder der Beteiligten informiert ist und sein Einverständnis zum Inhalt des Papiers gegeben hat. Sie mögen das für übertrieben halten,und dass es nicht wichtig ist. Oder dass Sie unmöglich auf der höheren Ebene verstehen können, was in der Publikation steht. Wenn das so ist, stimmt etwas nicht mit der Publikation. Sie, die Sie Daten geliefert haben, mussten diese auch ausarbeiten, nicht nur mit Knöpfchen drücken spielen, sondern die Qualität intelligent bewerten. Sie sollten also wissen wollen, wie sie verwendet werden.

Ich versichere Ihnen, dass dies nicht übertrieben ist. Als Herausgeber einer Zeitschrift (jetzt für A&A, wie Sie wissen, in einem früheren Leben für ApJ) habe ich Fälle gesehen, in denen Autoren Publikationen und Zitate für Publikationen angehäuft haben, von denen sie nicht einmal wussten, dass sie existierten. In einigen Fällen ist es sogar passiert, dass die Arbeit eingereicht, begutachtet und veröffentlicht wurde, bevor jemand auf der Autorenliste wusste, dass sie existiert. Zu diesem Zeitpunkt war es zu spät, die Arbeit zu korrigieren. Es ist unethisch, wenn jemand ohne seine Zustimmung auf eine Arbeit gesetzt wird, unethisch, eine Arbeit einzureichen, ohne dass der Autor den Inhalt kennt, und unethisch, auf die Kritik eines Gutachters zu reagieren, ohne dass diese unter den Autoren diskutiert wurde. Und mit ``unethisch'' meine ich, dass es nicht erlaubt ist. Der Inhalt eines Papiers ist nicht etwas, dem man unbesehen zustimmt. Sie sollten, wenn Sie einbezogen werden wollen, darum bitten, die Arbeit vor der Einreichung zu sehen.

Aber, um es klar zu sagen: Forschung ist nicht einfach die Anhäufung von Daten.

Übersetzung: Martin Dubbs

Steve Shore

E' il momento per tutti noi di fare una discussione importante sul processo inerente alle pubblicazioni scientifiche

Il database ARAS sta diventando una risorsa conosciuta ed utilizzata nella sempre più ampia comunità astronomica. Analogamente al database di spettri delle stelle Be e agli archivi fotometrici AAVSO, dimostra un impegno nel progresso dell'astrofisica. A causa della progressiva inaccessibilità ai telescopi dovuta alle limitazioni nelle grandi strutture (es. ESO), alla chiusura o ad un uso ridotto per quelle medie (telescopi da due a quattro metri), allo spostamento degli obiettivi di ricerca e alle risorse limitate, è ritenuto di bassa priorità lavorare su quelli che vengono considerati soggetti luminosi (magnitudine 14 o più luminosi). Gli spettrografi passano frequentemente in secondo piano rispetto ad altri strumenti, ad esempio quelli per l'astrofotografia. Malgrado i tentativi dei personaggi biblici di fermare il ciclo giornaliero, ci sono ancora non più di 365 notti per anno e spesso molte di meno. Qui entrano in gioco gli osservatori dotati di piccoli telescopi. Voi, armati di spettrografi e accurate metodologie osservative, aiutate a colmare questa importante lacuna.

Ma sia chiaro: la ricerca non è semplicemente la raccolta dei dati, questo è ciò che fanno i collezionisti. E' invece analizzarli, fare domande e cercare di mettere insieme le risposte per capire. Anche se l'obiettivo immediato è quello di ottenere risultati qualitativi (es. l'aspetto d'insieme dello spettro) o quantitativi (i flussi e i profili delle righe), il percorso non termina qui. Poter rendere i dati pubblici presenta grandi vantaggi ma se ci limitiamo solo ad accumularli, saranno come libri in una biblioteca chiusa o seppelliti insieme al proprietario. Tutte le nostre discussioni in questi anni sono state indirizzate verso questa parte essenziale dell'attività. Non è richiesto di approfondire concetti per proprio conto ma che abbiate interesse all'analisi in ogni ricerca che utilizza i vostri contributi e per le quali potreste essere co-autori. Almeno essere sicuri di comprendere come i vostri dati verranno utilizzati e perché. E' ciò che fanno i colleghi l'uno per l'altro. Non ci si può aspettare che uno manda uno spettro, un altro la fotometria e, in qualche modo, un master chef prepara la cena e la serve ai "professionisti". In altre parole, i risultati vengono incorporati all'interno di un manoscritto per la pubblicazione. Può trattarsi di un ATel o un paper per Nature, A&A, ApJ o qualsivoglia rivista scientifica. Lo scopo non è la destinazione ma la collaborazione, il coinvolgimento.

Ogni rivista ha un codice etico. La rivista non è una vetrina da esposizione. Queste sono le procedure standard per valutare un contributo (da parte della rivista) e per assicurare la veridicità e la paternità dei dati. Per essere più precisi, usando A&A come esempio ma vale per tutte le riviste di astrofisica, all'autore che presenta il lavoro per la pubblicazione viene chiesta la conferma che tutti gli altri autori hanno letto e approvato il paper.

Per la collettività ciò potrebbe essere scontato ma ci sono procedure di revisione interna in cui partecipano tutti i co-autori. Significa che i collaboratori non solo mettono qualcosa nella pentola, ma sanno anche come il tutto è stato cucinato. Non è una priorità: questo ha a che fare con l'onestà della pubblicazione. L'onestà è assicurata se ogni persona che si impegna è informata e fornisce il consenso informato ai contenuti del paper. Potreste pensare che sia eccessivo e che non sia importante. Oppure che non siete in grado di capire ad un livello adeguato quello che è scritto nel paper. Se è così, c'è qualcosa di sbagliato nel paper. Voi che avete fornito i dati, avete dovuto anche elaborarli. Non semplicemente premendo un pulsante ma valutando con cognizione la loro qualità. Per questo voi dovreste voler sapere come vengono utilizzati.

Vi posso assicurare che non è eccessivo. Come editore di riviste (al momento, come sapete, per A&A, in precedenza per ApJ), ho visto casi di autori che accumulavano paper e citazioni di cui non sapevano l'esistenza. In alcuni casi è anche capitato che un paper sia stato presentato, recensito e pubblicato prima che uno degli autori ne fosse a conoscenza. Troppo tardi a quel punto per correggere il lavoro. Non è etico essere inserito in un paper senza aver dato il consenso, non è etico presentare un paper senza che l'autore conosca i suoi contenuti, non è etico rispondere ad una critica dei revisori senza che sia discusso fra gli autori. E per "non etico" intendo non permesso. I contenuti di un paper non sono qualcosa da accettare a scatola chiusa. Se sarete inclusi, dovreste chiedere di vedere il documento prima della presentazione per la pubblicazione

Ma sia ben chiaro: la ricerca non è semplicemente la raccolta dei dati

Traduzione: P. Berardi

A la fi, una darrera paraula : publicacións científiques i contribucions

És l'hora que tothom tingui aviat una discussió seriosa sobre el procés de les publicacións científiques.
La base de dades ARAS s'està convertint en un recurs conegut i utilitzat com a font de la comunitat astronòmica més àmplia i com la base de dades espectroscòpica de estrelles Be i de l'arxiu fotomètric de l'AAVSO, demostrant un compromís amb el avanç de l'astrofísica. A causa de la inaccessibilitat als telescopis degut a les limitacions actuals a les grans instal·lacions (p. ex., ESO) i també tancaments o limitacions d'accés per a telescopis intermedis (dos a quatre metres), canviant els objectius de investigacions i recursos, treballar en allò que ara es veu com a objectius brillants (De 14a magnitud o més brillant) , és considerat com de baixa prioritat.

Els espectrògrafs solen ocupar el seient del darrere davant d'altres instruments com els que produeixen imatges directes. I malgrat els intents fets per figures bíbliques per aturar el cicle diürn, encara hi ha com a màxim, només 365 nits a l'any i molt sovint moltes menys. Allà és el paper del petit telescopi i a on entra l'observador. Vostè, armat amb un espectrògraf i amb mètodes d'observació acurats, ajuda a omplir aquest buit essencial.

Però, siguem clars: la investigació no és simplement l'acumulació de dades. Això és el que fan els col·leccionistes. Però mirar aquestes dades, fer preguntes o intentar-ho, provar d'unir una comprensió. Fins i tot si l'objectiu és obtenir qualitativa (aplicació espectral global, una pèrdua, per exemple) o bé resultats quantitatius (com fluxos i perfils de línia), el procés no s'atura aquí. Tenir les dades disponibles públicament és un fantàstic benefici, però si només s'acumulen, les dades són com els llibres apilats en una biblioteca o bé enterrats junt amb el propietari. Totes les nostres discussions d'aquests anys han estat dirigides a aquesta part essencial de la nostra activitat. No és que tu hagis de "fer alguna cosa profunda "amb això tu tot sol. Però en qualsevol recerca a on se utilitzen les vostres contribucions i per a la qual vosaltres potser també hauríeu d'interessar-vos per el seu anàlisi com a coautors. Almenys en la mesura que us asseguressiu de tenir coneixement de com queden les vostres dades, com s'ussen i per què. Això és el que fan uns companys per cadascun dels altres. No és que un enviï un espectre o un altre envia fotometria i d'alguna manera, un "mestre de cuina" fa el sopar i el distribueix perquè els "professionals" el puguin compartir. En altres paraules, els resultats s'incorporen a un manuscrit enviat a publicació. Pot ser un ATel,o bé, un article per a Nature, A&A, ApJ o a qualsevol altra revista. La destinació no és l'objectiu, la implicació sí.
Cada revista té un codi ètic. Això no és només guanyar una " decoració de l'aparador" per quedar bé. Aquests són els procediments estàndard per a avaluar una contribució (per part de la revista) i per assegurar la veracitat de les dades de l'autor del "vaixell". Per ser més concret, utilitzeu A&A com a exemple, però això manté, com en totes les revistes d'astrofísica que, al enviar un treball per a la seva posible publicació, es demana a l'autor un comunicat a on reafirmi que totes els autors ha llegit i aprovat el document.

Per a col·lectius enormes això pot ser només implícit però fins i tot en els més grans hi ha revisions internes, procediments en què participen tots els coautors. Això vol dir que els col·laboradors no només llancen un tros a l'olla, també saben com s'ha remenat. Això no és una cosa prioritària: això té a veure amb l'honestedat del resultat de la publicació. L'obertura està assegurada si tothom que ha fet l'esforç està informat i dóna el seu consentiment com que està informat de la contingut del document. Potser podeu creure que això és excessiu, i que no és important. O que tu no tents el nivell necessari per entendre tot el què hi ha al paper. Si és així, hi ha alguna cosa que no funcion en el paper. Vostè que ha proporcionat dades també tindría de elaborar-les, no només jugant prement els botons però avaluant intel·ligentment la seva qualitat. Així hauríeu de fer-ho, si es fan sevir les meves dades també vull saber com s'utilitzen.

Us asseguro que això no és excessiu. Com a editor de revista, (ara per a A&A com ja sabeu i en una vida anterior per ApJ) He vist casos d'autors acumulant papers i cites de papers que ni tan sols ells coneixien que si realment han existit. En alguns casos, fins i tot ha passat que el treball que un autor ens va enviar, el vàrem revisar i publicar el abans un dels autors de la llista sapigués que el treball existis, per la qual cosa, llastimosament, ja era massa tard per corregir el treball. No és ètic possar el nom algú en un paper sense el seu consentiment, és poc ètic enviar un article sense que l'autor coneixi el seu contingut i és poc ètic respondre a les crítiques dels àrbitres sense que es discuteixin entre ells els autors. I per "poc ètic" vull dir que no es pot permetre. El contingut d'un document no és quelcom acordat a la vista invisible. Si us hi inclouen, hauríeu de demanar veure el document abans de presentar-lo.

Però, siguem clars: la investigació no és simplement l'acumulació de dades

Traduït al català per Joan Guarro

New Insights into Classical Novae

Chomiuk, Laura; Metzger, Brian D.; Shen, Ken J.

We survey our understanding of classical novae: non-terminal, thermonuclear eruptions on the surfaces of white dwarfs in binary systems. The recent and unexpected discovery of GeV gamma-rays from Galactic novae has highlighted the complexity of novae and their value as laboratories for studying shocks and particle acceleration. We review half a century of nova literature through this new lens, and conclude: --The basics of the thermonuclear runaway theory of novae are confirmed by observations. The white dwarf sustains surface nuclear burning for some time after runaway, and until recently, it was commonly believed that radiation from this nuclear burning solely determines the nova's bolometric luminosity. --The processes by which novae eject material from the binary system remain poorly understood. Mass loss from novae is complex (sometimes fluctuating in rate, velocity, and morphology) and often prolonged in time over weeks, months, or years. --The complexity of the mass ejection leads to gamma-ray producing shocks internal to the nova ejecta. When gamma-rays are detected (around optical maximum), the shocks are deeply embedded and the surrounding gas is very dense. --Observations of correlated optical and gamma-ray light curves confirm that the shocks are radiative and contribute significantly to the bolometric luminosity of novae. Novae are therefore the closest and most common "interaction-powered" transients.

https://arxiv.org/pdf/2011.08751.pdf

A very comprehensive review of the novae events

The 2019 eruption of recurrent nova V3890 Sgr: observations by Swift, NICER, and SMARTS

Page, K. L.; Kuin, N. P. M.; Beardmore, A. P.; Walter, F. M.; Osborne, J. P.; Markwardt, C. B.; Ness, J. -U.; Orio, M.; Sokolovsky, K. V.

V3890 Sgr is a recurrent nova that has been seen in outburst three times so far, with the most recent eruption occurring on 2019 August 27 UT. This latest outburst was followed in detail by the Neil Gehrels Swift Observatory, from less than a day after the eruption until the nova entered the Sun observing constraint, with a small number of additional observations after the constraint ended. The X-ray light curve shows initial hard shock emission, followed by an early start of the supersoft source phase around day 8.5, with the soft emission ceasing by day 26. Together with the peak blackbody temperature of the supersoft spectrum being □100 eV, these timings suggest the white dwarf mass to be high, $\sim 1.3\, {\rm M_{\odot }}$. The UV photometric light curve decays monotonically, with the decay rate changing a number of times, approximately simultaneously with variations in the X-ray emission. The UV grism spectra show both line and continuum emission, with emission lines of N, C, Mg, and O being notable. These UV spectra are best dereddened using a Small Magellanic Cloud extinction law. Optical spectra from SMARTS show evidence of interaction between the nova ejecta and wind from the donor star, as well as the extended atmosphere of the red giant being flash-ionized by the supersoft X-ray photons. Data from NICER reveal a transient 83 s quasi-periodic oscillation, with a modulation amplitude of 5 per cent, adding to the sample of novae that show such short variabilities during their supersoft phase.

Monthly Notices of the Royal Astronomical Society, Volume 499, Issue 4, pp.4814-4831

https://arxiv.org/pdf/2010.01001.pdf

Early spectral evolution of classical novae: consistent evidence for multiple distinct outflows

Aydi, E.; & al.

The physical mechanism driving mass ejection during a nova eruption is still poorly understood. Possibilities include ejection in a single ballistic event, a common envelope interaction, a continuous wind, or some combination of these processes. Here we present a study of 12 Galactic novae, for which we have pre-maximum high-resolution spectroscopy. All 12 novae show the same spectral evolution. Before optical peak, they show a slow P Cygni component. After peak a fast component quickly arises, while the slow absorption remains superimposed on top of it, implying the presence of at least two physically distinct flows. For novae with high-cadence monitoring, a third, intermediate-velocity component is also observed. These observations are consistent with a scenario where the slow component is associated with the initial ejection of the accreted material and the fast component with a radiation-driven wind from the white dwarf. When these flows interact, the slow flow is swept up by the fast flow, producing the intermediate component. These colliding flows may produce the gamma-ray emission observed in some novae. Our spectra also show that the transient heavy element absorption lines seen in some novae have the same velocity structure and evolution as the other lines in the spectrum, implying an association with the nova ejecta rather than a pre-existing circumbinary reservoir of gas or material ablated from the secondary. While this basic scenario appears to qualitatively reproduce multi-wavelength observations of classical novae, substantial theoretical and observational work is still needed to untangle the rich diversity of nova properties.

We are glad that the publication uses spectra obtained by ARAS Observers (25 % of the spectra). However, we have to recall that ARAS Database is an open database and in order that we can maintain this status, we expect those who make use of spectra from the database to abide by the conditions of use, amoung them: the names of observers whose spectra are used in the analysis must be included in the Acknowledgements section of the publication.

ARAS Spectral Database: Submitting and using spectra

ARAS Spectral Database:
http://www.astrosurf.com/aras/Aras_DataBase/DataBase.htm

The ARAS Spectral Database is the result of the commitment of many observers who voluntarily make a substantial investment of their time and money to carefully acquire, process and share their spectra.

Submitting data to the database

While a basic validation check of submitted spectra is carried out prior to adding them to the database, it is primarily the responsibility of those submitting data to verify the quality of their spectra.

Detailed instructions on how to process and submit spectra to the database are given here:
Link to instructions (*in construction*)

Conditions for use of the data are described below. By submitting data to the database, observers acknowledge and accept these conditions of use. Ownership of data in the database remains with the observer.

Conditions for use of data from the database

This is an open database and in order that we can maintain this status, we expect those who make use of spectra from the database to abide by the following conditions:

1. The ARAS Spectral Database must be acknowledged in all publications which make use of spectra from the database by reference to the following publication:
   http://articles.adsabs.harvard.edu/pdf/2019CoSka..49..217

2. Reference to the database should use the following link:
   http://www.astrosurf.com/aras/Aras_DataBase/DataBase.htm

3. The names of observers whose spectra are used in the analysis must be included in the Acknowledgements section of the publication.

4. If the publication includes, or is linked to, a table of observations, it is strongly encouraged that this should include the names of the observers.

5. It is the responsibility of the lead author to consider including observers as co-authors if they believe their observations have made a substantial contribution to the analysis.

6. Authors are strongly recommended to inform the ARAS Team via the following email address prior to any publication using spectra from the database to confirm the Acknowledgement is compliant with the conditions of use: francoismathieu.teyssier@gmail.com

François Teyssier (FR), David Boyd (UK), Forrest Sims (US)

Eruptive stars spectroscopy
Cataclysmics, Symbiotics, Novae

Spectroscopic monitoring of eruptive stars (e.g. symbiotic binaries, classical novae) by amateurs around the world, in both the northern and southern hemispheres, is a fundamental activity of the ARAS (Astronomical Ring for Amateur Spectroscopy) initiative. The group of volunteers demonstrates what can be accomplished with a network of independent, very small telescopes (from 20 to 60 cm), furnished with spectrographs of different resolution, from 500 to 15000, and covering the range from 3600 to 9000 Å. The observing program concentrates on bright symbiotic stars (67, to date) and novae (41, to date). The main features of the ARAS activity are rapid response to alerts, long term monitoring and high cadence. A part of the program involves collaborations based on requests from professional teams (e.g. CH Cyg, AG Dra, R Aqr, SU Lyn, T CrB) for long term monitoring or specific events.

Submit your spectra:

Please :
- respect the procedure
- check your spectra BEFORE sending them

Resolution should be at least R = 500

1. reduce your data in accordance with standard procédures (notably offset, dark, flat, correction of atmospheric and instrumental response)
2. the header must be compliant with BeSS file format
3. name your file as: _novadel2013_yyyymmdd_hhh_Observer
   Example: _chcyg_20130802_886_toto.fit
4. send you spectra to francoismathieu dot teyssier (at) gmail com (dot) com for inclusion in the ARAS database and a copy to arasdatabase@gmail.com for double check by David Boyd and Forrest Sims.

Conditions for use of data in publications

This is an open database and in order that we can maintain this status, we expect those who make use of spectra from the database to abide by the following conditions:

1. The ARAS Spectral Database must be acknowledged in all publications which make use of spectra from the database by reference to the following publication: http://articles.adsabs.harvard.edu/pdf/2019CoSka..49..217

2. Reference to the database should use the following link: http://www.astrosurf.com/aras/Aras_DataBase/DataBase.htm

3. It is the responsibility of the lead author to consider including observers as co-authors if they believe their observations have made a substantial contribution to the analysis.

4. Otherwise the names of observers whose spectra are used in the analysis must be included in the Acknowledgements section of the publication.

5. If the publication includes, or is linked to, a table of observations, it is strongly encouraged that this should include the names of the observers.

6. Authors are strongly recommended to inform the ARAS Team via the following email address prior to any publication using spectra from the database to confirm the Acknowledgement is compliant with the conditions of use: francoismathieu.teyssier@gmail.com

The Letter is prepared by François Teyssier (FR), David Boyd (UK), Forrest Sims (US)

Download previous issues of the Eruptive Stars Information Letter:
http://www.astrosurf.com/aras/novae/InformationLetter/InformationLetter.html

The letter in the SAO/NASA Astrophysics Data System
https://ui.adsabs.harvard.edu/abs/2019ESIL...43...19T/abstract

ARAS database:
http://www.astrosurf.com/aras/Aras_DataBase/DataBase_EruptiveStars.htm

Your observations, taken with higher cadence than usually followed in the literature will be key to understanding this in a broad range of systems.

S. Shore, 2015

Your dedication, interest, and persistence are continuing gifts to the community, to future generations who may eventually be able to understand these phenomena because of the precision and care of your contributions. You may think it's just one spectrum, or one datum, but without the history any inferences are tentative at best and misleading at worst.

S. Shore, 2020

... the presented results showed also the importance of professional/amateur collaborations. ARAS Group is a perfect example that such collaboration can be very successful and can bring important results. Thanks to amateur photometric and spectroscopic data, we are now able to monitor the evolution of symbiotic systems on timescales which were not previously available.

R. Gàlis& al., 2019

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.

K. Ilkwiecz & al., 2015

High cadence of both photometric and spectroscopic observations as provided by AAVSO and ARAS databases allows a detailed mapping of usually fast events of outbursts

A. Skopal, 2019