Eruptive stars spectroscopy

Cataclysmics, Symbiotics, Nova Supernovae

Aras Eruptive Stars
Information Letter n° 21 #2015-09 20-12-2015

Observations of November 2015

NEWS

4th nova in Sagitarius for 2015 PNV J18225925-1914148 discovered independantly by Fujikawa, Nishimura, Yama-moto: 2015 October 31

First spectrum shows a He/N spectrum

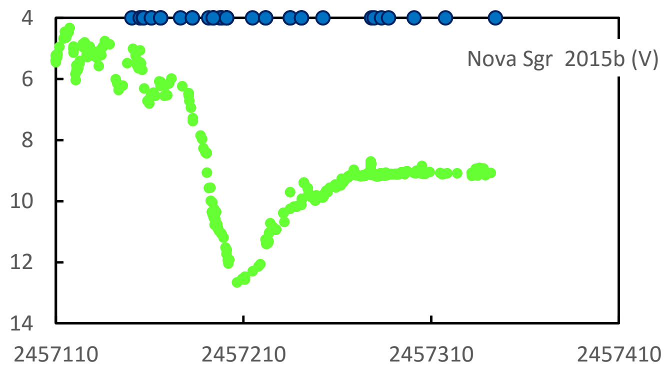
Contents

Authors : F. Teyssier, S Shore, P. Somogyi, D. Boyd, T. Lester, K. Graham, T. Bohlsen, J. Guarro Flo, P. Berradi, J. Montier, F. Boubault, A. J. Wilson, O. Garde, C Buil

N
O
V
A
E

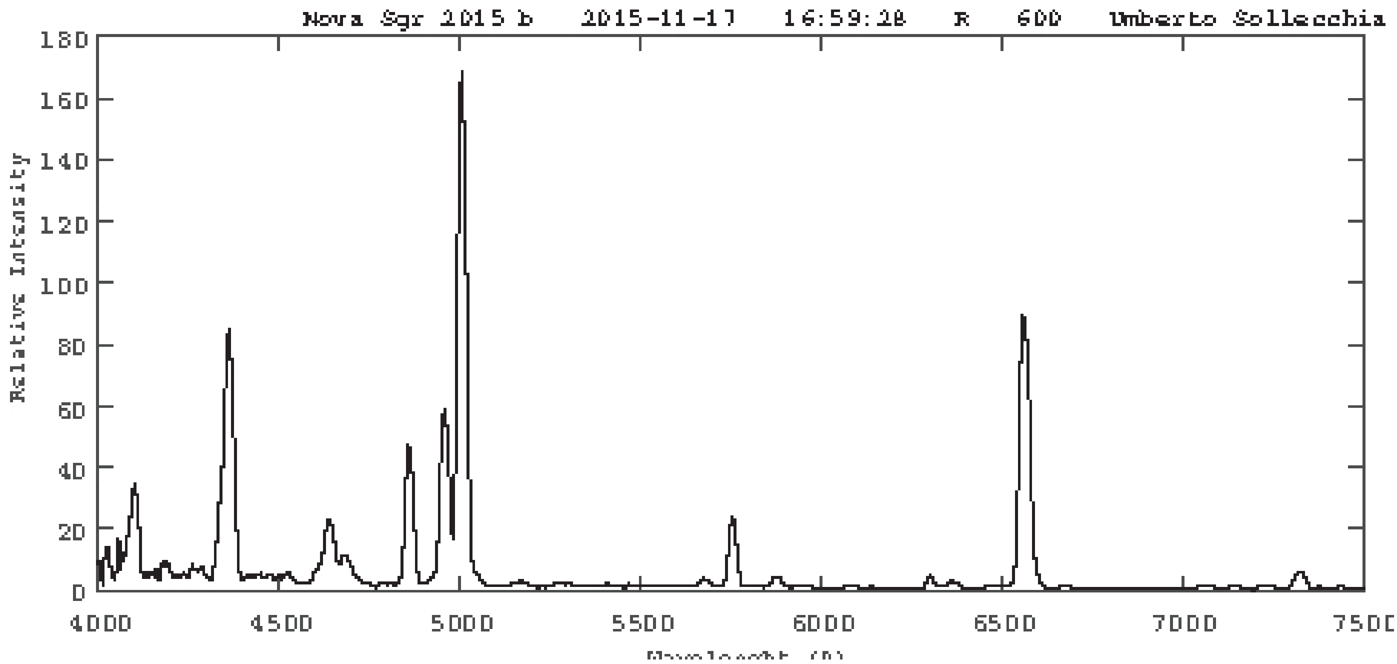
Nova Sgr 2015 b = V5668 Sgr

Coordinates (2000.0)	
R.A.	18 36 56.8
Dec	-28 55 39.8



AAVSO V band - ARAS Spectra (blue dots)

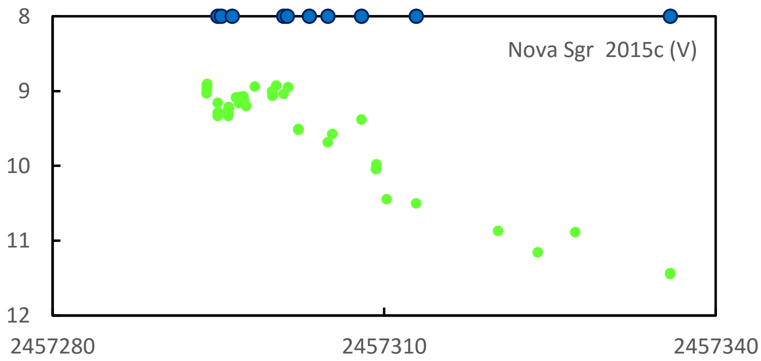
A new spectrum during nebular phase obtained by Umberto Sollecchia using his new ALPY 600



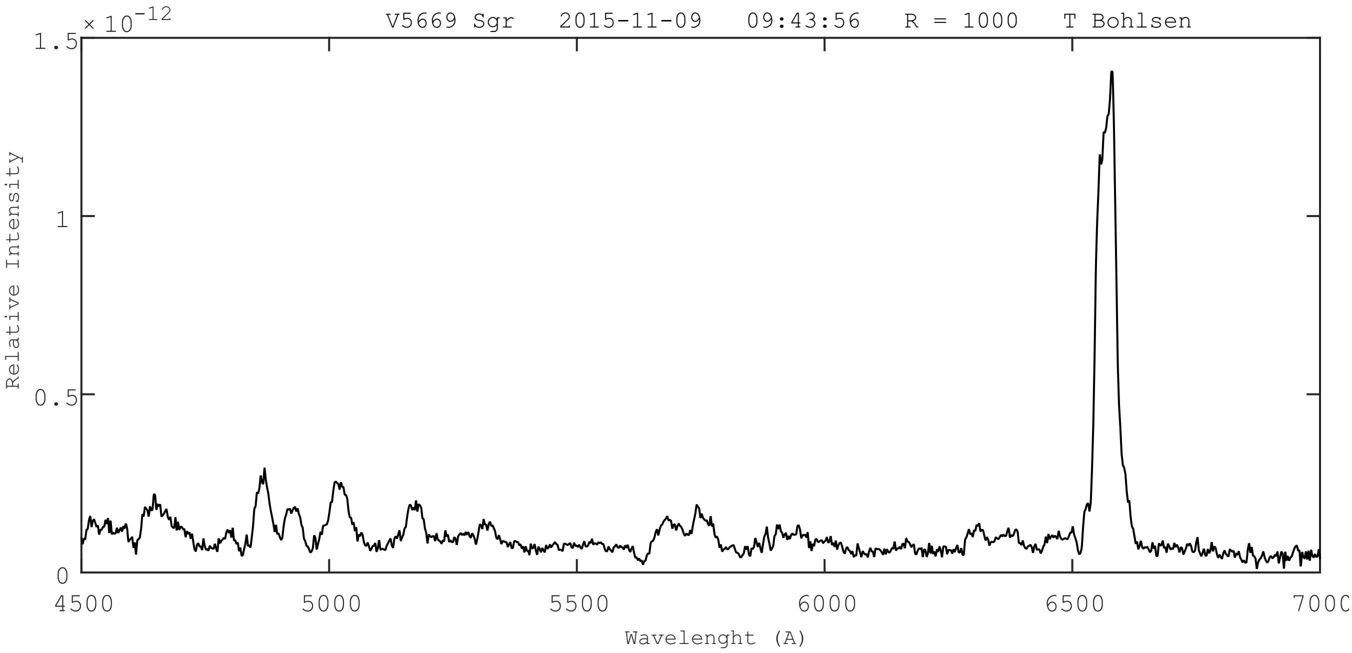
Nova Sgr 2015 c = V5669 Sgr

Coordinates (2000.0)	
R.A.	18 36 56.8
Dec	-28 55 39.8

Flux calibtrated spectrum obtained by Terry Bohlsen using a LISA spectrographe



AAVSO V band - ARAS Spectra (blue dots)

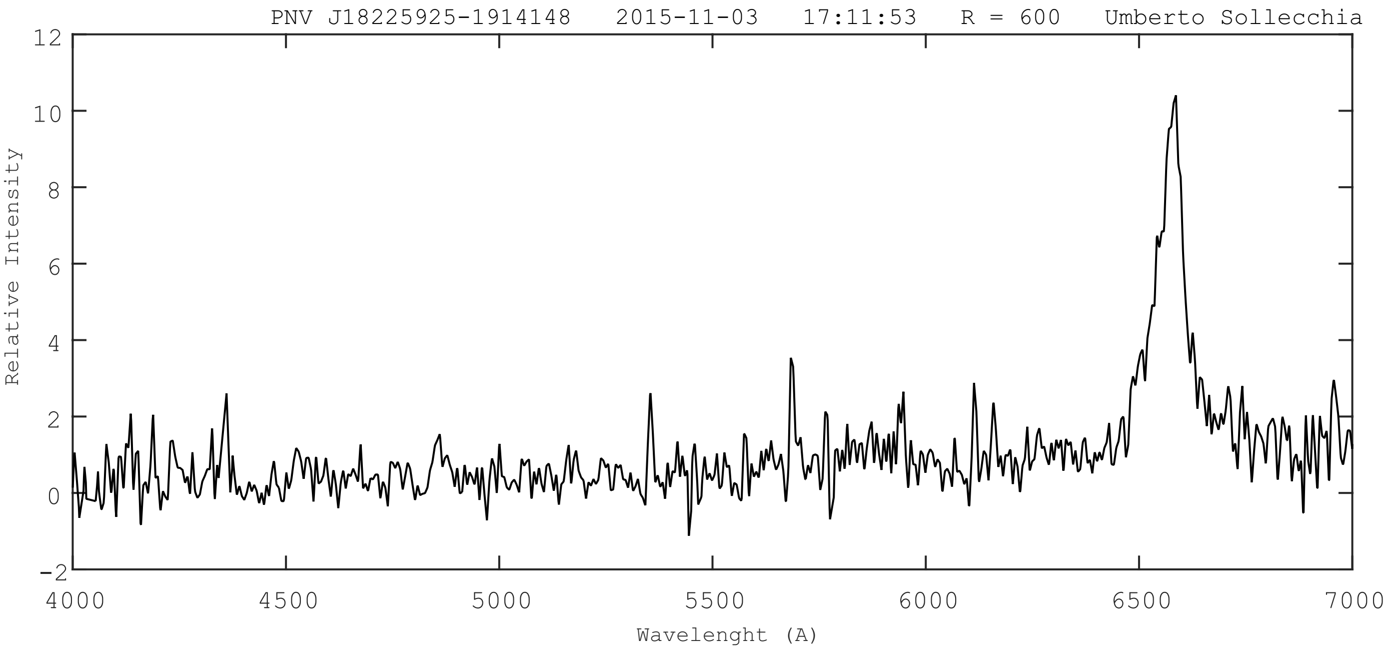


NOVAE

Nova Sgr 2015 d

Coordinates (2000.0)	
R.A.	18 22 59.35
Dec	-19 14 11.8

Umberto Sollecchia obtained two spectra of the fourth nova in Sagittarius for 2015 on 02 and 03-11-2015 See CBAT#4163



AAVSO Alert Notice : https://www.aavso.org/aavso-alert-notice-534
FUJII's Specrograms : http://otobs.org/FBO/etc/pnv_j18225925-1914148.htm
CBAT4163 : http://www.cbat.eps.harvard.edu/iau/cbet/004100/CBET004163.txt

CBAT 4163

U. Munari, Istituto Nazionale di Astrofisica, Padova Astronomical Observatory; and U. Sollecchia, Asiago Novae and Symbiotic Stars (ANS) collaboration, report that on Nov 2.758 UT they obtained a long-exposure, low-resolution spectrogram of PNV J18225925-1914148 with an Alpy 600 spectrograph mounted on a 20-cm Celestron C8 telescope at L'Aquila, Italy. The object shows a feable red continuum superimposed with a very broad H-alpha feature in emission, with a nearly Gaussian profile characterized by FWHM = 5100 km/s, which suggests the transient to be a nova. Munari adds that he also obtained a low-resolution spectrogram (range 330-780 nm; 0.23 nm/pixel) of PNV 18225925-1914148 on Nov 3.718 with the Asiago 1.22-m telescope. The spectrum shows strong emission lines of hydrogen Balmer, He I (501.6-, 587.6, and 706.5-nm), and N II (465.1- and 568.0-nm), appearing on top of a highly reddened continuum; their FWHM is measured to be 4000 km/s, causing He I 667.8-nm to be overwhelmed by the H-alpha red wing. The object has the typical spectrum of a He/N nova.

Symbiotics in November

CH Cygni : remains at high state and flickersbetween 6.6 and 7.4 (V) but all the observed profiles of Balmer lines shows a classical shape with central absorption, and no absorptions in the blue edge of the line

AG Peg : declining during the secondary outburst. Raman OVI strenghtens, as [FeVII] but with a delay for the last one.

CI Cyg :luminosity increases in V band with fast evolution of the shapes of Balmer lines

LT Del :first spectrum of this yellow symbiotic (J. Guarro)

Observing : main targets

Ungoing campaign : CH Cygni for A Skopal (low resolution and H alpha profile at R > 10000

AG Peg during the decline of its secondary outburst
CI Cyg : evolution of Balmer lines

V694 Mon

SYMBIOTICS

Symbiotics in ARAS Data Base

#	Name	AD (2000)	DE (2000)	Nb. Of spectra	First spectrum	Last spectrum	Days Since Last
1	EG And	0 44 37.1	40 40 45.7	31	12/08/2010	07/12/2015	13
2	AX Per	1 36 22.7	54 15 2.5	63	04/10/2011	28/11/2015	22
3	o Ceti	2 19 20.7	-2 58 39.5				
4	BD Cam	3 42 9.3	63 13 0.5	9	08/11/2011	28/11/2015	22
5	UV Aur	5 21 48.8	32 30 43.1	33	24/02/2011	29/11/2015	21
6	V1261 Ori	5 22 18.6	-8 39 58				
7	StHA 55	5 46 42	6 43 48				
8	ZZ CMi	7 24 13.9	8 53 51.7	21	29/09/2011	24/10/2015	57
9	BX Mon	7 25 24	-3 36 0 22		04/04/2011	31/10/2015	50
10	V694 Mon	7 25 51.2	-7 44 8 65		03/03/2011	04/10/2015	77
11	NQ Gem	7 31 54.5	24 30 12.5	26	01/04/2013	01/11/2015	49
12	GH Gem	7 4 4.9	12 2 12				
13	CQ Dra	12 30 06	69 12 04	1	11/06/2015	11/06/2015	192
14	TX CVn	12 44 42	36 45 50.6	21	10/04/2011	11/07/2015	162
15	IV Vir	14 16 34.3	-21 45 50	3	28/02/2015	09/05/2015	225
16	T CrB	15 59 30.1	25 55 12.6	61	01/04/2012	29/08/2015	113
17	AG Dra 1	6 1 40.5	66 48 9.5	59	03/04/2013	31/10/2015	50
18	V503 Her	17 36 46	23 18 18	1	05/06/2013	05/06/2013	928
19	RS Oph	17 50 13.2	-6 42 28.4	16	23/03/2011	16/09/2015	95
20	V934 Her	17 6 34.5	23 58 18.5	9	09/08/2013	20/06/2015	183
21	AS 270	18 05 33.7	-20 20 38	2	01/08/2013	02/08/2013	870
22	AS 289	18 12 22	-11 40 13				
23	YY Her	18 14 34.3	20 59 20	17	25/05/2011	07/09/2015	104
24	FG Ser	18 15 6.2	0 18 57.6	3	26/06/2012	24/07/2014	514
25	StHa 149	18 18 55.9	27 26 12	3	05/08/2013	14/10/2015	67
26	V443 Her	18 22 8.4	23 27 20	20	18/05/2011	19/07/2015	154
27	FN Sgr	18 53 52.9	-18 59 42	4	10/08/2013	02/07/2014	536
28	V335 Vul	19 23 14.2	24 27 40.2				
29	BF Cyg	19 23 53.4	29 40 25.1	71	01/05/2011	07/11/2015	43
30	CH Cyg	19 24 33	50 14 29.1	316	21/04/2011	07/12/2015	13
31	V919 Sgr	19 3 46	-16 59 53.9	2	10/08/2013	10/08/2013	862
32	V1413 Aql	19 3 51.6	16 28 31.7	5	10/08/2013	26/09/2015	85
33	HM Sge	19 41 57.1	16 44 39.9	7	20/07/2013	11/11/2015	39
34	QW Sge	19 45 49.6	18 36 50				
35	CI Cyg	19 50 11.8	35 41 3.2	104	25/08/2010	30/11/2015	20
36	StHA 169	19 51 28.9	46 23 6				
37	V1016 Cyg	19 57 4.9	39 49 33.9	7	15/04/2015	01/11/2015	49
38	PU Vul	20 21 12	21 34 41.9	14	20/07/2013	23/11/2015	27
39	LT Del	20 35 57.3	20 11 34	1			
40	ER Del	20 42 46.4	8 40 56.4	3	02/09/2011	05/11/2014	410
41	V1329 Cyg	20 51 1.1	35 34 51.2	4	08/08/2015	26/09/2015	85
42	V407 Cyg	21 2 13	45 46 30				
43	StHA 190	21 41 44.8	2 43 54.4	14	31/08/2011	08/11/2015	42
44	AG Peg	21 51 1.9	12 37 29.4	148	06/12/2009	07/12/2015	13
45	V627 Cas	22 57 41.2	58 49 14.9	7	06/08/2013	22/11/2015	28
46	Z And	23 33 39.5	48 49 5.4	51	30/10/2010	29/11/2015	21

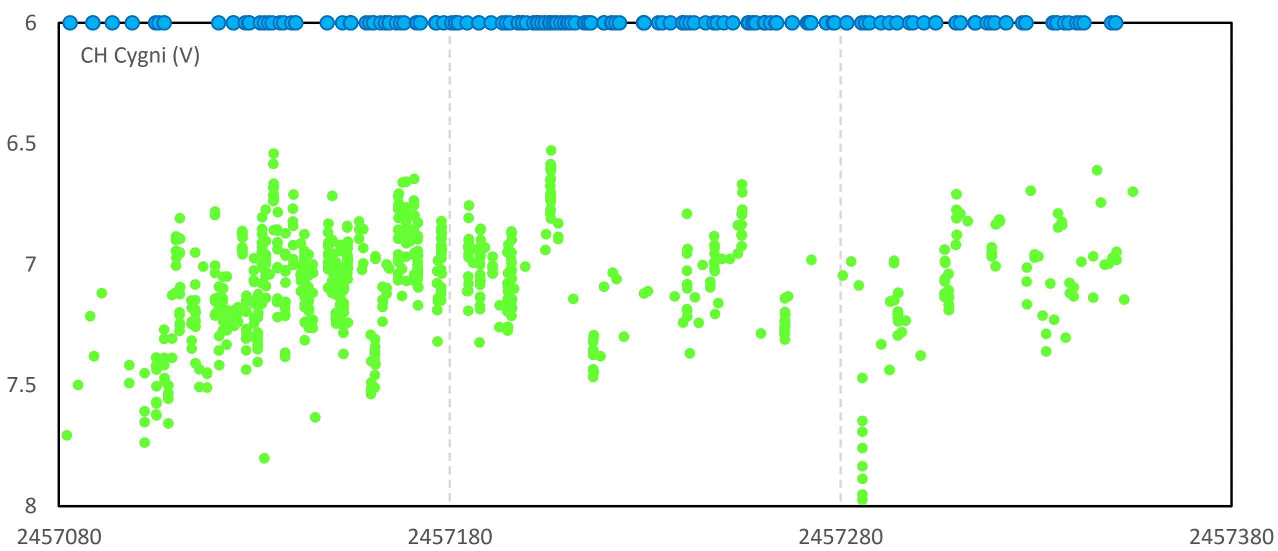
ARAS Data Base Symbiotics : http://www.astrosurf.com/aras/Aras_DataBase/Symbiotics.htm

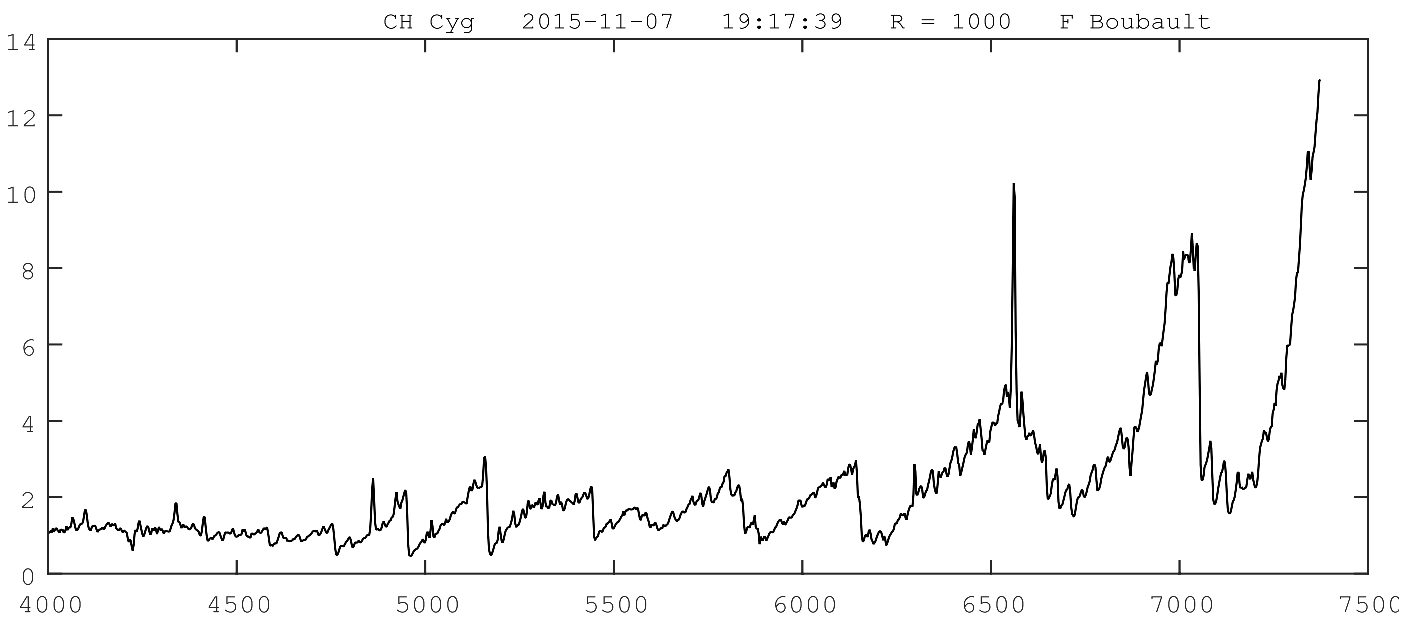
S Y M B I O T I C S

CH Cyg

Coordinates (2000.0)	
R.A.	18 22 59.35
Dec	-19 14 11.8

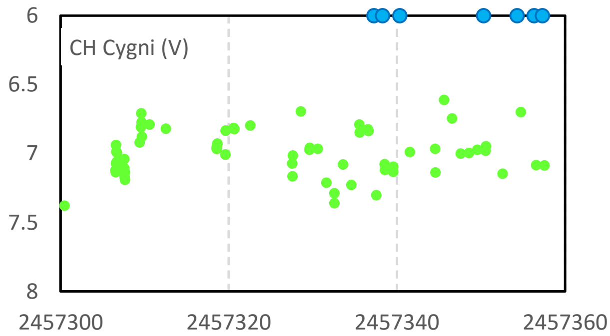
In November, CH Cygni remains in high state; flickering between 6.6 and 7.4 in V band.
Ungoing observations in ARAS database : the H alpha profile is classical on all the observations with only a deep central absorption. No phenomenon of multiple absorption in the blue edge of the line.

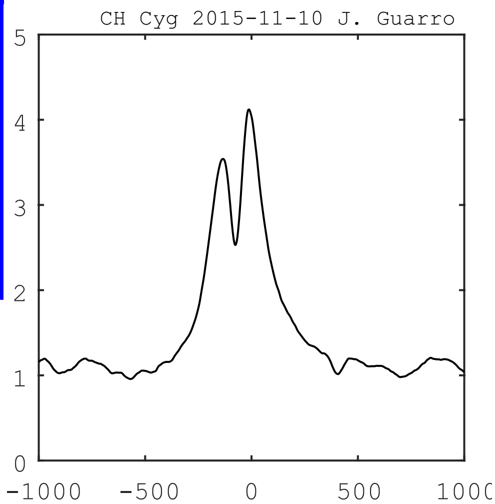




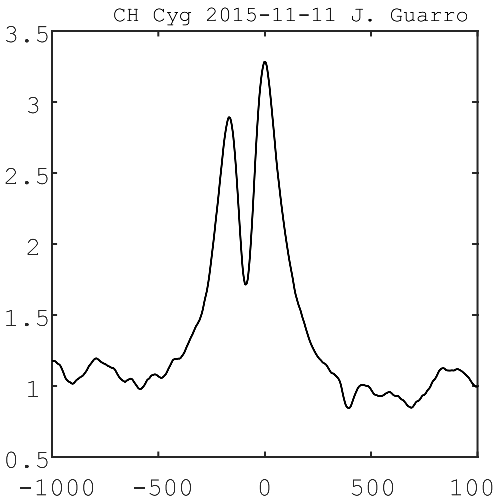
CH Cyg by Franck Boubault with a LISA at R = 1000

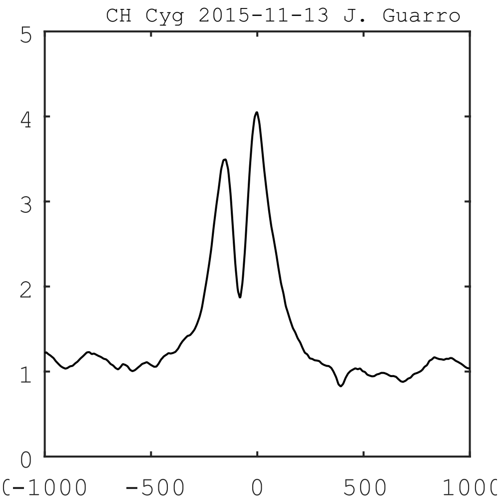
CH Cyg

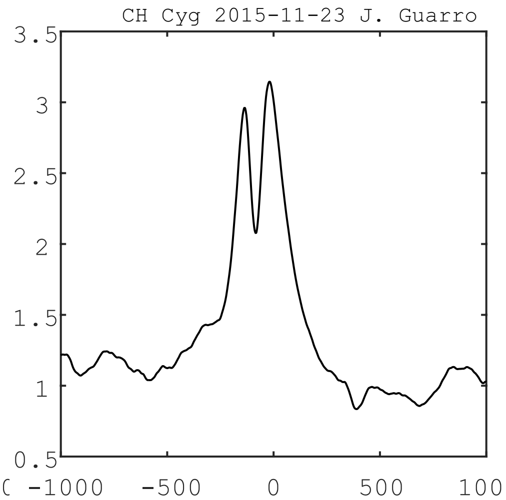


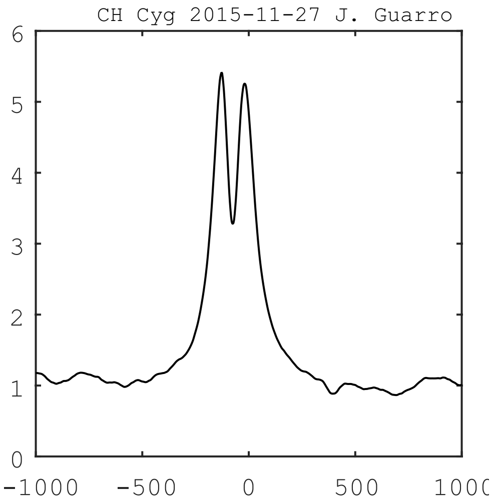


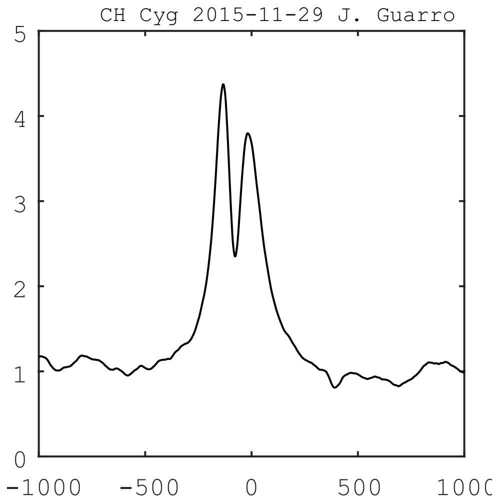
H alpha profile by Joan Guarro with a home built spectrograph (R = 6000)

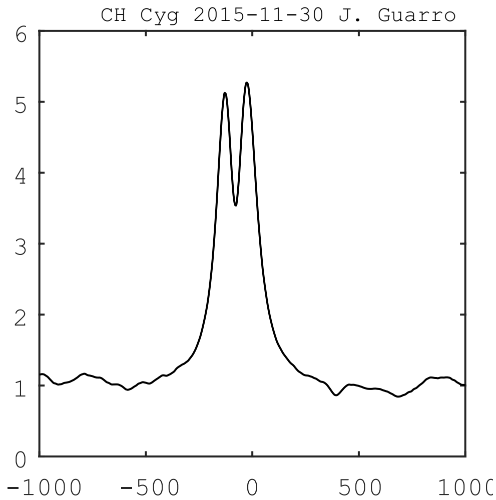






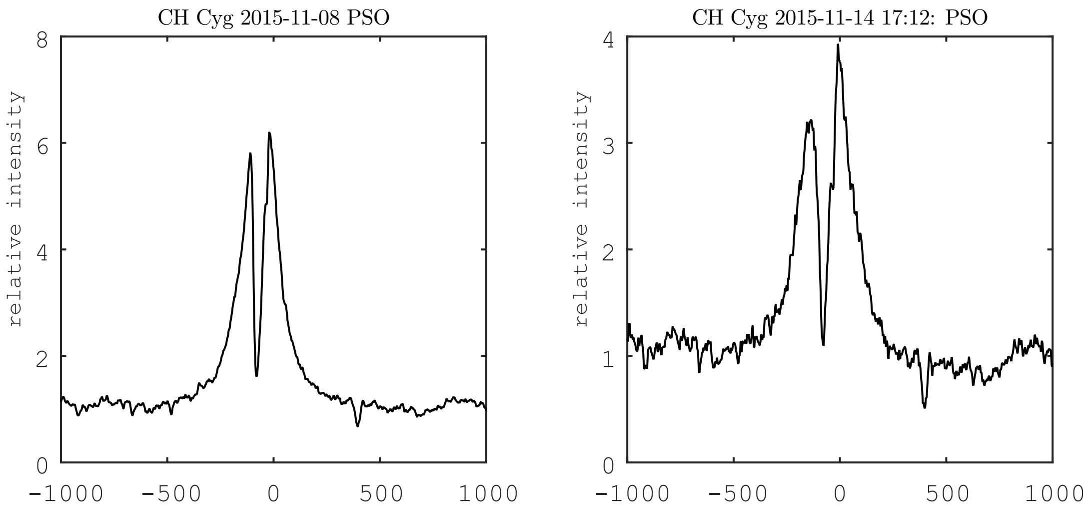




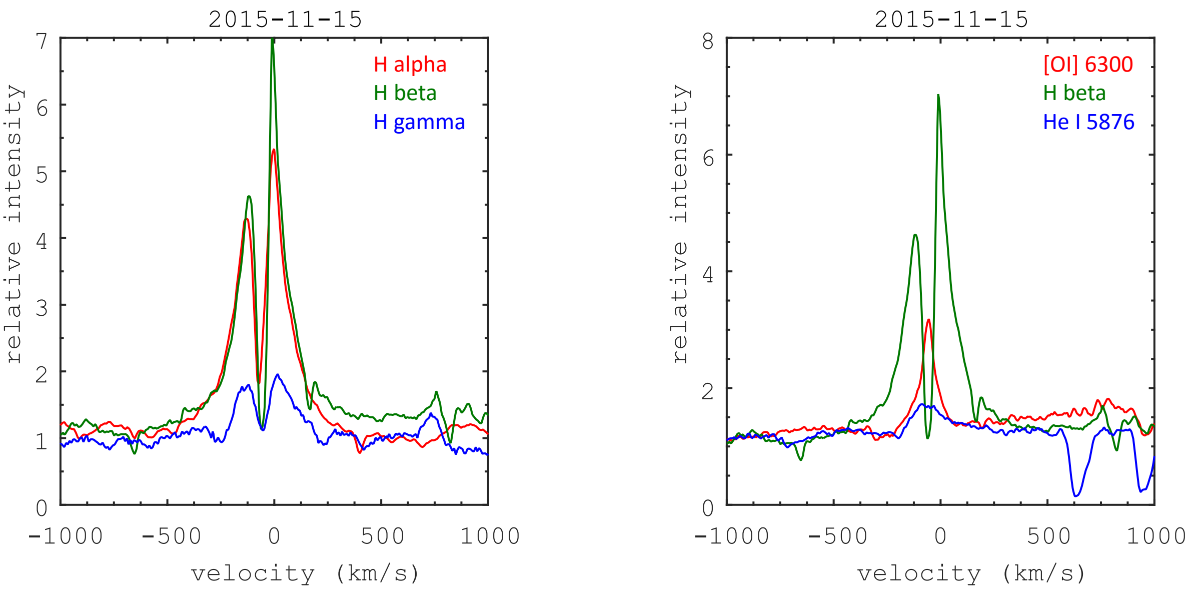


SYMBIOTICS

CH Cyg



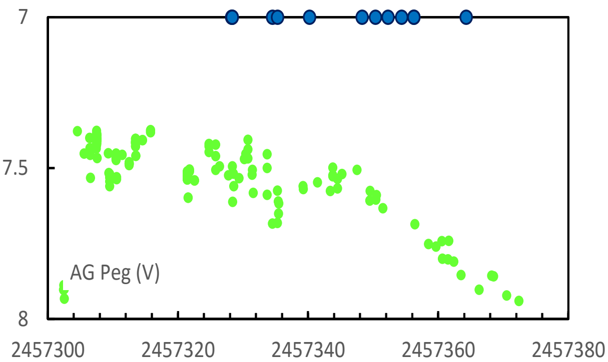
H alpha profile by Peter Somogyi (Lhires III - 2400 l/mm) R ~ 20000

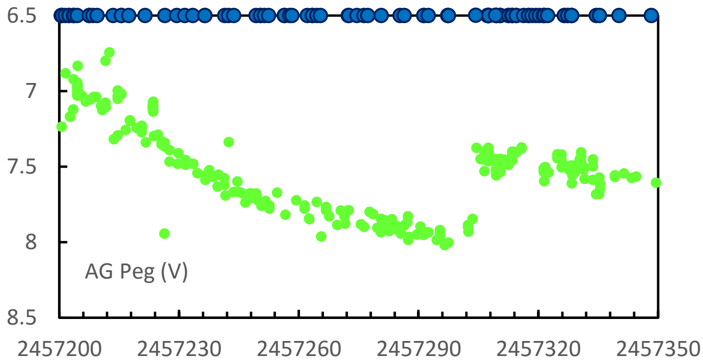


Line profiles - F. Teyssier - eshel = 11000

AG Peg

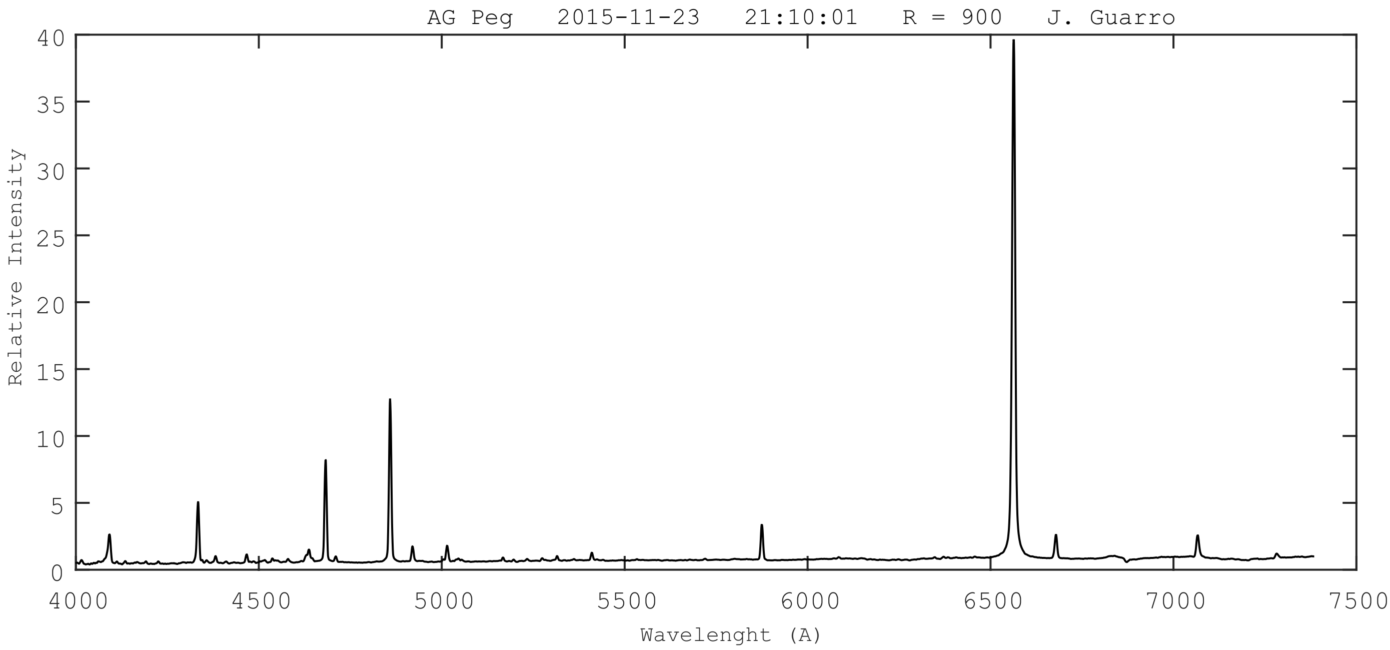
Coordinates (2000.0)	
R.A.	18 22 59.35
Dec	-19 14 11.8



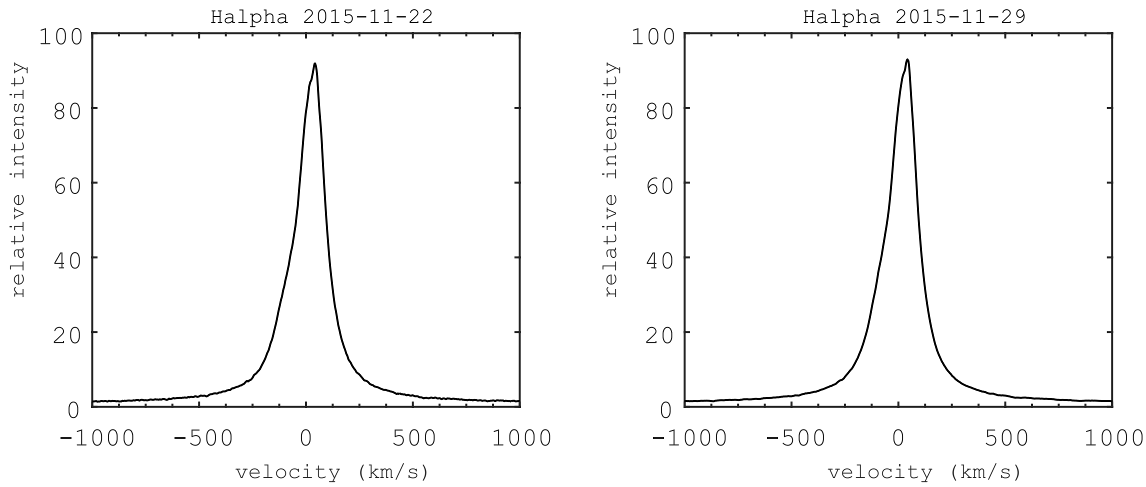


The two symbiotic outburts of AG Peg in 2015 (June and October)

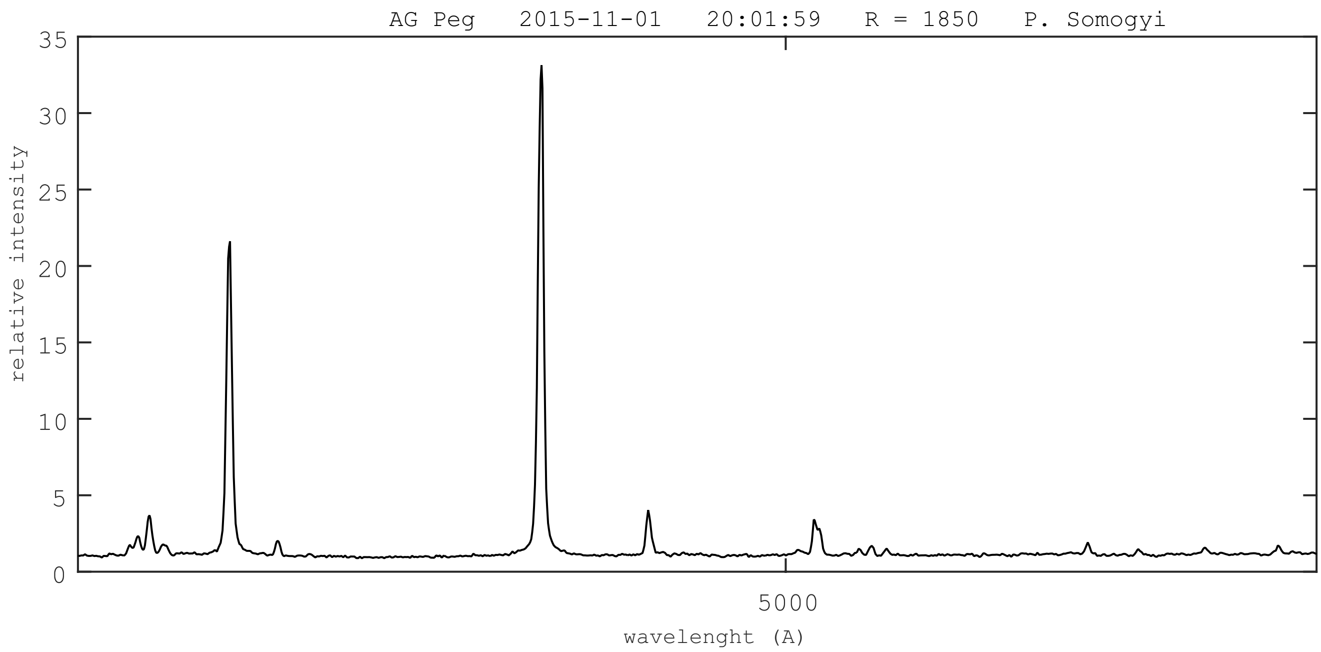
Left : observations of AG Peg in November by ARAS observers during the decline of the secondary outburst



AG Peg

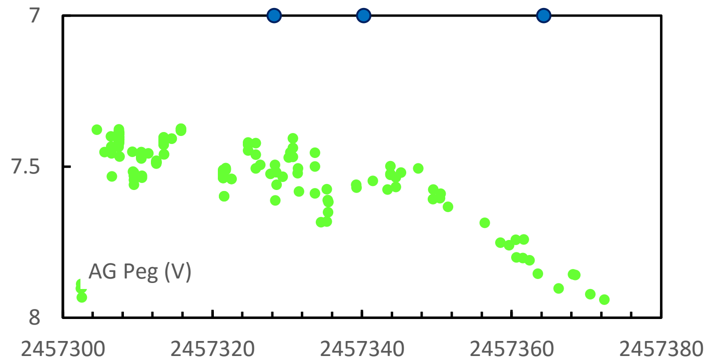


H profile Lhires III - 2400 l/mm - R = 20000 by A. J. Wilson and P. Berardi



H beta region by Peter Somogyi - Lhires III - 600 l/mm - R = 1800

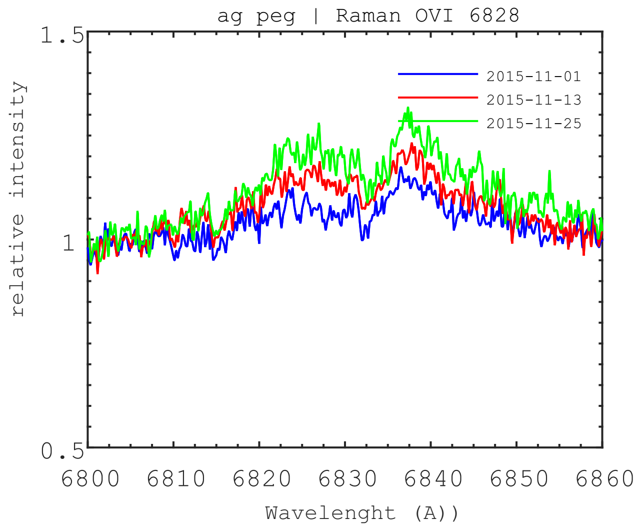
AG Peg

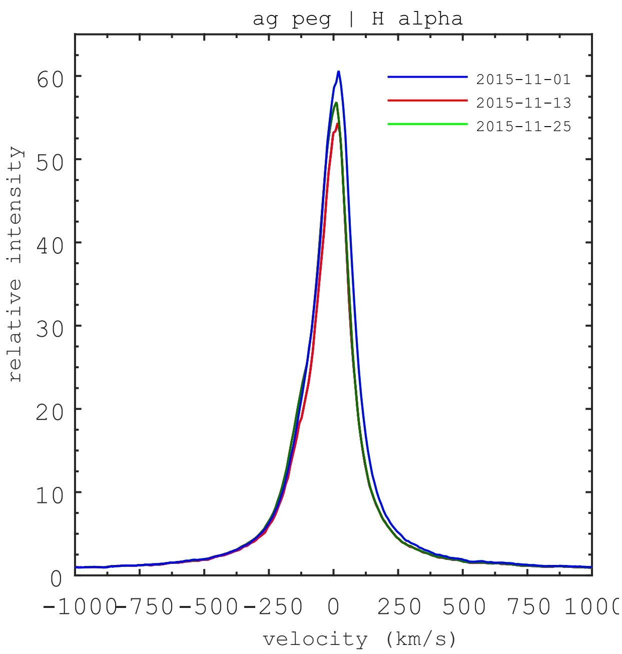


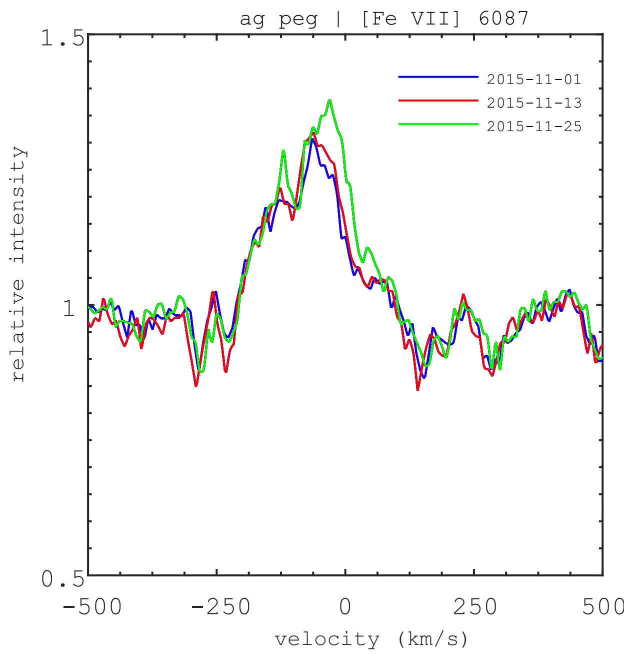
eshel spectra R = 11000
F. Teyssier

During the decline, Raman OVI (which had almost desappeared at the beginning of the outburst) strenghtens.

The same for [Fe VII], but with a different behavior : the relative intensity remains almost constant during the first part of the decline (1-11 and 13-13) and increases during the second part (25-11, at mag V ~ 7.9)



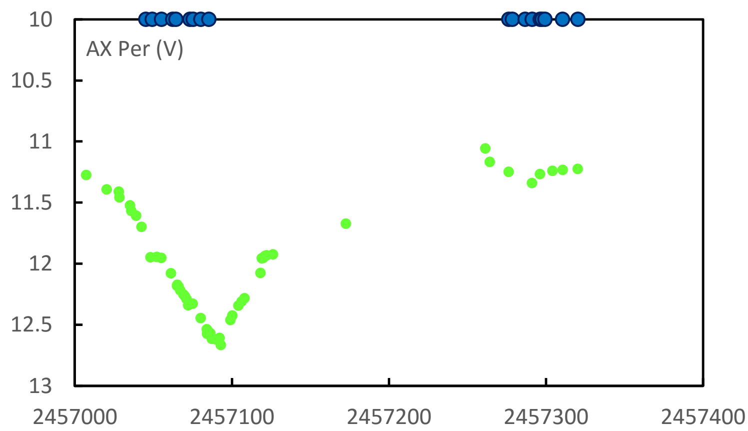


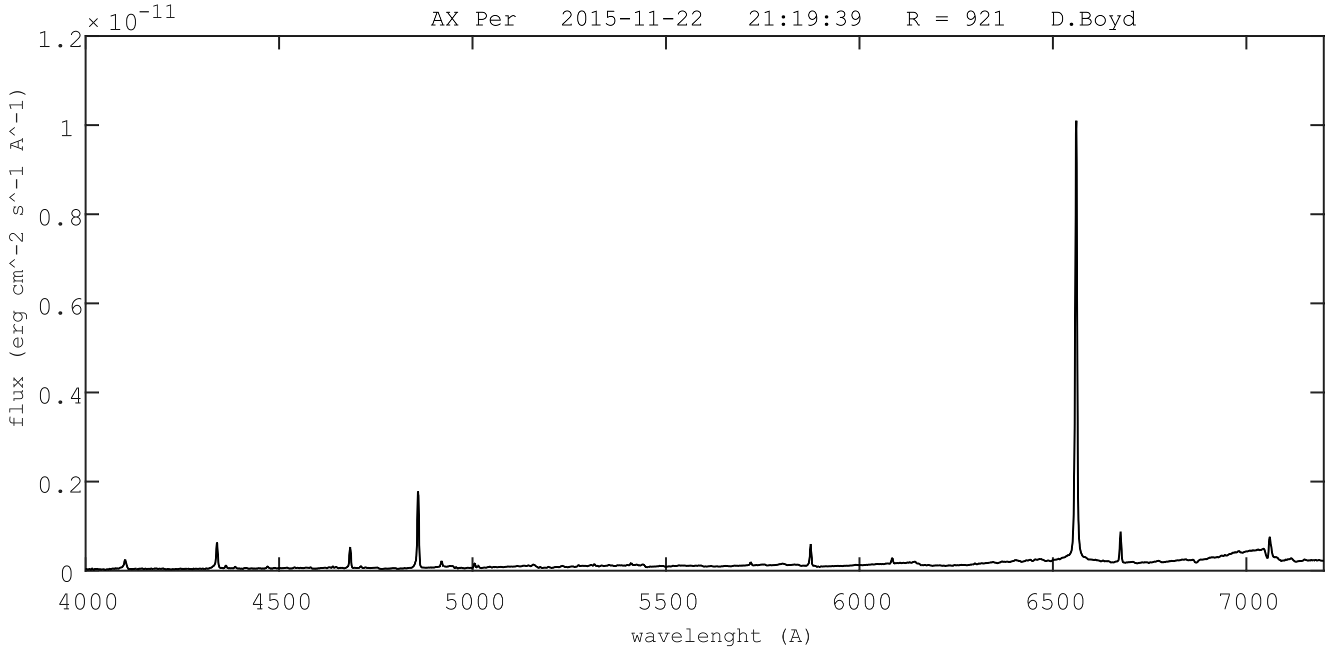


SYMBIOTICS

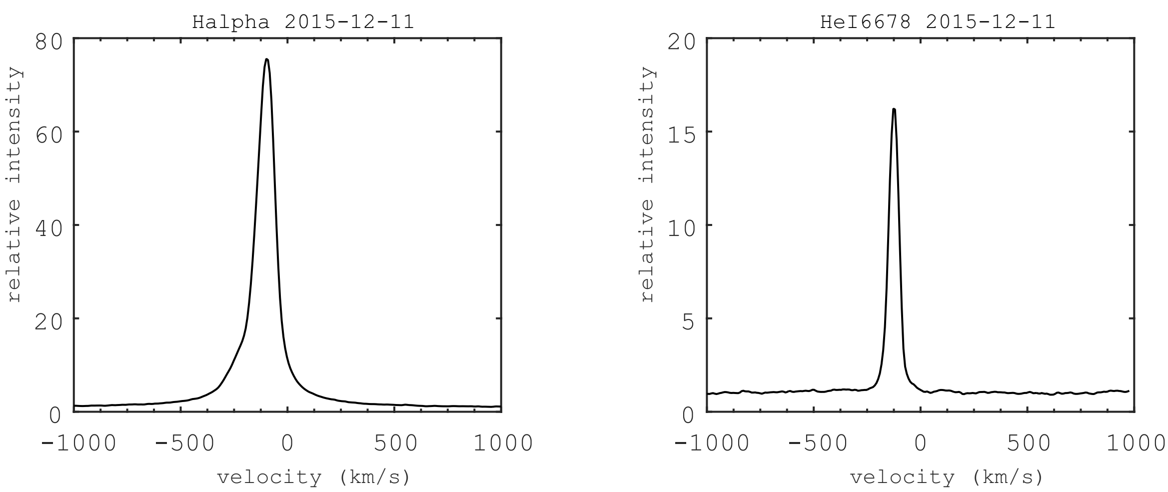
AX Per

Coordinates (2000.0)	
R.A.	1 36 22.7
Dec	54 15 2.5
Mag	11.3 (V)





Flux calibrated spectrum - D. Boyd LISA R = 1000

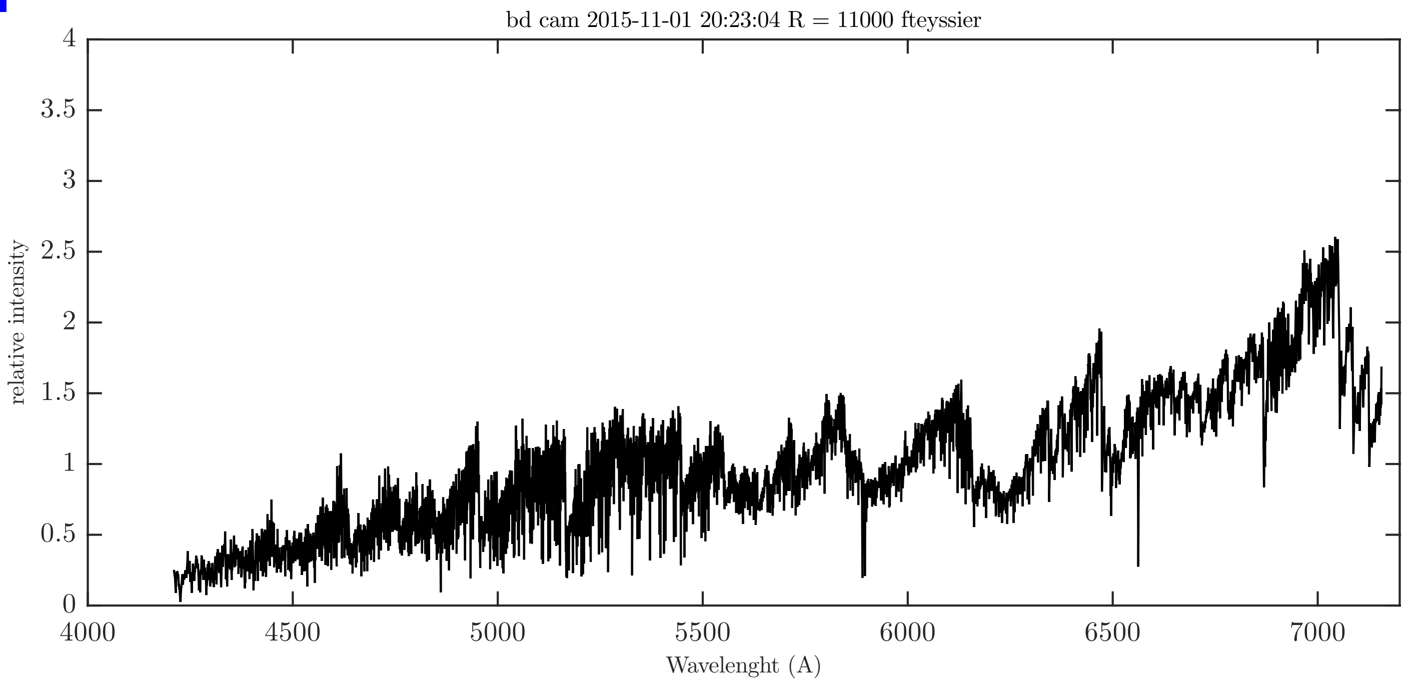


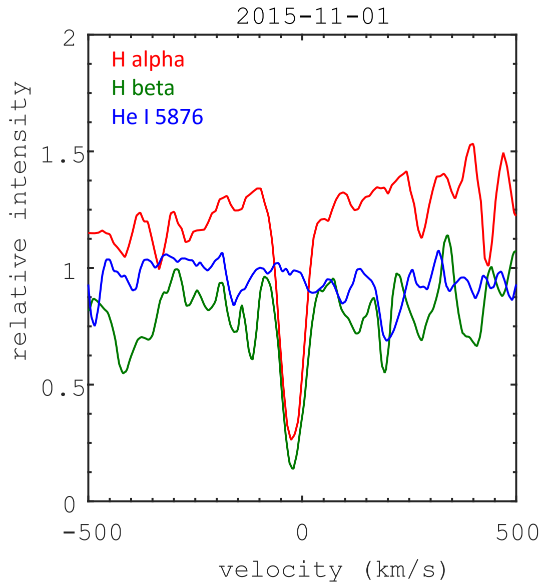
H alpha and He I 6678 - P. Berardi Lhires III 1200 l/mm R = 5500

S Y M B I O T I C S

BD Cam

Coordinates (2000.0)	
R.A.	3 42 9.3
Dec	63 13 0.5
Mag	~ 5

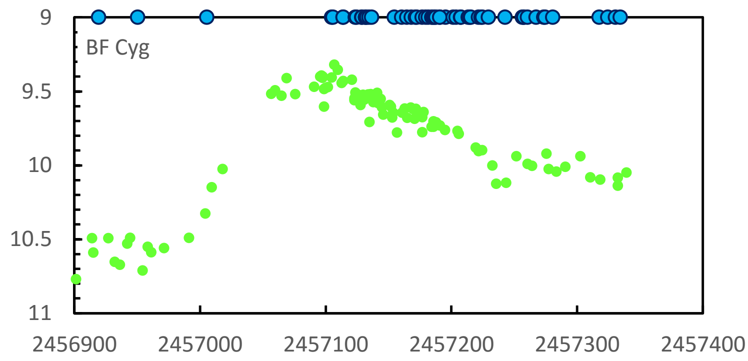


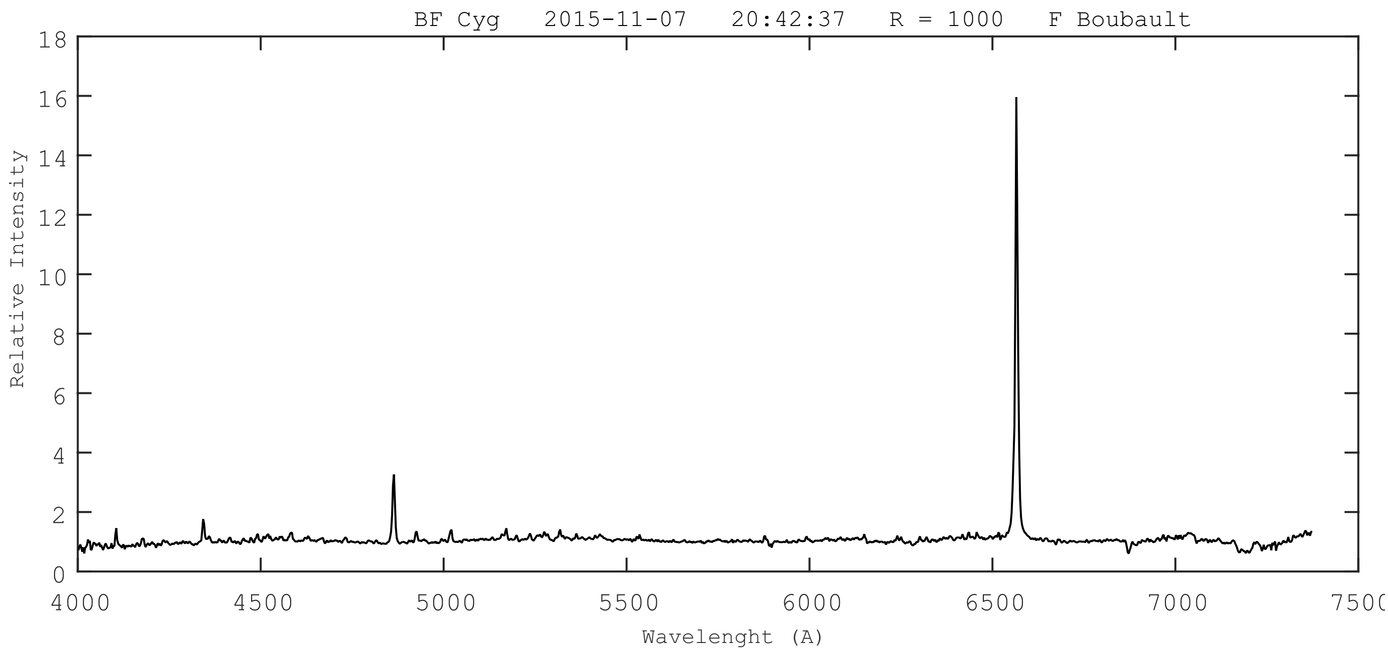


SYMBIOTICS

BF Cyg

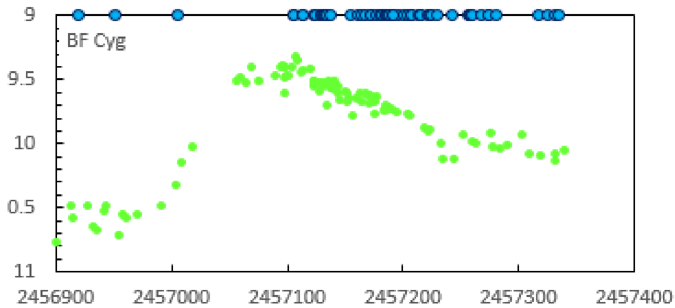
Coordinates (2000.0)	
R.A.	19 23 53.4
Dec	29 40 25.1
Mag	10.2 (V)

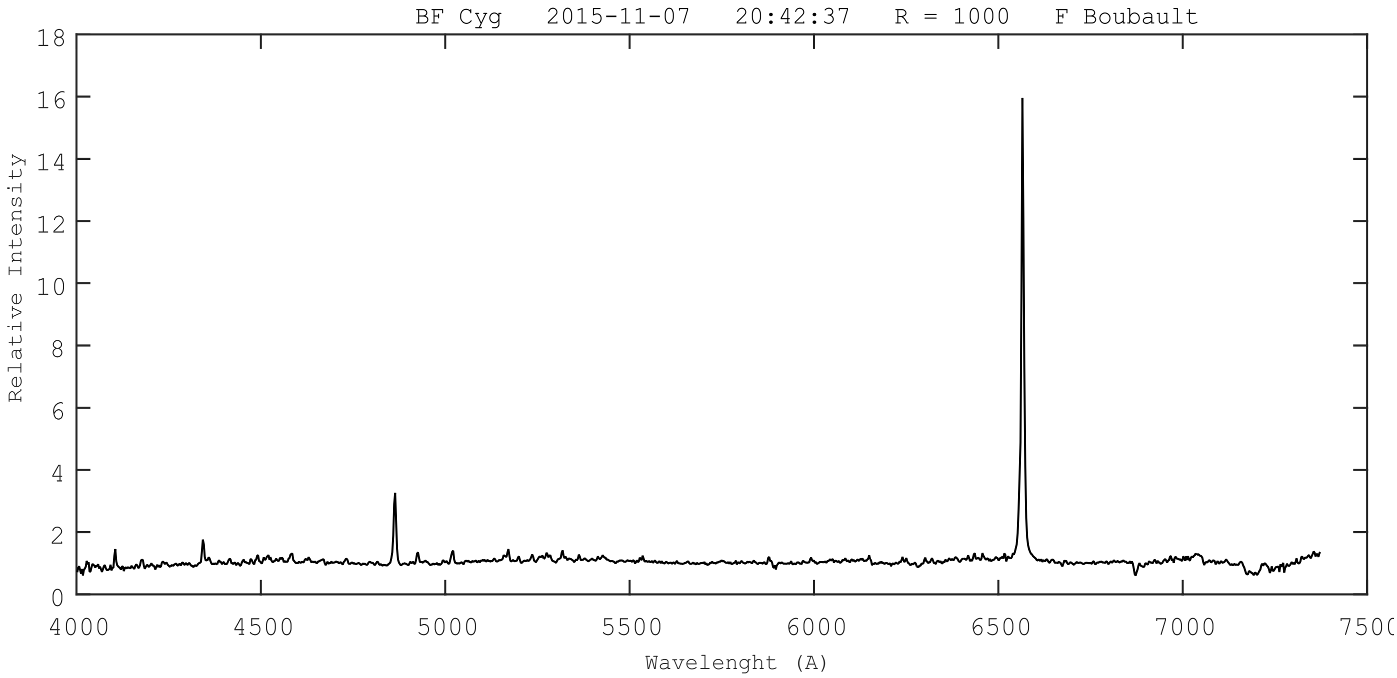


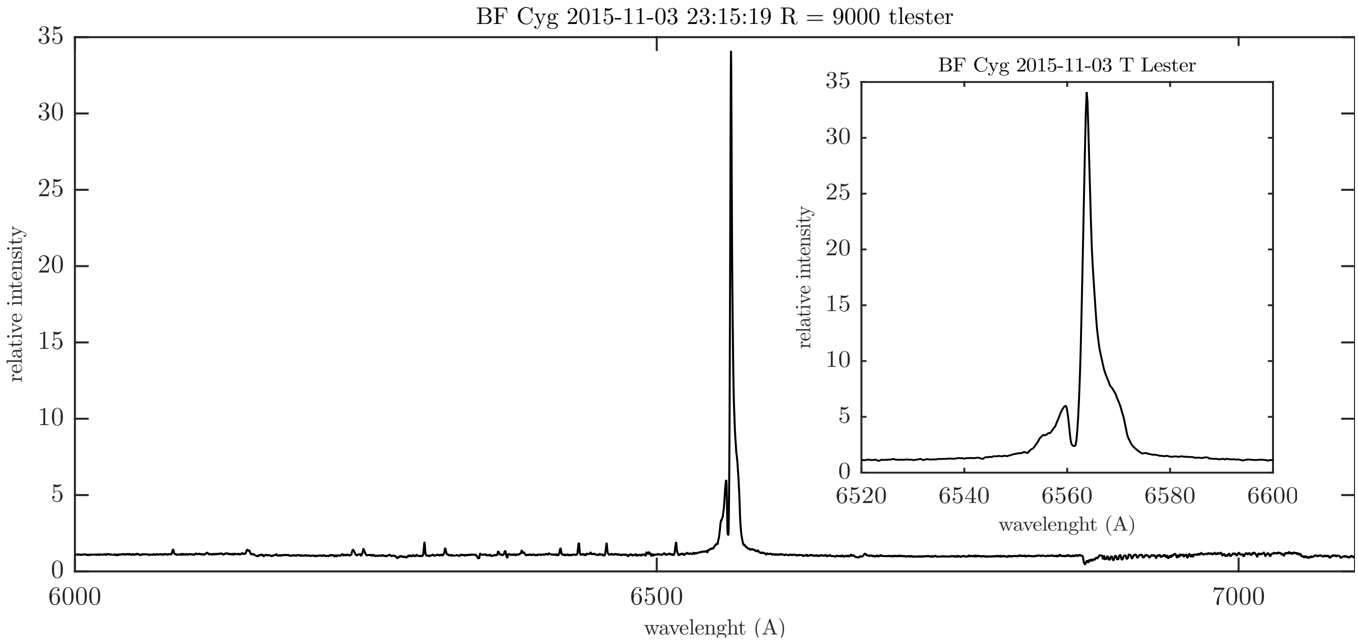


BF Cyg

Coordinates (2000.0)	
R.A.	19 23 53.4
Dec	29 40 25.1
Mag	V = 10.1





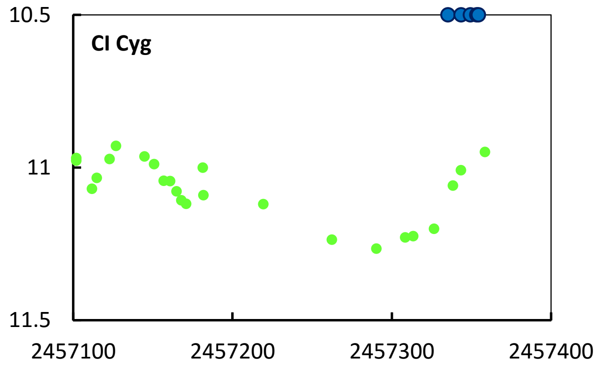


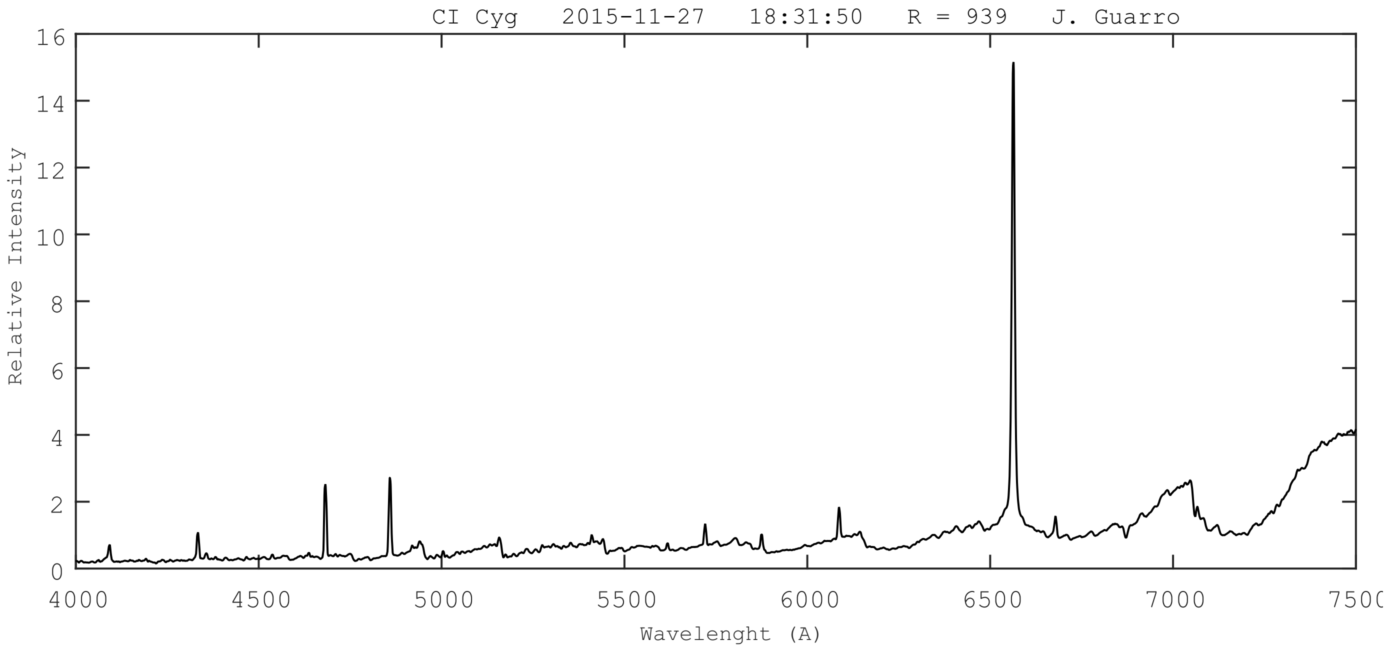
SYMBIOTICS

CI Cyg

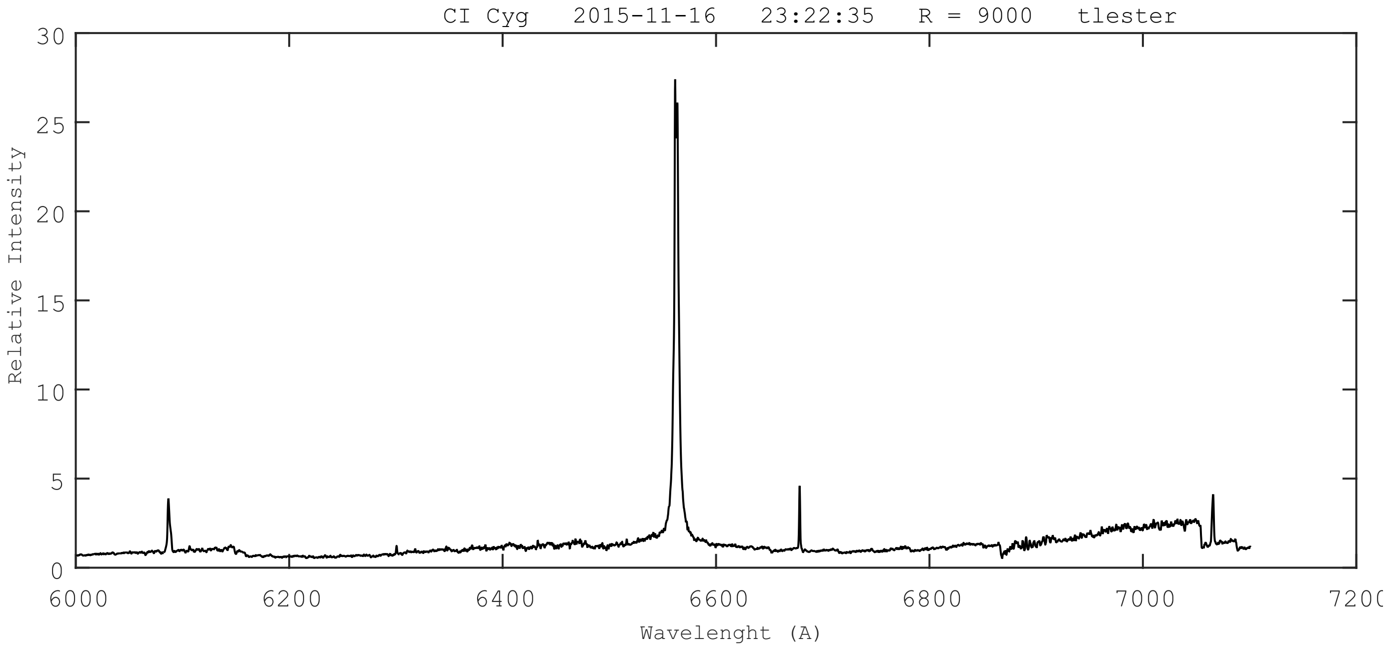
Coordinates (2000.0)	
R.A.	19 50 11.8
Dec	35 41 3.2
Mag	10.8 (V)

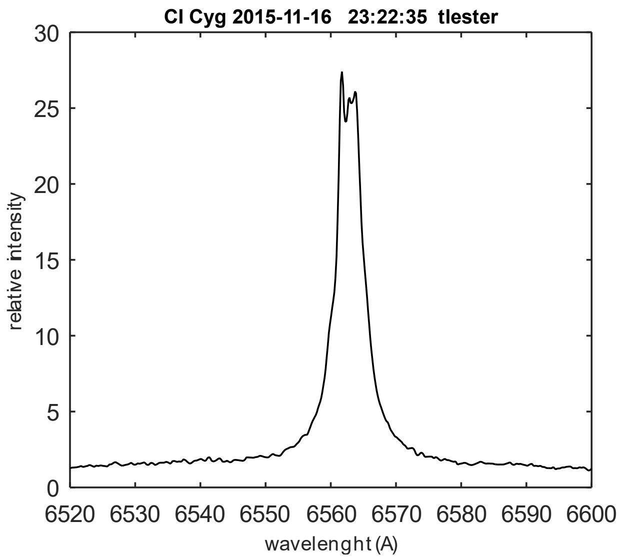
Increasing luminosity in November.
Fast change of Balmer profiles



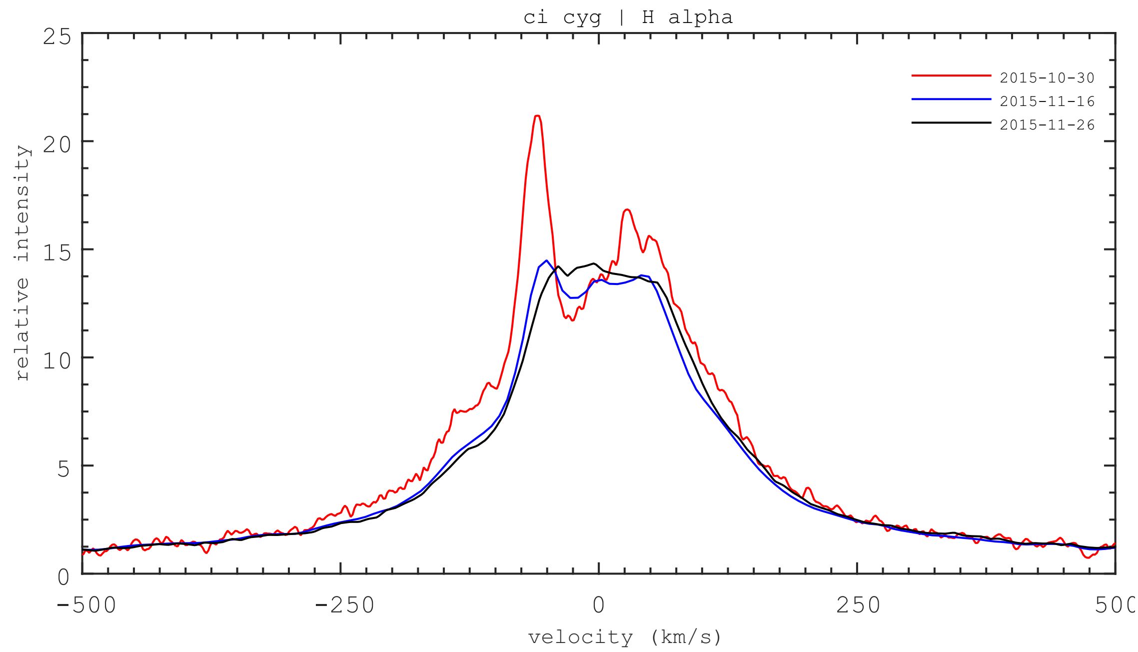


CI Cyg


CI Cyg 2015-11-16 23:22:35 R = 9000 tlester
Relative Intensity
0
5
10
15
20
25
30
6000
6200
6400
6600
6800
7000
7200
Wavelenght (A)

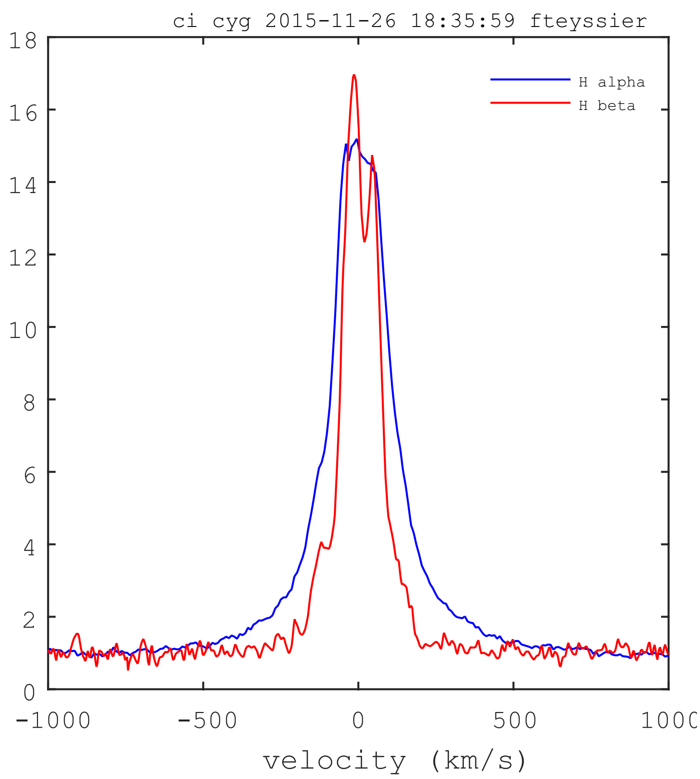

CI Cyg 2015-11-16 23:22:35 tlester
relative intensity
0
5
10
15
20
25
30
6520
6530
6540
6550
6560
6570
6580
6590
6600
wavelenght (A)

CI Cyg



Evolution of Hα profile in november, 2015
30-10-2015 : Peter Somogyi Lhires III 2400 l/mm R = 17000
16-11-2015 : Tim Lester Home Built Spectrograph R = 9000
26-11-2015 : François Teyssier eShel R = 11000

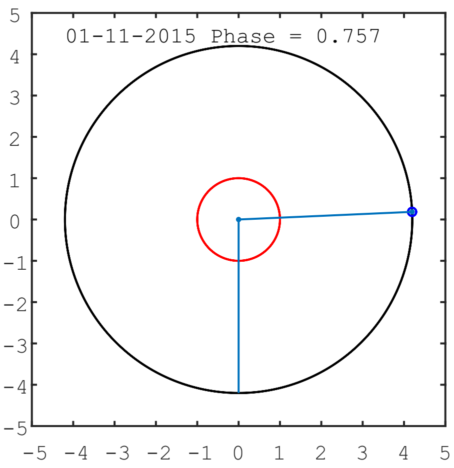
Comparison of Hα and Hβ profiles
F. Teyssier - eShel

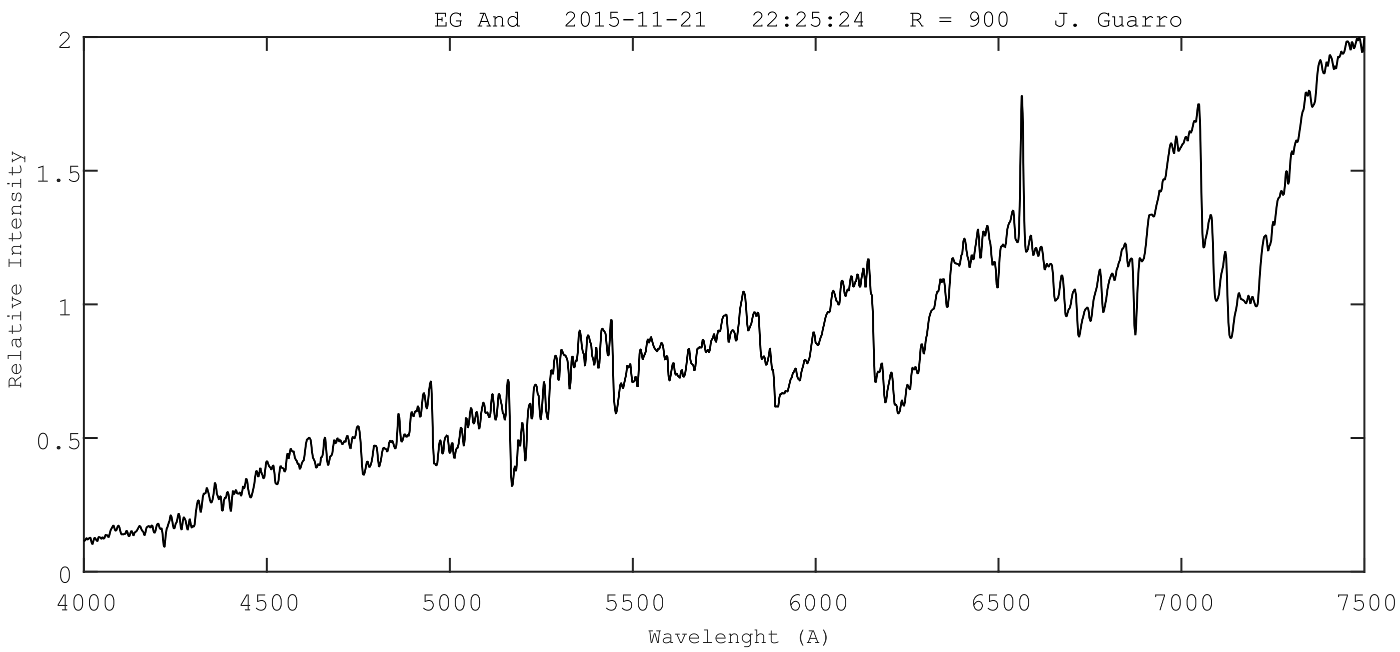


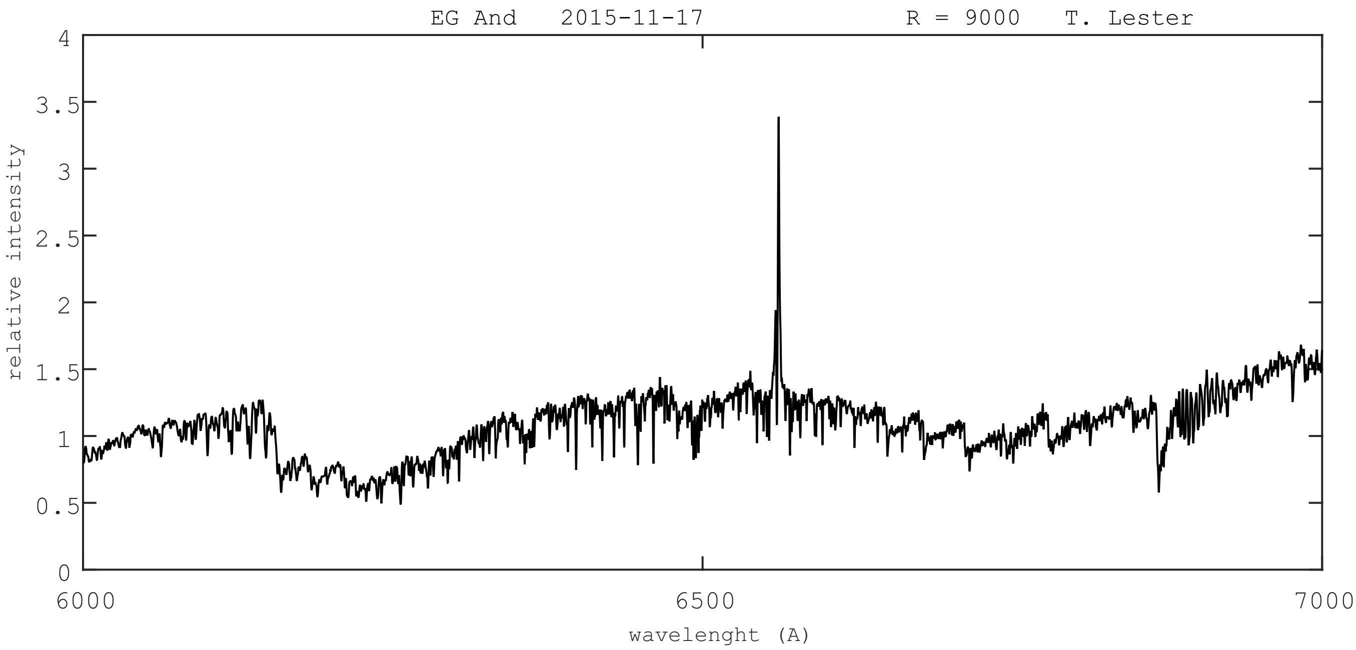
EG And

Coordinates (2000.0)	
R.A.	0 44 37.1
Dec	40 40 45.7
Mag	

Orbit of EG And
Orbital period = 482.6 days
JDmin = 2,445,380
The view is perpendicular to the orbital plane. The white dwarf size has been exaggerated for clarity, but all other sizes and positions are scaled in terms of red giant radii.
Ephemeris from Belczynski et al. 2000



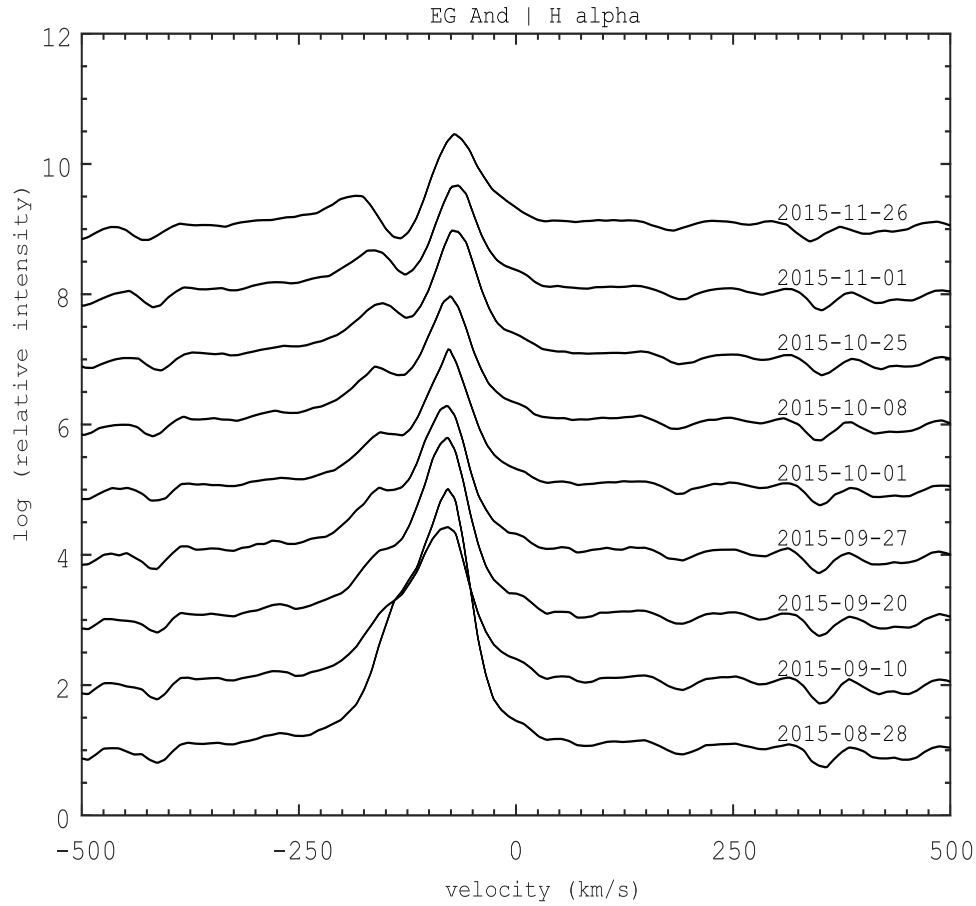


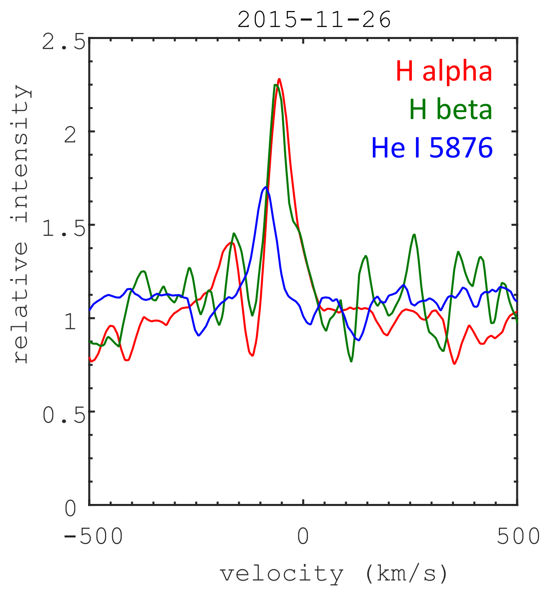


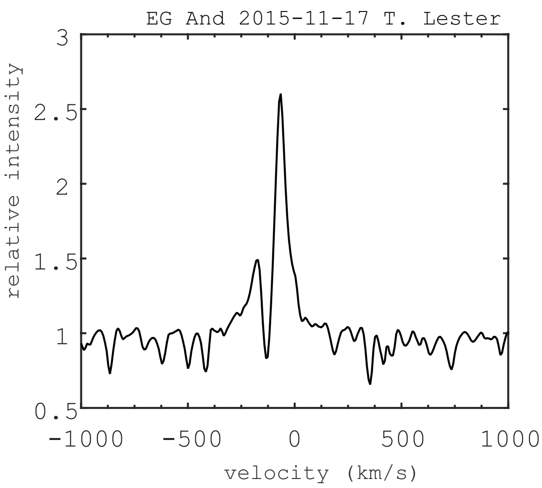
SYMBIOTICS

EG And

Evolution of Ha profile
F. Teyssier
eshel R = 11000





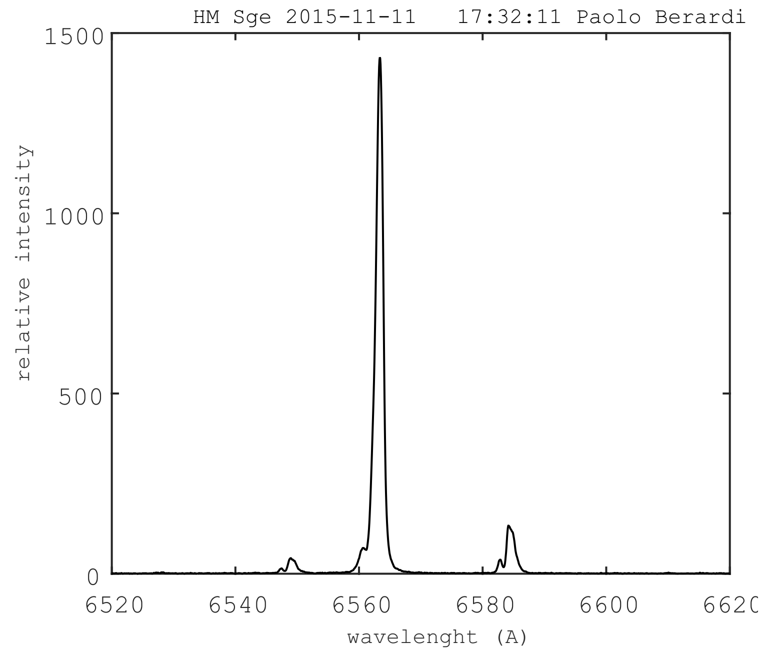


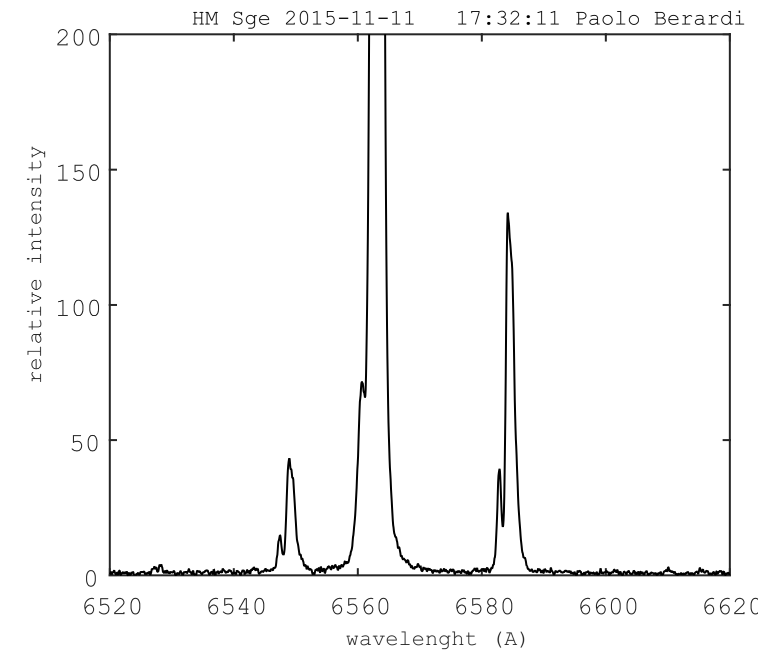
HM Sge

Coordinates (2000.0)	
R.A.	19 41 57.1
Dec	16 44 39.9
Mag	

The H alpha region of the symbiotic nova HM Sge, with [NII] 6548, 6583, obtained by Paolo Berardi with a Lhires III 2400 l/mm at R = 16000

The bipolar nature of the nebula appears clearly



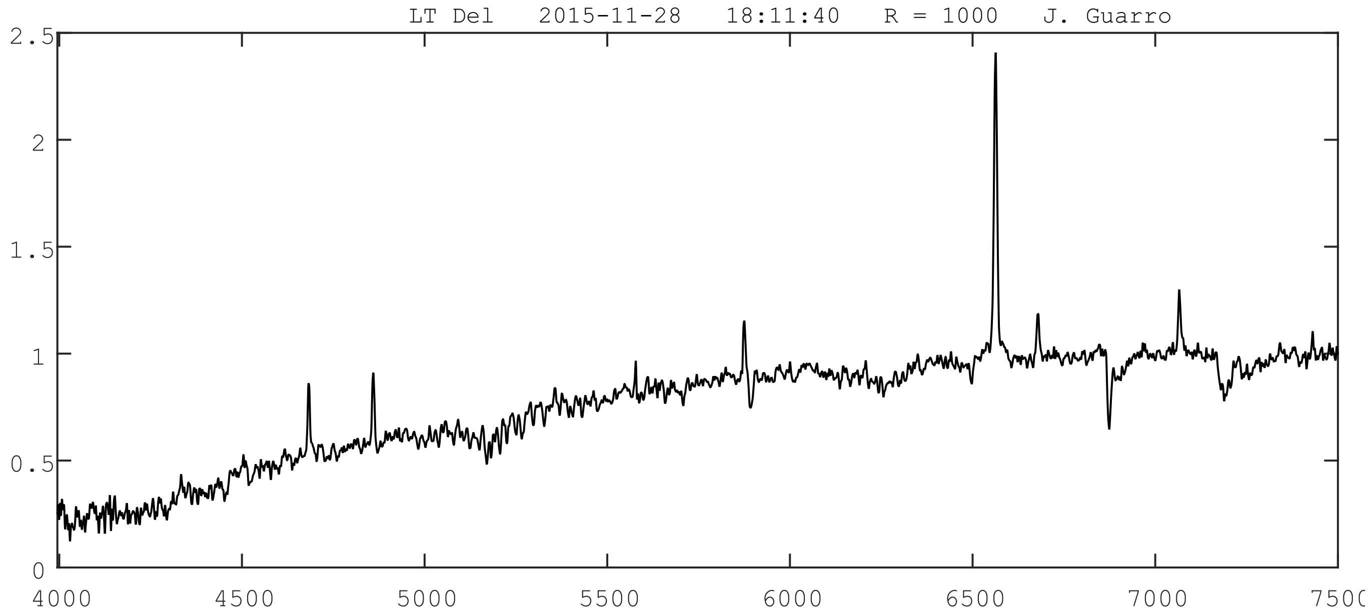


S
Y
M
B
I
O
T
I
C
S

LT Del

Coordinates (2000.0)	
R.A.	20 35 57.3
Dec	20 11 34
Mag	~ 13 (?)

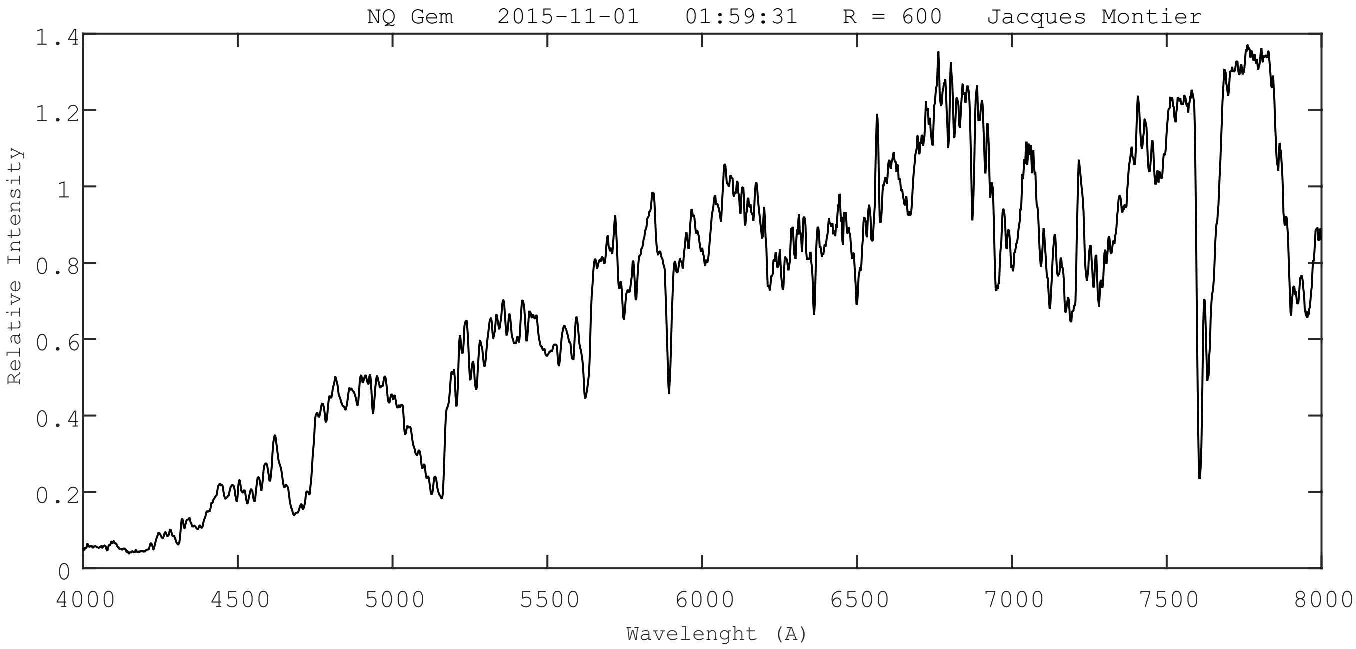
First spectrum of the yellow symbiotic LT Del in Aras DataBase
Compare with StHa 190



SYMBIOTICS

NQ Gem

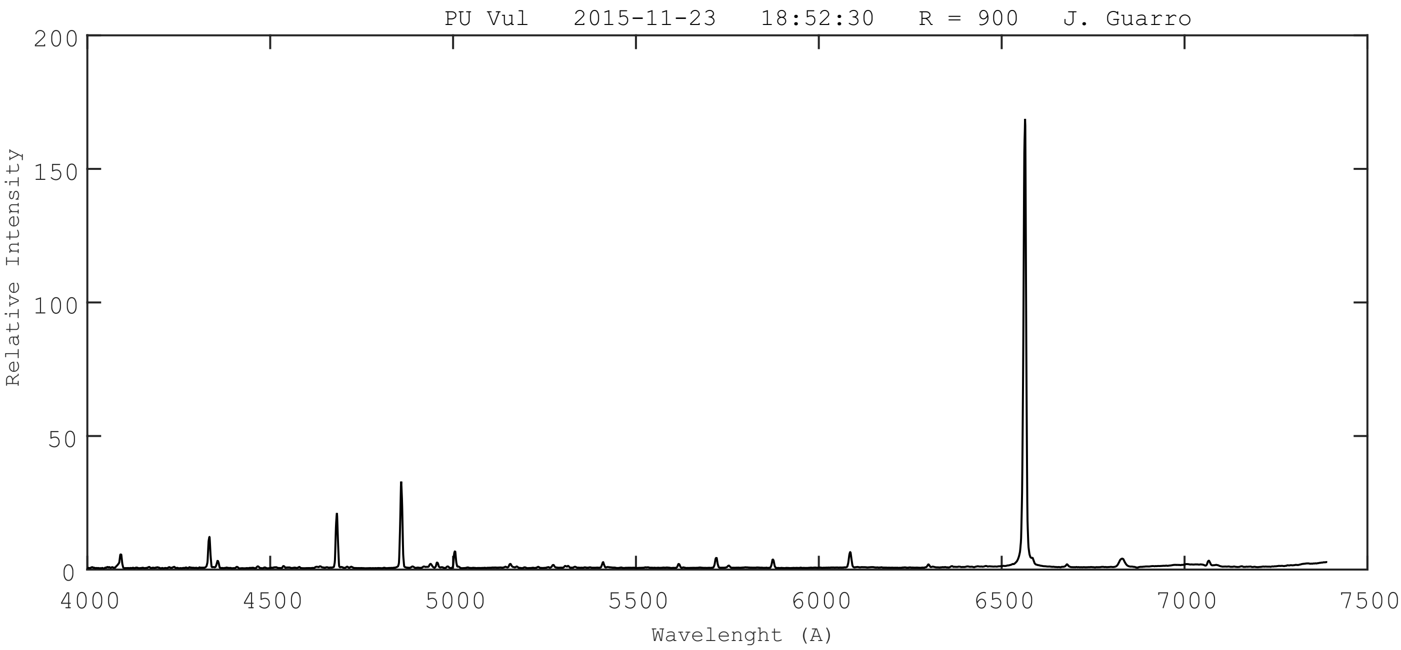
Coordinates (2000.0)	
R.A.	7 31 54.5
Dec	24 30 12.5
Mag	7.8 (V)



SYMBIOTICS

PU Vul

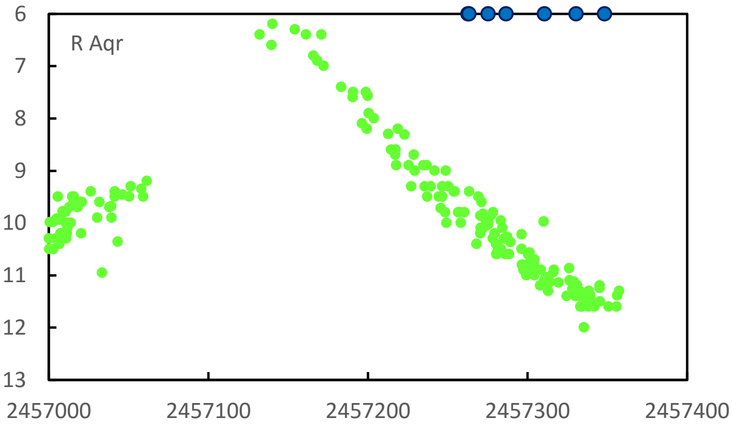
Coordinates (2000.0)	
R.A.	20 21 12
Dec	21 34 41.9
Mag	12.8(V) 11.1(R)

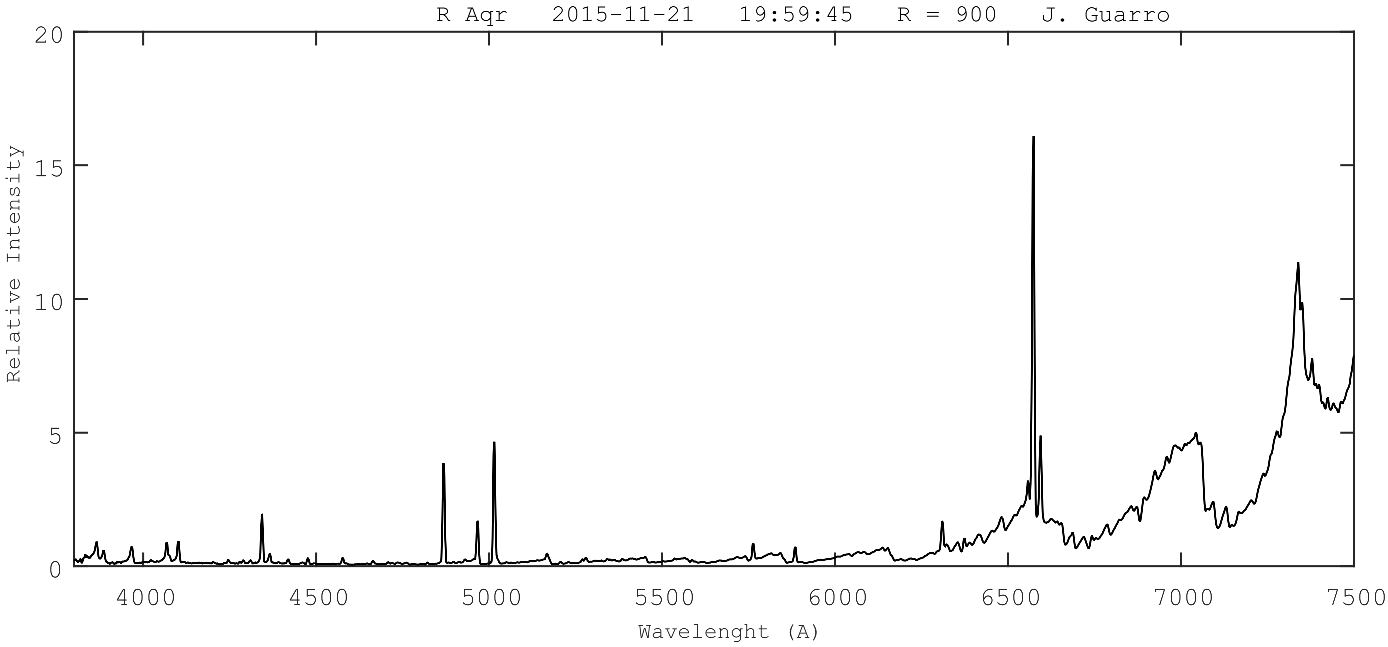


R Aqr

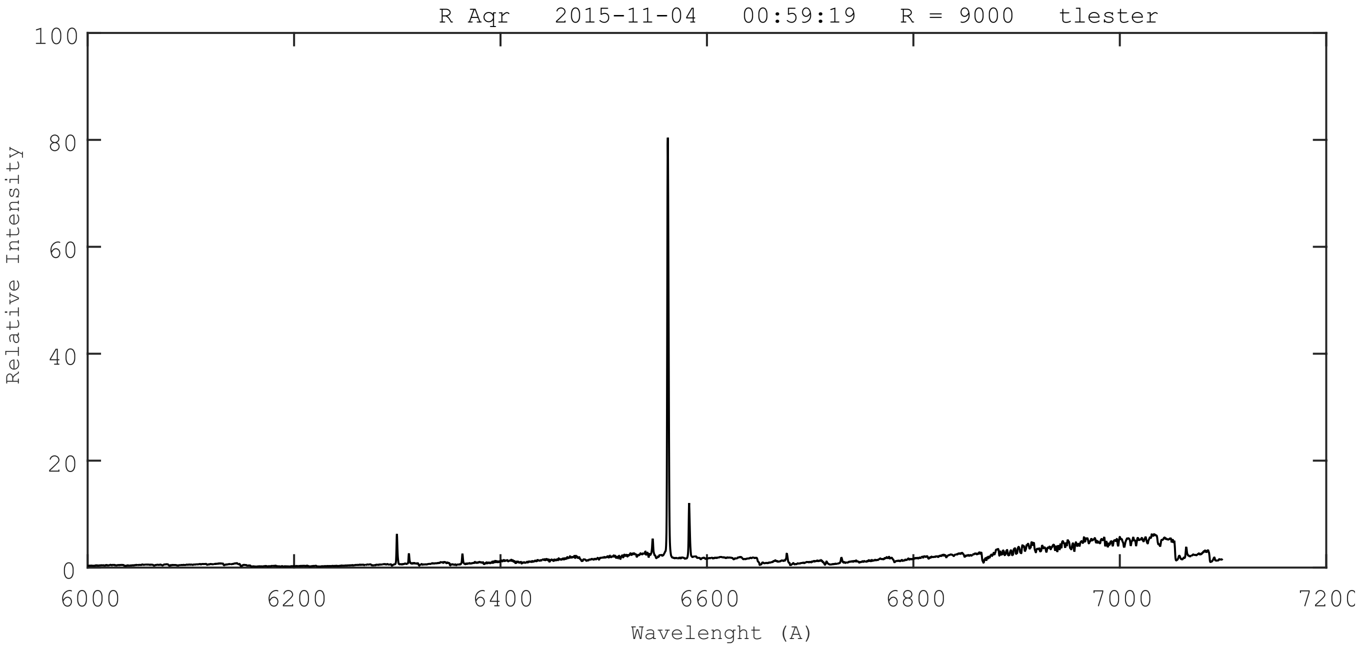
Coordinates (2000.0)	
R.A.	23 43 49.4
Dec	-15 17 4.2
Mag	~ 11.4

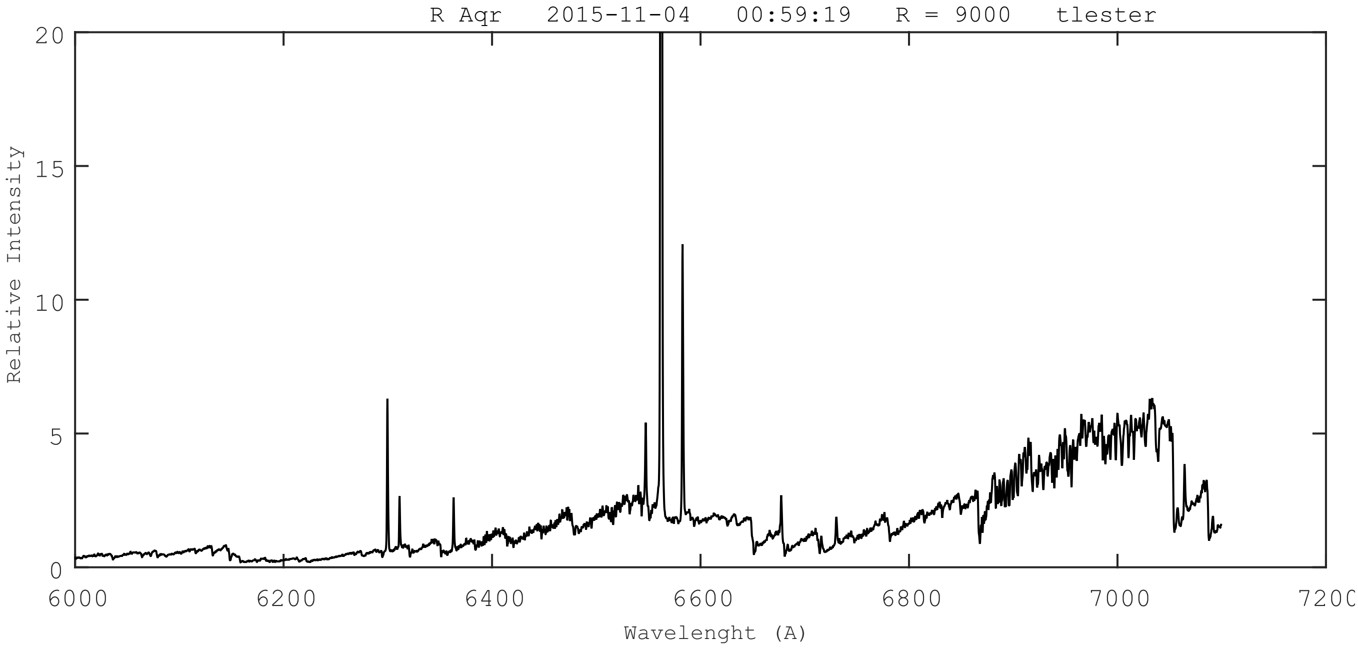
R Aqr near minimum luminosity (V, Vis ~ 11.4) (pulsation of the Mira component).
The pusation is deeper than previous one (Vis = 10.8 mid-october, 2014)
The relative intensity of emission lines at its higher level at that phase.

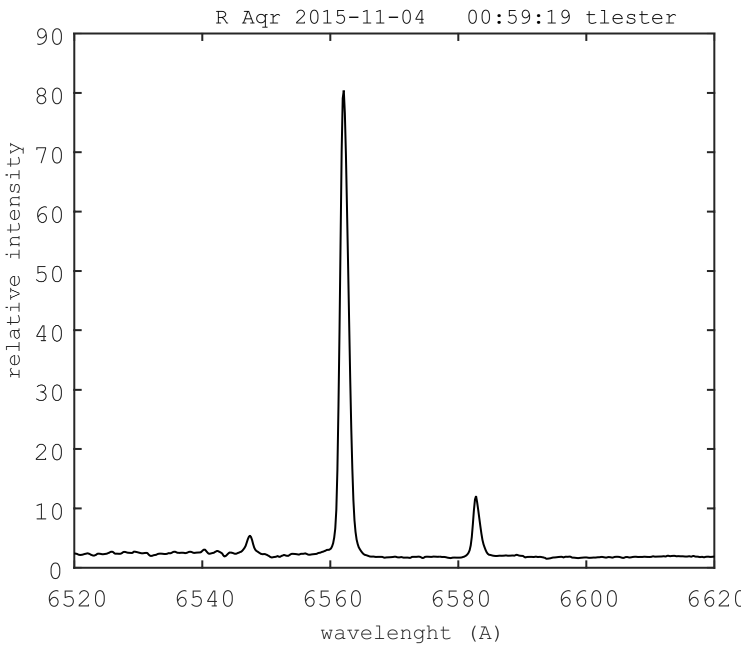




R Aqr





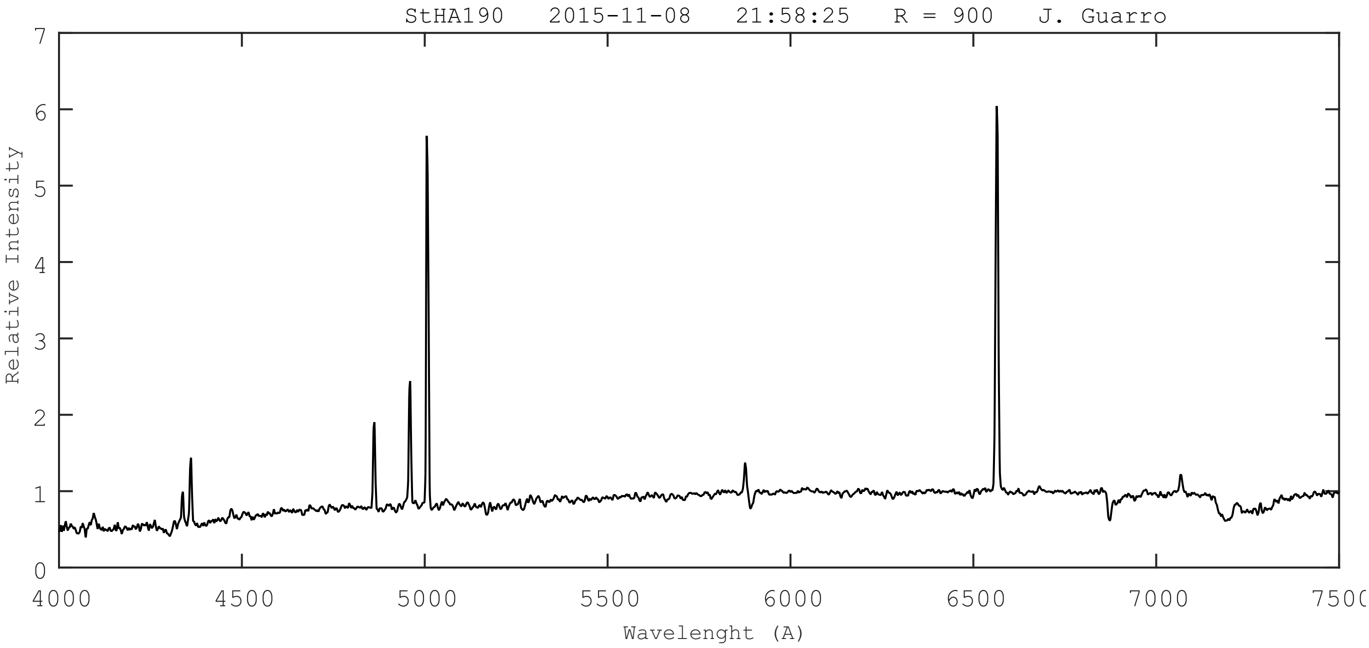


H alpha line and [NII] λλ 6548, 6583
Tim Lester R = 9000

S
Y
M
B
I
O
T
I
C
S

StHa 190

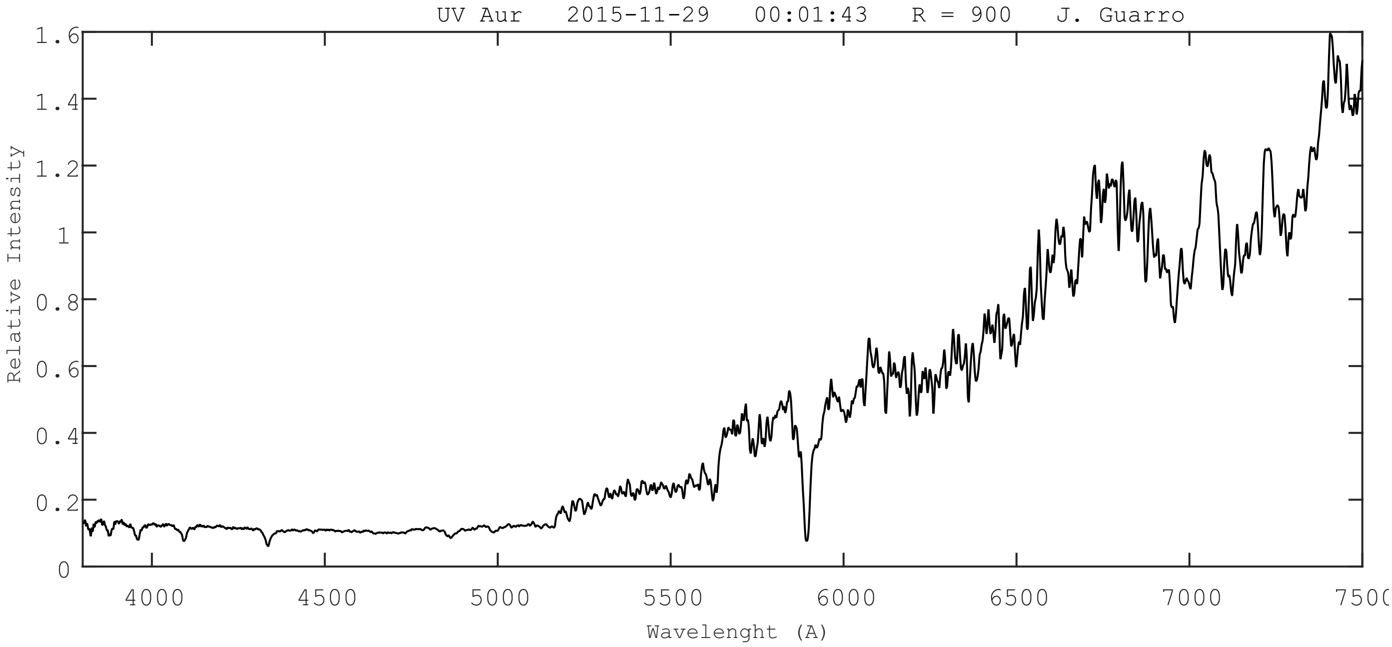
Coordinates (2000.0)	
R.A.	21 41 44.8
Dec	2 43 54.4
Mag	10.2 (Vis.)



SYMBIOTICS

UV Aur

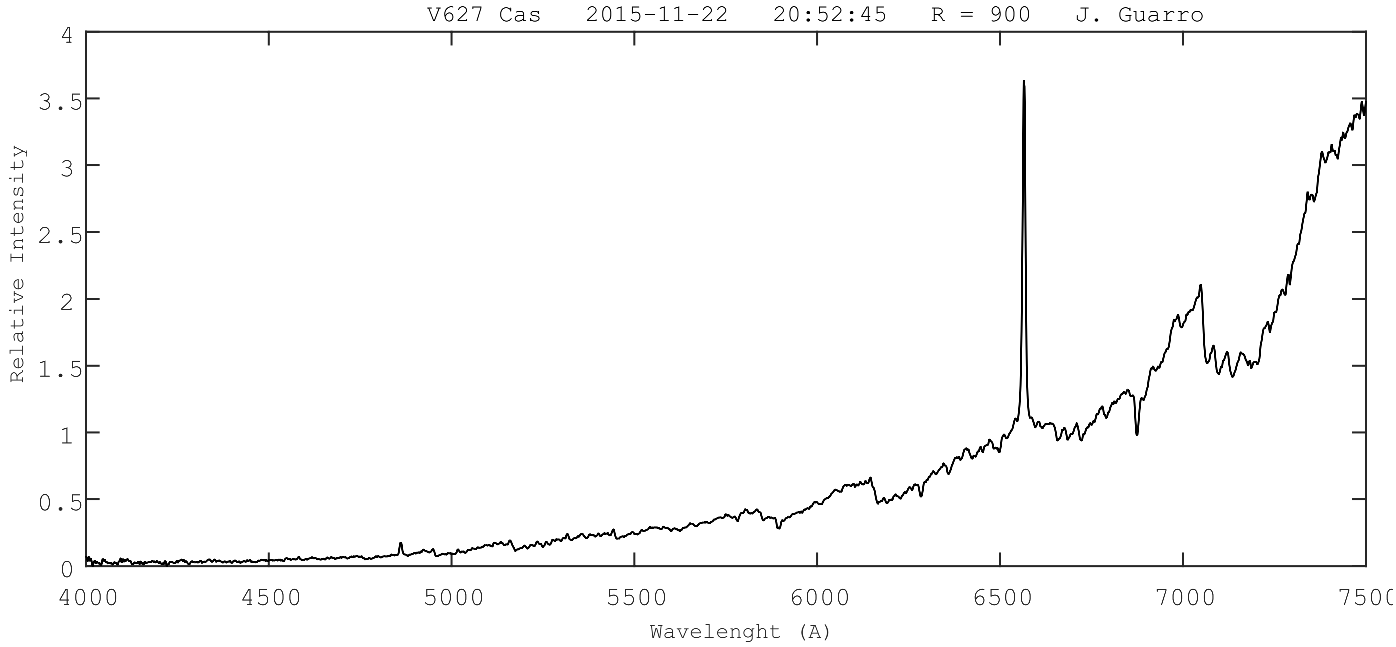
Coordinates (2000.0)	
R.A.	05 21 48.9
Dec	+32 30 40.2
Mag	



SYMBIOTICCS

V627 Cas

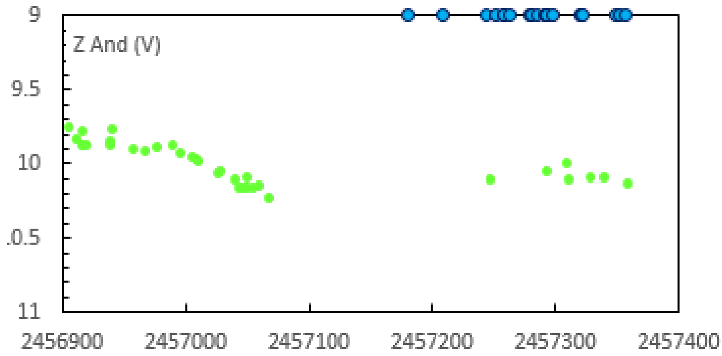
Coordinates (2000.0)	
R.A.	22 57 41.2
Dec	58 49 14.9
Mag	12.7 (V)

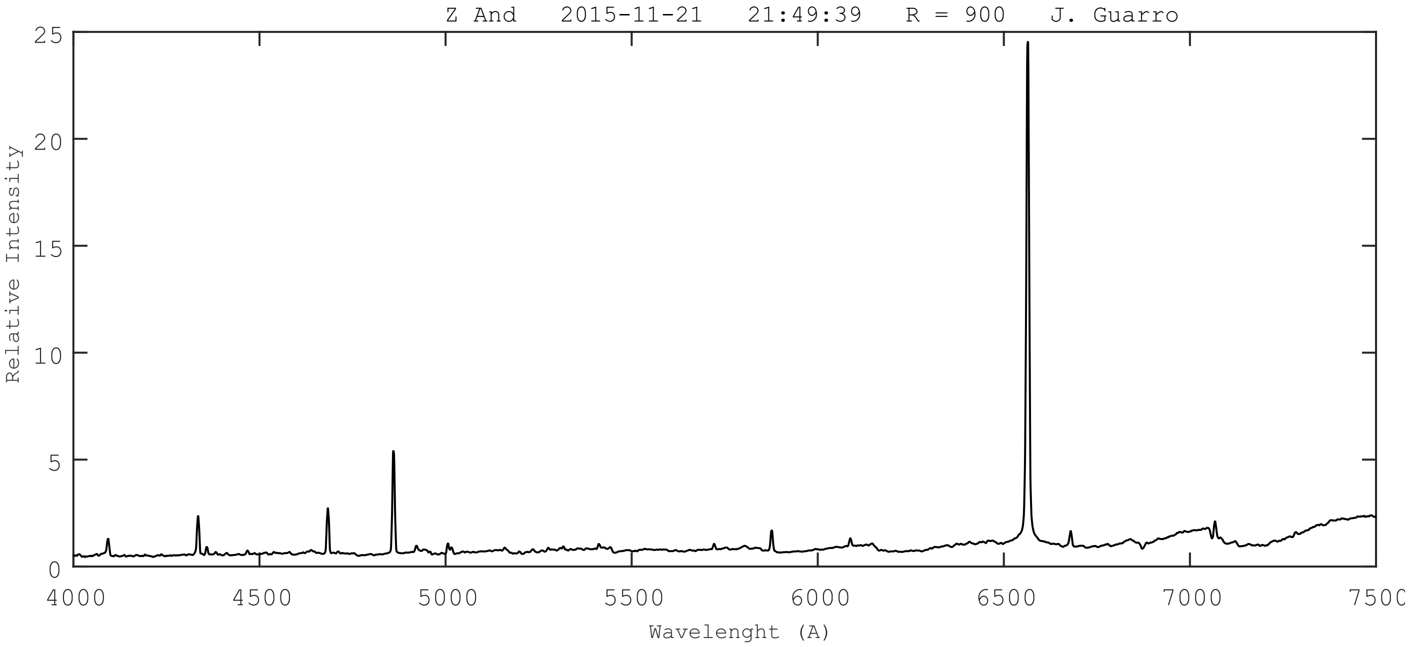


SYMBIOTICS

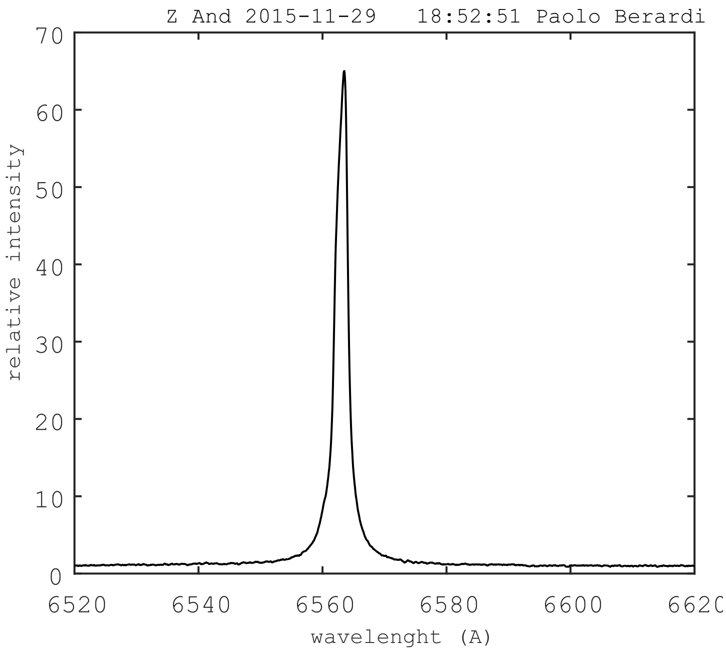
Z And

Coordinates (2000.0)	
R.A.	23 43 49.4
Dec	48 49 5.4
Mag	10.1

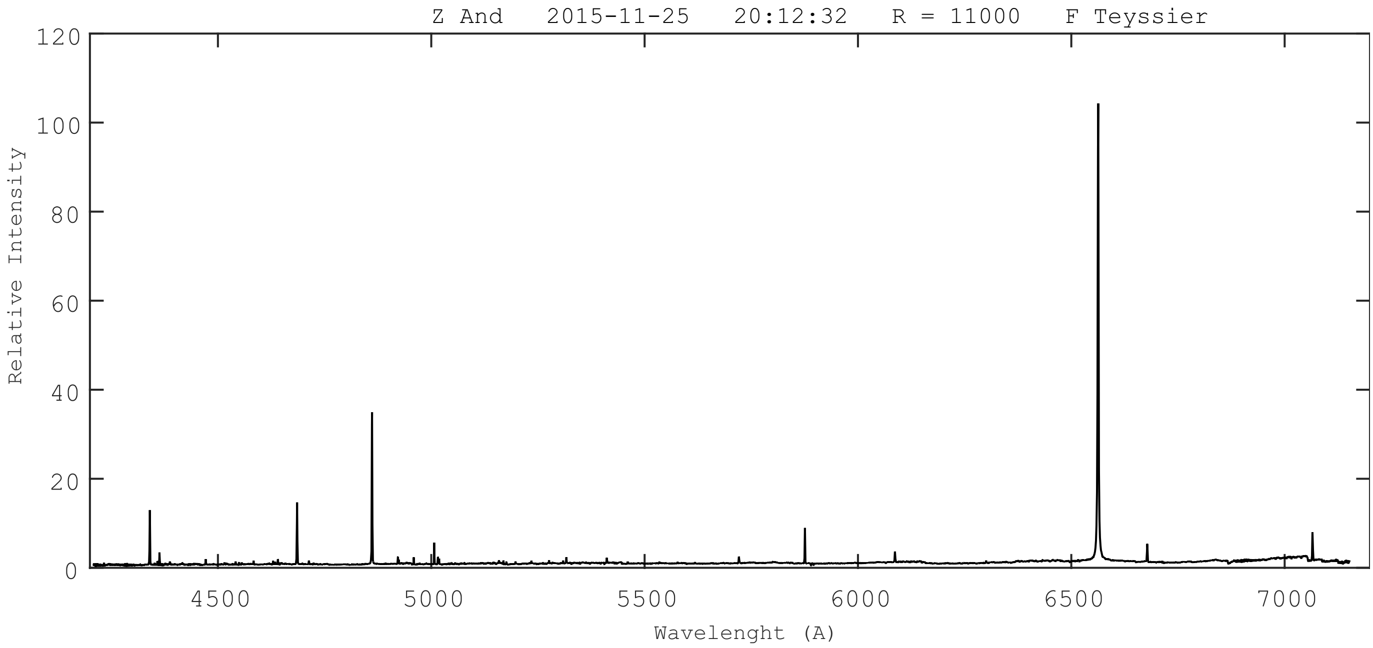


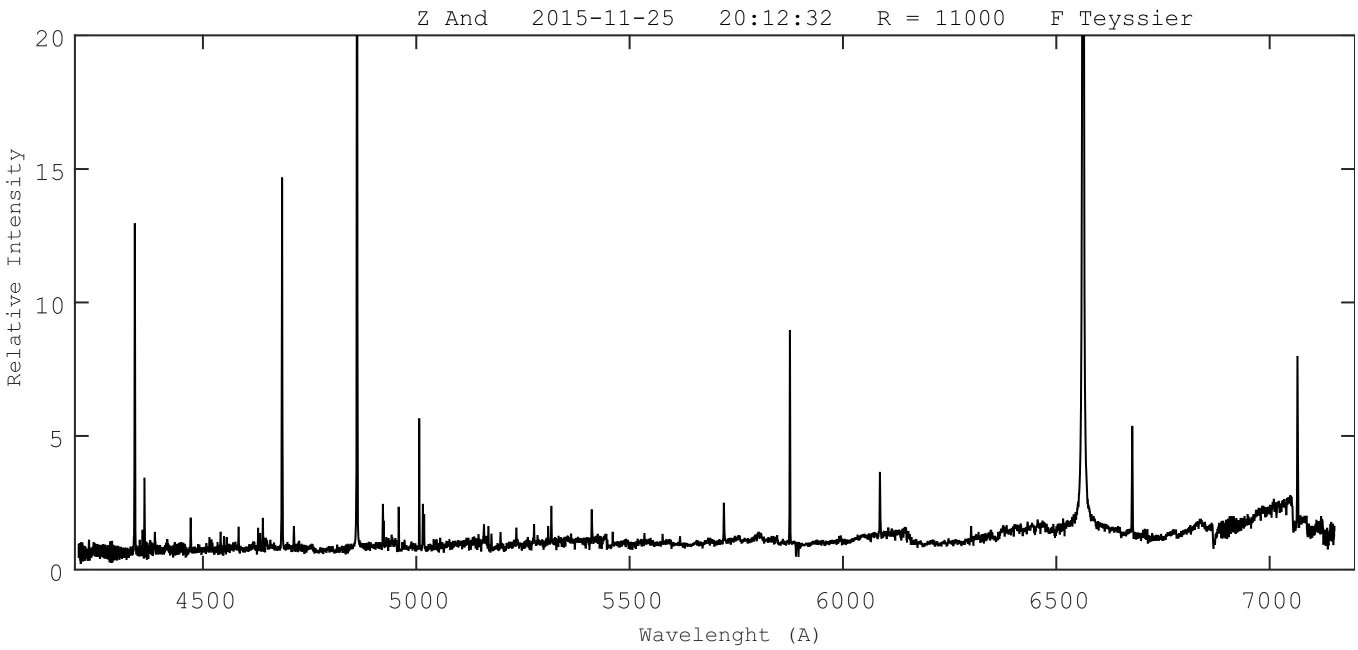


Hα by Paolo Berardi with
Lhires III 2400 l/mm
R = 15000



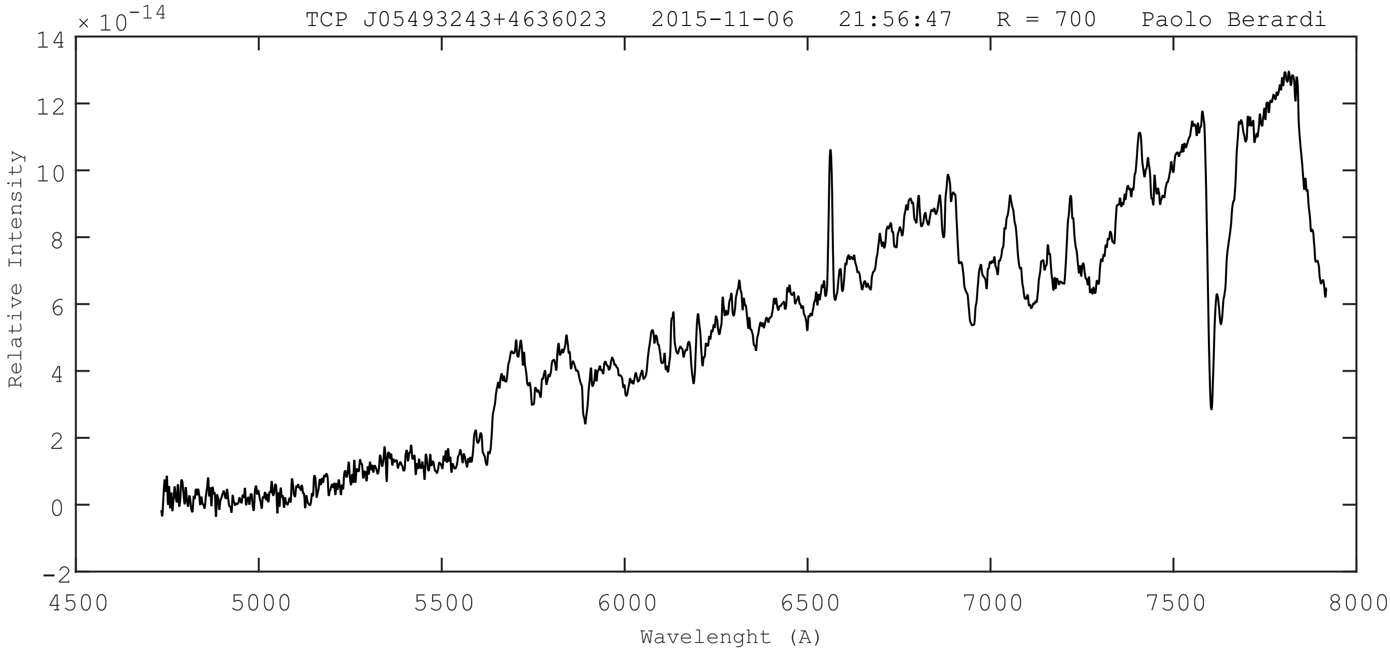
Z And


Z And 2015-11-25 20:12:32 R = 11000 F Teyssier
Relative Intensity
120
100
80
60
40
20
0
4500
5000
5500
6000
6500
7000
Wavelenght (A)


Z And 2015-11-25 20:12:32 R = 11000 F Teyssier
Relative Intensity
20
15
10
5
0
4500
5000
5500
6000
6500
7000
Wavelenght (A)

Coordinates (2000.0)	
R.A.	23 43 49.4
Dec	48 49 5.4
Mag	

A transcient alert on CBAT :
http://www.cbat.eps.harvard.edu/unconf/followups/J05002724+1334199.html
Paolo Berardi got a spectrum of this transcient : a carbon star with H alpha in emission, such as, for instance, V CrB or SS Vir



Red giants, Carbon stars, S Stars, see :
http://www.astronomie-amateur.fr/Projets%20Spectro%20hb.html

On symbiotics, novae, and active galaxies: Spectra and structure, another way to think about connections

Steve Shore

In our discussions of the symbiotic phenomenon, and also novae, one feature probably hasn't been emphasized strongly enough. All aspects of the line formation depend on nonlocal effects. I've used the notion of departures of strict local equilibrium, that the populations of atomic (and molecular) levels depend on more than just the collisions with the particles in the immediate vicinity. When there's a strong source of radiation outside the line forming region, scattering and fluorescent excitation are important. Think of the Raman effect, so well illustrated in the spectra of AG Peg that are now residing in the ARAS database, but also any of the symbiotics that show variations in these features. They're produced because around the hot source, there's region of neutral hydrogen that scatters the specific lines of O V in the far UV. This neutral gas, shielded by the optical depth of the Lyman continuum, cannot produce the O VI resonance lines but the near match of the levels between Lyman beta and the resonance lines down-converts the emission to optical wavelengths. Any near match produces the same effect, (this is used in the laboratory to identify molecules in a sample when illuminated by a wavelength-fixed radiation source), in cosmic plasmas this has also been seen in the He II spectrum in planetary nebulae. Other examples we've discussed are the fluorescent emissions from Fe group lines when the UV absorption is strongly saturated, as in the early stages of nova expansion.

But there is another class of objects for which the symbiotic stars – and planetary nebulae – serve as analogs and that are accessible to all of you at low resolution, active galactic nuclei. First a word on the class. The term "active nucleus" is applied to galaxies whose central regions, the inner few hundred parsecs or smaller, contains most or nearly all of the luminosity of the parent galaxy. The most extreme cases are quasars (that were first called quasi-stellar because they lacked extended structure when observed with photographic methods that saturated the inner region). The emission spans the spectrum but is particularly notable in X-rays, where normal galaxies are not especially intense, implying a central emitting The first optical examples actually pre-date all radio and X-ray surveys. In 1943, Seyfert (1943, ApJ, 97, 28; an earlier paper appeared in 1941, PASP, 53, 231) described the optical emission lines from a small sample, six, galaxies that showed strong, and extremely broad, emission lines and compact nuclear regions. He used a resolution of about 600 with prism spectrographs on the 60 in (1.5 m) Mt. Wilson with calibration strips to obtain relative intensities (with photographic plates it was necessary to produce a calibration from the same batch under identical development conditions because of the intrinsic nonlinearity of the emulsion responses, isn't it lovely that we don't have to do this anymore?). The measured underlying continuum is relatively late type for the galaxies he observed so there wasn't much contamination, and the emission lines showed a large contrast. Many of the lines with which you are now familiar were present, mainly He I/II, the Balmer lines, the [O III] and [N II] nebular transitions, [Ne III] 3869, 3968Å[S II] 6716, 6730Å and so on. But he also noted the strength in several galaxies of [Fe VII] 6087Å, [Ar IV] and possibly [Ca V]. In other words, the spectrum looks like a planetary or symbiotic but with impossibly extended broad wings. Fast forward to the 1970s. Khachikian and Weedman (1974, ApJ, 192, 581) produced the first atlas of what were by then named Seyfert galaxies and divided these into excitation and profile classes. The nuclei are always dominant.

But there are two broad classes. One has broad permitted (e.g. Balmer and helium) lines byt narrower forbidden lines (e.g. [O III], [N II]), called Sy 1, while a distinct class, Sy 2, shows narrower permitted and forbidden lines. The difference in the line widths is up to a factor of 10, ranging from about 1000 to 10,000 km.s^{-1}. The spectra lead to an immediately understandable picture for those familiar with symbiotics. The broad-line forming region (BLR) is more compact and higher density than the region producing the narrow lines (NLR) inferred from the difference in the densities at which the lines are collisionally damped (remember, for a high density the transitions of the forbidden lines will not be seen because of local collisional deexcitation without photon emission). The BLR contains a hot, compact central object and the line widths are interpreted as arising from orbital motion of gas around what is now called the "central engine". Later observations in polarized light (see the early review by Antonucci 1993, ARA&A, 31, 473) show that the difference in the spectra is due to the obscuration of the broad line region by surrounding interstellar absorption within the galactic nucleus. This leads to the current unified model in which the nuclear source is a black hole of at least 10^6 M, hence its compactess, surrounded by accreting matter that accumulated from external sources and accretes as in cataclysmics because of a turbulent viscosity within the disk. The narrow lines are, then, produced in the surrounding gas of the nuclear interstellar medium. Notice how closely this resembles any of the spectra you've sen for symbiotics and uoch less so for planetaries. The central object, for the binaries, is an accreting white dwarf whose UV and soft XR continua produce the ionization of the circumstellar wind. The gas is bound to the binary as the gas is bound to the central black hole in the Sy galaxies. Osterbrock later introduced refinements to the taxonomy (these and the physical picture are summarized in the superb general nebular diagnostics reference Osterbrock and Ferland 2009, Astrophysics of Gaseous Nebulae and Active Galactic Nuclei 2nd Ed. (Univ. Science Books) by extending the classification to excitation and line ratio differences. But these are details for our purposes.

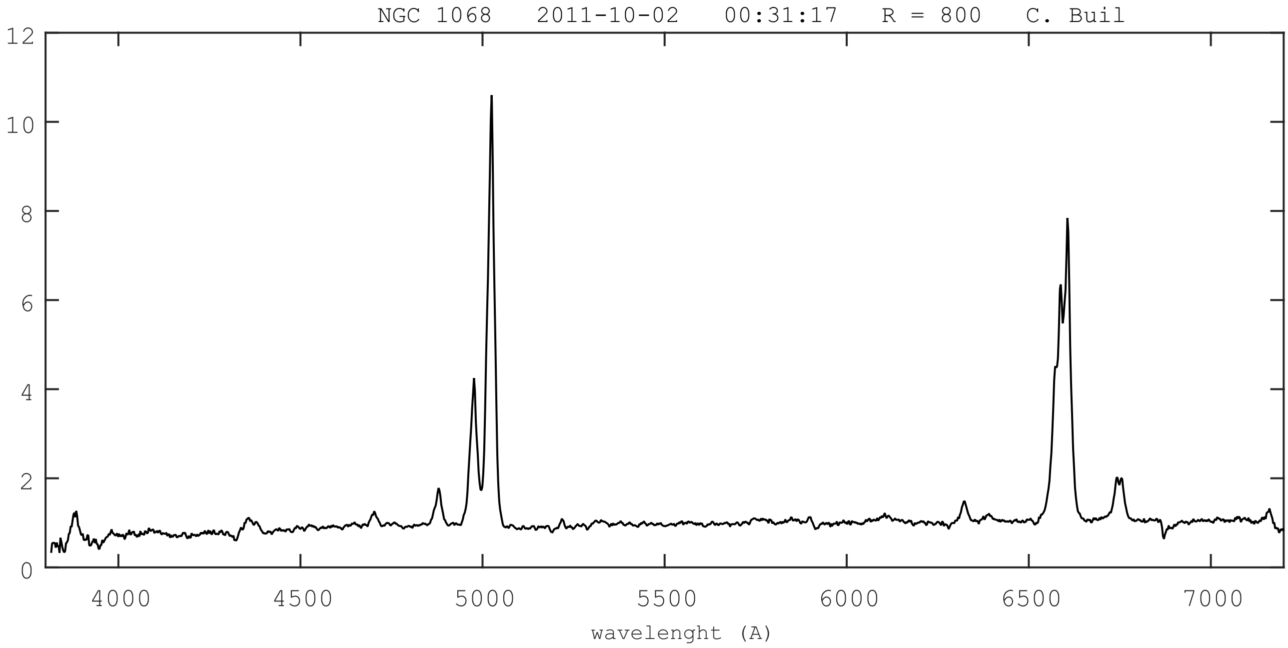
The basic picture is that a comparatively passive medium (but obviously not quiescent, the line widths are still enormously supersonic for the typical interstellar kinetic properties of a few km s^{-1} at most). The essential link came with the recognition that quasar spectra are most like Sy 1 galaxies, hence the closure of the question of whether such objects are cosmological (they clearly are). The dust in the circumnuclear environment has an obvious source in the galactic interstellar medium in the same way that some symbiotics, the D-type, have it in the stellar wind of the red giant. The line widths are much larger, but for the high resolution UV and FUV line profiles in the binaries the widths are far in excess of those in the giant wind, which is itself supersonic relative to the implied sound speed given by the temperature. The size of the region is inferred from two things, at least at first pas. The sources are unresolved from the ground, so the nuclear region is at most 0.1 arcsec in size. HST observations reduce this considerably, to milliarcsecond scales. With the prototypical galaxies being at low redshift, their distances can be obtained (e.g. NGC 1068, NGC 4451, NGC 7469) and now the galaxies are easily distinguished from the nucleus and (unlike the symbiotics) studied separately (well, there are radio interferometric images of some of the symbiotics and their cousins but it's not quite the same). The gas surrounding the core of η Car is similar and far more dusty. Lines are formed both locally, from recombination and collisional excitation, and from the intense but diffuse radiation from the central object. In fact, many other fluorescent features (such as [Fe II] emission in quasar spectra) are known fromthese galaxies. The number is too large to cite and spectroscopic surveys are now extending to larger fields with multi-object methods (such as integral field spectroscopy and multiple fibers). The ubiquitous presence of XR emission, not radio as first thought, has been confirmed by several generations of space observations and many of the most active sources bear Einstein or Chandra designations.

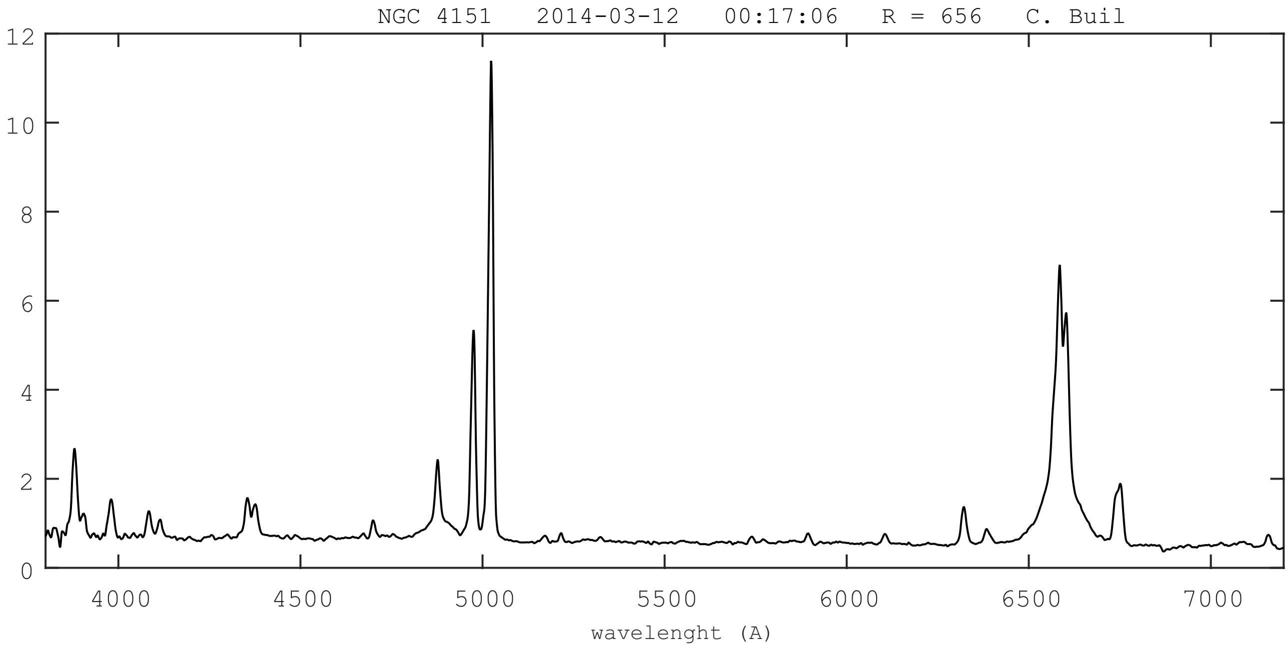
The most intense XR emitters are also intense gamma-ray sources are typed based on their first identified member, the BL Lac objects (also called blazars). These are of the least interest for spectroscopists. They show nonthermal, power law continua with emission extending across the whole electromagnetic range from gamma-ray to centimeter radio, but they show no emission lines. The final unification of these disparate types asserts that the blazars are AGNs with strong jet-like ejection of material at relativistic speeds (already known to be present from early optical observation of, e.g., M 87) when the jet is within a degree or so of the line of sight. Think of novae such as T Pyx. Here the ejecta are decidedly non-relativistic (a mere few thousand km.s^{-1}) so the highest velocities are seen in what looks like a collimated structure. Aligned relativistic motion boosts the surface brightness (for motion near the speed of light the emission becomes progressively more restricted in opening angle but the surface brightness also increases by so-called "Doppler-boosting" in which the solid angle strongly enhances the surface brightness. Just a small shift away from nearly perfect alignment and this effect decreases very quickly, so much so that we see the jets in XR and even radio when they are not along the line of sight.

Again, the analogy with the symbiotics is there. Jets are emitted from the active site in such systems, e.g. CH Cyg, AG Peg, Z And), presumably launched from the disks and collimated in the inner parts of the accretion flow. But in symbiotics, the jets are at most a few tens to hundreds of times faster than the wind into which they emerge while in AGNs the jets are nearly relativistic even on the bulk scale (that is, in the mean, organized velocity of the outflow). Because of this, there should be a strong interaction with the wind and the jets both mix and decelerate. For AGNs, this does not appear to happen, the jets emerge from the nucleus and maintain their structural integrity to distances of kiloparsecs to hundreds of kpc. How is still one of the massively open questions. But one way to understand their origin is to use very long baseline interferometry, VLBI, that can may the radio emission to microarsec scales (parsecs at the nucleus) that show episodes of emerging jet emission in expanding bursts rather than continuous flows. Your monitoring of the symbotics shows the same behavior but on a more compact scale. On the other hand, there are structural similarities between the systems that make the study of variability especially interesting. When the inner accretion disk goes through fluctuations in brightness, forgetting how this triggers, the reaction of the rest of the medium to the change in illumination (and spectrum) depends on the distance from the core. This can be used to map the emission line regions structures (at least th BLR) in the same way a symbitoic outburst maps the structure of the wind of the giant. The light travel time in the binary is short but not negligible for length scales of hundreds of stellar radii (several tens of AU). Fo AGNs, this is much longer, perhaps years, but still within the range of monitoring. The same behavior observed in SS 433 in the changes in the disk and the jets is also seen in these galaxies and, for this reason, the class of jetting active binaries are called micro-quasars (e.g. GRS 1915+105, LS I +61°303) and these show many of the same phenomena – especially gamma-ray emission that shows orbital modulation. The main reason for bringing all this up is that one often gets the idea that individual classes of astrophysically significant objects are quite unrelated. But novae are, in many ways, planetary nebulae sped up. Active galaxies are enormously extended symbiotics. Once you get used to thinking in these plasma diagnostics and profile formation mechanisms you'll see again that the physics scales across many orders of magnitude of size and mass.

For now, I'll stop. But there's one last thing to add. Thank you all for this year, and especially deepest, heartfelt thanks to Francois for his patience, persistence, and determination to put this newsletter together. And to you all who have been and continue to demonstrate that a new era of astronomical observational work by a truly worldwide community is well underway. I hope you're finding these notes still interesting and look forward to any and all comments, gripes, and suggestions anyone might have. With all my deepest respect and gratitude for being in your community, very best wishes to you and yours for the new year.

Steve Shore, 22-12-2015





The Seyfert galaxies NGC 1068 (Seyfert 2) and NGC 4151 (Seyfert 1) by C. Buil with an Alpy
see : http://www.astrosurf.com/buil/galaxies/spectra.html

Recent publications

Novae

Light curve analysis of Neon Novae

Izumi Hachisu (The University of Tokyo), Mariko Kato (Keio University)
http://arxiv.org/abs/1511.06819

Symbiotics

Probing The Accreting Hot Components in Six S-Type Symbiotic Variables

Edward M. Sion, Patrick Godon, Joanna Mikolajewska, Bassem Sabra
http://arxiv.org/abs/1511.07352
(LT Del, BD -21 387, StHa 190, CQ Dra, V443 Her, RW Hya)

Spectroscopic view on the outburst activity of the symbiotic binary AG Draconis

L. Leedjärv, R. Galis, L. Hric,3 J. Merc and M. Burmeister
http://arxiv.org/pdf/1512.03209v1.pdf

ABSTRACT Variations of the emission lines in the spectrum of the yellow symbiotic star AG Dra have been studied for over 14 years (1997–2011), using more than 500 spectra obtained on the 1.5-metre telescope at Tartu Observatory, Estonia. The time interval covered includes the major (cool) outburst of AG Dra that started in 2006. Main findings can be summarized as follows: (i) cool and hot outbursts of AG Dra can be distinguished from the variations of optical emission lines; (ii) the Raman scattered emission line of Ovi at λ 6825 almost disappeared during the cool outburst; (iii) lower excitation emission lines did not change significantly during the cool outburst, but they vary in hot outbursts and also follow orbital motion; (iv) similarity of variations in AG Dra to those in the prototypical symbiotic star Z And allows to suggest that a "combination nova" model proposed for the latter object might also be responsible for the outburst behaviour of AG Dra.

About ARAS initiative

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

To this end, ARAS has prepared the following roadmap:

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

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

Be Monthly report

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

VV Cep campaign

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

Submit your spectra

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

Resolution should be at least R = 500
For new transcients, supernovae and poorly observed objects,
SA spectra at R = 100 are welcome

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

Exemple: _chcyg_20130802_886_toto.fit

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

Further informations

francoismathieu.teyssier at bbox.fr