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CCD spectrophotometry of CVs.

V. 3300-9100 Å atlas for 20 faint systems. ⋆

Ulisse Munari[1] **and Tomaž Zwitter**[2]

[1] Osservatorio Astronomico di Padova, Sede di Asiago, I-36032 Asiago (VI), Italy;
E-Mail: munari@astras.pd.astro.it
[2] University of Ljubljana, Department of Physics, Jadranska 19, 1000 Ljubljana, Slovenia;
E-Mail: tomaz.zwitter@uni-lj.si

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Abstract. A 7 Å resolution, 3300-9100 Å spectrophotometric atlas is presented for 20 objects from the Downes & Shara (1993) catalogue of Cataclysmic Variables (CVs). The stars were selected among those listed as lacking published spectra. As for previous papers in this series, the aim is to check the CV status of the objects spectroscopically and to provide absolute spectrophotometry over a wide optical wavelength range. For all programme stars UBVRI magnitudes, continuum fluxes at selected wavelengths and integrated fluxes of emission lines are derived.

Among the 20 programme stars, 10 have a CV–like spectrum, 7 show F-G-K spectra similar to those of field stars, one is a white dwarf of the DA type, one is a sdB and one has just a sharp Hα in emission over a cool continuum.

Key words: Stars: emission line – Cataclysmic variables – Novae – White dwarfs

1. Introduction

Downes and Shara (1993, hereafter DS93) have compiled a very useful catalogue and atlas of the Cataclysmic Variables discovered through February 1992. A similar work for classical novae was presented by Duerbeck (1987, hereafter D87). DS93 listed references to published quiescence spectra for 271 objects and to outburst spectra for an additional 123 systems (in both cases a significant fraction belonging to the *pre-digital* era), but for 359 objects (∼half of the total) they were unable to locate published spectra.

In Papers I–IV of this series (Zwitter & Munari 1994, 1995, 1996; Munari *et al.* 1997) we have presented CCD spectra for 121 CVs listed by DS93 as lacking published spectroscopy. With this paper we conclude the survey presenting the spectra of 20 additional objects. A comprehensive analysis of the data so far gathered will be given elsewhere.

2. Observations

A journal of the observations is given in Tables 1 and 2. The quoted parameters of the programme stars are from DS93.

The observations were performed with the B&C + CCD spectrograph at the 1.50 m ESO telescope. We used a 400 l/mm grating and a 2 arcsec slit, resulting in a resolution of 7 Å and a wavelength range $\lambda\lambda$ 3300-9100 Å. For V442 Cen and V650 Cen the observations were performed with a 600 ln/mm grating, giving a resolution of 4.7 Å and a range covered of $\lambda\lambda$ 3470-7370 Å. The slit was always rotated perpendicularly to the horizon in order to minimize problems connected with differential atmospheric refraction. The seeing has always been significantly narrower than the slit width (in the FWHM sense). The details on observing strategy, data reduction, seeing and spectrophotometric standards are similar to those of the previous papers in this series.

The atmospheric extinction and instrumental response have been derived individually for each observing night from observations of spectrophotometric standard stars. Inter comparison of the latter throughout the whole observing run shows that the mean r.m.s. error of the absolute flux calibration does not exceed 4% over the $\lambda\lambda$3400–8800 Å wavelength range. Outside these bounds the flux calibration errors may increase appreciably.

3. Results

The flux calibrated spectra for the programme stars are presented in Figures 4–13. As in previous papers in this series continuum fluxes at selected wavelengths, integrated emission line

Send offprint requests to: U.Munari
⋆ Based on observations collected with the telescopes of the European Southern Observatory at La Silla, Chile.

Table 1. Journal of observations of the programme stars. Type, Max and Min as listed by DS93. Code for spectral information available in literature (DS93): *N* = no spectral information; *D* = only a glass plate tracing or a description of the quiescence spectrum; *X* = only a glass plate tracing or a description of the outburst spectrum. Status of the object when we have observed it: *Q* = quiescence; *Out* = outburst.

Name	$\alpha_{2000.0}$	$\delta_{2000.0}$	Type	Max (mag)	Min (mag)	Code	Observ. date	UT (mid-exp)	Expt. time	Status
V650 Ori	05 31 08.25	+09 45 09.9	UG:	15.5 p	>17.5 p	N	07.02.96	01:23	60^{min}	Q
DE Cnc	08 35 27.33	+19 45 29.2	UG	14.6 p	18.0 p	N	08.02.96	03:40	60^{min}	Q
1H 1025+220	10 28 00.15	+21 48 12.9	nl	16.2 V		N	09.02.96	04:37	60^{min}	Q
V442 Cen	11 24 51.99	−35 54 38.6	ugSS	11.9 V	>16.5 v	D	07.02.96	06:46	45^{min}	Out
PG 1157+004	11 59 52.00	+00 07 51.4	cv:	15.9 B		N	09.02.96	05:48	45^{min}	Q
IM Com	12 31 16	+14 12 14	UG:	17.6 B	18.5 B	N	11.02.96	06:51	60^{min}	Q
AP Cru	12 31 20.34	−64 26 24.3	n:	10.7 p	21.7 j	N	10.02.96	03:44	90^{min}	Q
V485 Cen	12 57 23.38	−33 12 07.7	ug	12.9 p	17.9 V	D	09.02.96	06:54	60^{min}	Q
PG 1510+234	15 13 02.35	+23 15 07.0	cv	15.1 B		N	11.02.96	09:10	40^{min}	Out
EK TrA	15 14 01.20	−65 05 35.7	ugsu	10.4 v	16.6:v	X	28.05.96	04:05	60^{min}	Q
PG 1522+122	15 24 27.32	+12 02 06.3	cv	16.1 B		N	11.02.96	08:06	60^{min}	Q
BR Lup	15 35 53	−40 34 07	ugsu	13.1 p	17.5 p	X	29.05.96	01:47	60^{min}	Q
IM Nor	15 39 26.20	−52 19 21.3	n:	9.0 p	22.0 j	N	29.05.96	03:07	60^{min}	Q
HP Nor	16 20 49.64	−54 53 23.3	ugz	12.8 v	16.4 V	D	28.05.96	05:13	50^{min}	Out
IK Nor	16 25 28.97	−55 20 03.4	ug	12.9 p	16.3 p	D	29.05.96	04:21	60^{min}	Q
KQ Nor	16 27 30	−59 19 59	UG/M:	15.8 p	>16.8 p	N	28.05.96	07:31	40^{min}	Q
LR Nor	16 33 53.87	−56 28 03.0	UG	15.5 p	>17.0 p	N	28.05.96	06:25	60^{min}	Q
PG 1633+115	16 35 45.76	+11 24 57.7	cv:	14.9 B		N	28.05.96	02:36	50^{min}	Out ?
AC Sco	16 46 45.85	−27 24 27.0	UG:	12.5 p	>16. p	N	28.05.96	01:24	30^{min}	Q
HO Del	20 36 55.56	+14 03 08.5	UG	13.6 p	>17.2 p	N	31.05.96	07:53	60^{min}	Q

fluxes, UBVRI magnitudes as well as the spectrum classification are given in Tables 3 to 6 for each programme star.

The V magnitude and the U–B, B–V, V–R_C and R_C–I_C colors have been computed from the flux calibrated spectra of each object. They are primarily intended for statistical use and to improve or fill in the missing photometric entries in the DS93 catalogue. For the band transmission profiles we have used the same sources as adopted in previous papers in this series: Lamla (1982; Vilnius Observatory reconstruction) for U and B, and Bessell (1976) for V, R_C and I_C.

The error level of the magnitudes and colors has been estimated by a comparison of derived and tabulated values for each standard star calibrated against all the other ones observed during the same night. The error matches those listed above for the absolute flux calibration. A somewhat larger value is however to be expected for the programme stars because their recorded spectra have in general a lower S/N and their placement on the slit may be problematic for the faintest ones. Comparison with available literature and the results presented in previous papers in this series suggests that the bulk of the targets should have V magnitudes accurate to 0.10 mag, the U-B colors to 0.10 mag and B–V, V–R_C, R_C–I_C colors to 0.05 mag.

In Figure 1 and 2 the colors of the programme stars are compared with the entries in the UBV photometric catalogue of CVs by Bruch & Engel (1994, hereafter BE94) and with the values of confirmed CVs from previous papers in this series. The agreement is excellent, arguing in favor of the accuracy of the flux calibration we have performed.

In Figure 3 the Hα profiles of the emission line objects are plotted on an expanded scale. The profile of the night–sky line at 5577.4 Å in the spectrum of AP Cru is shown as a template of the instrumental resolution (AP Cru being the programme star with the narrowest Hα profile).

4. Notes on some individual objects

AP Cru. This is Nova Cru 1935. It is a poorly known object discovered as a variable in 1935 and later reclassified as a nova, but without a spectroscopic confirmation (D87). The Hα in moderate emission in our spectrum is very sharp, its width not exceeding the instrumental PSF and very unlike those of the validated CVs (cf. Fig. 3).

V650 Ori , **DE Cnc** and **IM Com.** Faint objects with nearly featureless (due to poor S/N) cool continua, similar to field G-K stars.

V442 Cen. The object has been observed close to an outburst maximum, with the only emission being a faint core in the Hα profile.

HP Nor. This object too has been observed during an outburst phase, half-way between maximum and quiescence as suggested by the spectral appearance and the *V* magnitude in Table 6. The classification among the Z Cam sub-class in DS93

Table 2. Target objects without recorded spectra because at the time of our observations they were too faint. Type, Max and Min as listed by DS93. The scheme for spectral code (from DS93) is the same as in Table 1. Last column: magnitude of the object as estimated on deep white–light CCD exposures of the guiding system of the B&C spectrograph at the ESO 1.5 m telescope.

Name	$\alpha_{2000.0}$	$\delta_{2000.0}$	Type	Max (mag)	Min (mag)	Code	Date	UT	V (mag)
SV Ari	03 25 03.57	+19 49 53.9	n:	12. p	22. p	N	10.02.96	01:04	$\geq$ 21
SZ For	03 41 19.96	−26 36 22.4	UG:	18.2 p	20.8 p	N	10.02.96	01:19	$\geq$ 20.5
V701 Tau	03 44 00	+21 57 15	UG:	15.0 p	>21. p	N	10.02.96	01:12	$\geq$ 22
V421 Tau	05 48 22.98	+22 42 01.2	ug	14.5 p	20. p	N	07.02.96	00:35	$\geq$ 21
HM Gem	06 03 09	+25 14 49	UG:	16.5 p	20.5 p	N	07.02.96	00:58	$\geq$ 20.5
V344 Ori	06 15 19.02	+15 30 58.6	UGZ	14.2 p	17.5:p	N	07.02.96	00:49	$\geq$ 21.5
CI Gem	06 30 05.80	+22 18 56.6	ugsu:	14.7 p	18.5 p	N	07.02.96	00:41	$\geq$ 20.5
NSV 3313	06 58 45	+17 02 11	n::	7.0 v	>14. p	D	08.02.96	01:12	$\geq$ 22
EU CMa	07 05 41	−16 08 46	UG	16.5 p	>19. p	N	08.02.96	01:18	$\geq$ 21.5
RX Vol	08 39 32.45	−66 17 40.1	UGSU:	16. p	>18. p	N	06.02.96	03:33	$\geq$ 22
EG Cnc	08 43 04.12	+27 51 48.6	nl/ug:	11.9 v	17. :v	N	08.02.96	02:12	$\geq$ 20.5
CT Hya	08 51 08	+03 08 32	UGSS	14.1 p	20. :p	N	06.02.96	03:53	$\geq$ 21
SY Vol	08 53 28.96	−71 12 31.0	UG:	15.5 p	>17.5 p	N	06.02.96	03:38	$\geq$ 20.5
CQ Vel	08 58 50.99	−53 20 17.8	na:	9.0 p	21. j	D	26.02.96	03:45	$\geq$ 21
RX Cha	10 36 27.03	−80 02 52.4	UG	14.4 p	>16.9 p	N	07.02.96	05:17	$\geq$ 22
MT Cen	11 44 00.74	−60 33 39.1	n:	8.4 p	22. j	N	09.02.96	02:40	$\geq$ 22
V359 Cen	11 58 15.29	−41 46 07.9	n:	13.8 p	21.0 j	N	07.02.96	05:54	$\geq$ 20.5
FU Com	12 30 51.60	+27 07 09.2	ug	19.5 p	21. :p	N	10.02.96	06:07	$\geq$ 20.5
UZ Boo	14 44 01.45	+22 00 55.8	ugwz	11.5 v	20.4 V	N	28.05.96	03:13	$\geq$ 21.5
AI Cir	14 49 31.29	−68 51 35.9	n:	10.9 p	23 j	D	28.05.96	03:20	$\geq$ 21.5
PG 1617+150	16 19 51	+14 52 41	cv	15.0 B		N	28.05.96	02:00	$\geq$ 21.5
V544 Her	16 38 05.48	+08 37 57.4	ug	14.5 p	20: p	N	28.05.96	08:00	$\geq$ 22
V611 Her	16 44 52.16	+19 59 43.7	UG	15.4 p	>16.4 p	N	28.05.96	08:03	$\geq$ 22
V840 Oph	16 54 44	−29 37 26	na:	6.5 p	20: j	D	28.05.96	01:50	$\geq$ 21.5
V2276 Sgr	20 26 22.25	−43 40 33.0	UG	14.3 p	>16.7 p	N	31.05.96	07:14	$\geq$ 21.5
AO Oct	21 05 08.35	−75 21 08.3	ugwz:	13.5 p	21 p	N	31.05.96	08:39	$\geq$ 22
EH Aqr	23 34 06.66	−22 48 53.8	ug	17.5 p	>21.0 p	N	31.05.96	08:45	$\geq$ 22

Table 3. Integrated flux (in units of 10^{-15} erg cm^{-2} sec^{-1}) of the most prominent emission lines. The underlying continuum has been derived from a parabolic fit over a 100 Å interval.

	Hα	Hβ	Hγ	Hδ	He I (4471 Å)	He I (5876 Å)	He I (6678 Å)	He I (7065 Å)	He II (4686 Å)
1H 1025+220	21.5	13.9	8.9	5.6		2.1			
V442 Cen	17.8				9.0		5.5		
AP Cru	0.8								
V485 Cen	5.8	3.8				3.4	2.3	2.6	
PG 1510+234	4.4								
EK TrA	138	104	77	62	16	34	14	9.9	6.7
BR Lup	12	11	9.2	6.9	2.1	2.8	2.0	0.6	1.1
HP Nor	45	34	32	28			7.9	3.4	34
IK Nor	25	17	13	12	2.7	4.9	2.1	1.5	
PG 1633+115	3.3	2.9							
HO Del	17	16	13	14	3.2	4.6	1.6	1.1	

Table 4. Continuum fluxes for the programme stars. The fluxes have been scaled to Flux (5200 Å) = 1.00. They were computed averaging over 50 Å wide bins centered at the given wavelength.

Name	Continuum Fluxes										
	3450	3750	4000	4400	4800	5200	5600	6000	7050	8000	8800
V650 Ori			1.22	1.22	1.12	1.00	0.47	0.95	0.48		
DE Cnc		0.69	0.78	1.02	1.20	1.00	1.24	1.28	1.21	1.08	0.93
1H 1025+220	2.53	1.92	1.75	1.38	1.14	1.00	0.85	0.74	0.53	0.40	0.32
V442 Cen		0.77	1.15	1.17	1.09	1.00	0.88	0.74	0.51		
PG 1157+004	1.90	1.76	1.57	1.30	1.05	1.00	0.86	0.72	0.51	0.38	0.28
IM Com	0.43	0.89	0.99	0.94	1.18	1.00	0.93	0.92	0.74	0.58	0.45
AP Cru	0.05	0.11	0.18	0.58	0.76	1.00	1.32	1.44	1.72	2.02	1.98
V485 Cen	1.86	1.67	1.39	1.00	0.83	1.00	0.79	0.71	0.69	0.57	0.43
PG 1510+234	2.27	1.96	1.81	1.46	1.17	1.00	0.85	0.73	0.51	0.39	0.30
EK TrA	2.86	2.64	1.64	1.16	0.92	1.00	0.80	0.72	0.79	0.55	0.43
PG 1522+122	2.97	2.54	2.34	1.69	1.27	1.00	0.78	0.63	0.36	0.25	0.18
BR Lup	3.29	2.55	1.61	1.19	0.99	1.00	0.89	0.79	0.82	0.70	0.40
IM Nor		1.03	1.16	0.43	0.93	1.00	1.18	1.99	3.93		
HP Nor	2.03	1.72	1.61	1.37	1.14	1.00	0.87	0.76	0.60	0.48	0.37
IK Nor	1.88	1.69	0.96	0.81	0.84	1.00	1.05	1.13	1.44	1.55	1.39
KQ Nor	0.17	0.24	0.49	0.67	0.99	1.00	1.17	1.23	1.23	1.15	0.99
LR Nor	0.27	0.45	0.67	0.81	0.96	1.00	1.11	1.18	1.13	1.10	0.84
PG 1633+115	1.72	1.50	1.65	1.41	1.17	1.00	0.86	0.73	0.53	0.41	0.32
AC Sco 1	0.14	0.25	0.48	0.72	0.95	1.00	1.09	1.12	1.03	0.92	0.76
AC Sco 2	0.15	0.28	0.45	0.61	0.87	1.00	1.19	1.32	1.48	1.56	1.49
HO Del	1.95	1.95	1.33	1.11	1.02	1.00	0.89	0.86	0.81	0.64	0.49

could indicate that we have observed HP Nor during a standstill phase.

PG1157+004. The spectrum is classified as a white dwarf of the DA type. A negative detection at V$\geq$ 16 ($\pm$0.5 mag) was reported in Paper I. Photometry in Table 6 fits well the entries in the PG catalogue (Green et al. 1986), arguing against photometric variability.

V485 Cen. Remarkable spectrum with He I lines rivaling in intensity with hydrogen, a chemical abundance effect. Augusteijn *et al.* (1996) argued for a 59^{min} orbital period, thus our 60^{min} exposure spectrum looks as a perfect average over the orbital period. The suggestion by Augusteijn *et al.* about contribution to the system emission by the secondary star in the red part of the spectrum is confirmed by the color progression in our Table 6. Tutukov & Yungelson (1996) has modeled the ultra-short orbital period binaries like V485 Cen as helium white dwarf donors and carbon-oxygen WD accretors, with important implications for supernovae and accretion induced collapses.

PG 1510+234. The object has been photometrically confirmed as a dwarf nova with a short outburst cycle length by Iida et al. (1995), with a range in V between 14.8 and 17.9 mag. Our spectrum shows an Hα in moderate emission and an emission core inside a broad absorption for higher Balmer lines which is appropriate for a CV halfway between outburst maximum and quiescence, as supported by the V=16.3 mag we measured on our spectrum.

PG 1522+122. Haefner (1995) reported the object does not show flickering activity. Our photometry in Table 6 is quite close to that reported in the PG catalogue (Green et al. 1986), suggesting limited or no variability. Our spectrum resembles that of a late sdB (HeI 4471 Å weakly present).

IM Nor. Elliot & Liller (1972) reviewed the available very scanty photometric informations on IM Nor $\equiv$ Nova Nor 1920, which rose to mag 9 and lingered there for at least a couple of months. No spectroscopic information collected during the eruption is available. Our spectrum refers to the star marked in the finding chart by D87 and is quite featureless, possibly a K star. We measure B=21.5 on our spectrum, which is quite close to the eye–estimated mag = 22j by D87 on the SRC plates. The faintness (and therefore distance), very red colors and low galactic latitude ($b = +2.5°$) all suggest significant reddening. The strongest absorption line in the spectrum is in fact the (interstellar) NaI D at λ=5893 Å.

IK Nor. A CV-like emission line spectrum with the TiO bands of the secondary star well visible in the red. The red–peaked energy distribution of the secondary and a low relative brightness of the disk may explain the slope of the continuum and the red colors in Table 6. Interstellar reddening does not seems to

Table 5. Classification of the programme stars.

Name	Classification
V650 Ori	cool cont.
DE Cnc	cool cont.
1H 1025+220	CV
V442 Cen	CV
PG 1157+004	WD (DA)
IM Com	cool cont.
AP Cru	K7 + Hα em.
V485 Cen	CV
PG 1510+234	CV
EK TrA	CV
PG 1522+122	sdB
BR Lup	CV
IM Nor	K:
HP Nor	CV
IK Nor	CV
KQ Nor	K3 III
LR Nor	G2 II :
PG 1633+115	CV
AC Sco 1	F8 V
AC Sco 2	G5 V
HO Del	CV

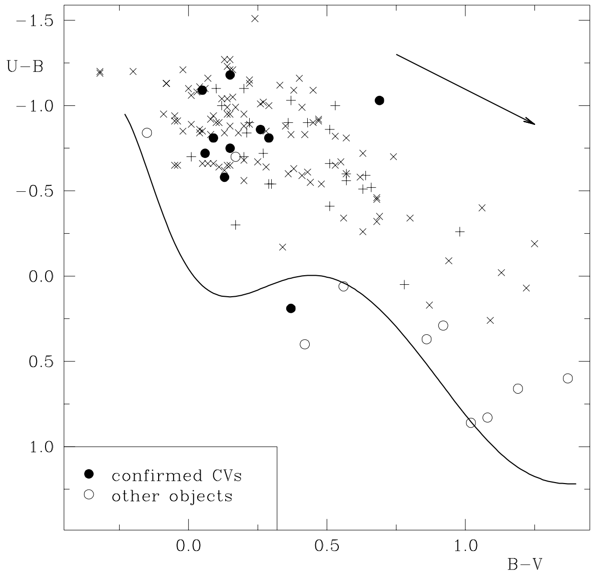

Fig. 1. U–B, B–V diagram of programme stars. No reddening correction has been applied to the data given in Table 6. The reddening vector corresponding to E_{B-V}=0.5 is shown. The solid line is the ZAMS according to Caldwell *et al.* (1993). Legend: *filled circles* = confirmed CVs from the present paper; *open circles* = other programme stars; *crosses* = CVs in quiescence from the UBV photometric catalogue of Bruch & Engel (1994); *plus signs* = validated CVs in quiescence from previous papers in this series.

Table 6. U–B, B–V, V–R_C, R_C–I_C color indices and V magnitude for the programme stars as derived from our absolute spectrophotometry.

Name	V	U-B	B-V	V-R_C	R_C-I_C
V650 Ori	20.25	0.40	0.42		
DE Cnc	18.16	0.47	0.76	0.51	0.58
1H 1025+220	16.44	-0.81	0.09	0.20	0.17
V442 Cen	12.25	0.19	0.37	0.11	
PG 1157+004	15.81	-0.70	0.17	0.16	0.15
IM Com	18.07	0.06	0.56	0.34	0.37
AP Cru	18.68	0.60	1.37	0.79	0.98
V485 Cen	18.06	-0.81	0.29	0.29	0.46
PG 1510+234	16.27	-0.72	0.06	0.17	0.13
EK TrA	16.50	-1.09	0.05	0.39	0.41
PG 1522+122	16.44	-0.84	-0.15	0.02	-0.13
BR Lup	18.42	-1.18	0.15	0.41	0.49
IM Nor	20.03		1.47	1.22	1.48
HP Nor	14.18	-0.75	0.15	0.24	0.30
IK Nor	17.58	-1.03	0.69	0.69	0.89
KQ Nor	13.71	0.83	1.08	0.58	0.64
LR Nor	18.28	0.29	0.92	0.55	0.62
PG 1633+115	15.95	-0.58	0.13	0.19	0.19
AC Sco 1	13.95	0.86	1.02	0.51	0.53
AC Sco 2	17.18	0.66	1.19	0.70	0.82
HO Del	17.82	-0.86	0.26	0.41	0.45

play an appreciable role due to the absence of NaI D absorption at λ 5893 Å.

PG 1633+115. The spectra of Ringwald (1993) show weak Hα emission and even weaker Hβ absorption. Our spectrum presents emission cores in broad Hβ, Hγ and Hδ absorptions and a full emission Hα of moderate intensity. Misselt & Shafter (1995) reported short term $\triangle m \sim 0.06$ mag variability of PG 1633+115 with periods $\sim 3^h$ and wider $\triangle m \sim 0.5$ variability over weeks. The objects looks as a genuine CV observed possibly far from flat quiescence conditions.

AC Sco. The star marked in DS93 is an optical double. We observed both objects. The brighter star is classified as F8 V. The fainter one $\sim$ 4 arc sec to the south of the bright one is a G5 V.

References

Augusteijn T., van der Hooft F., de Jong J.A. & van Paradijs J. 1996, A&A 311, 889
Bessell M.S. 1976, PASP 88, 557
Bruch A., Engel A. 1994, A&AS 104, 79, (BE94)
Caldwell J.A.R., Cousins A.W.J., Ahlers C.C., van Wamelen P. & Maritz E.J. 1993, South African Astron. Obs. Circulars 15, 1
Downes R.A. & Shara M.M. 1993, PASP 105, 127 (DS93)

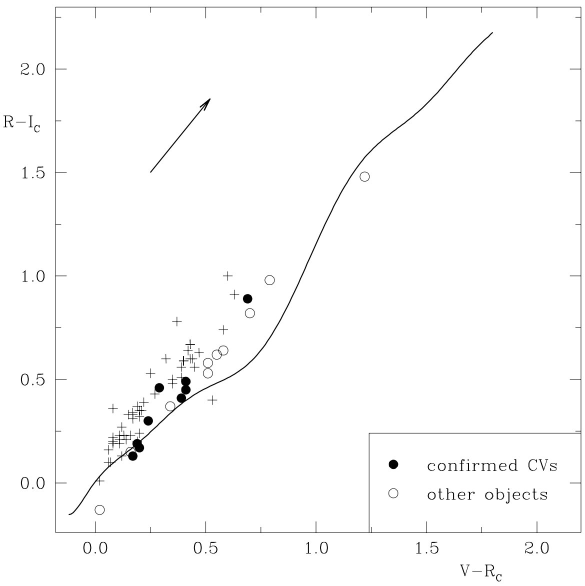

Fig. 2. V-R$_C$, R$_C$-I$_C$ diagram of programme stars. The solid line is the ZAMS according to Caldwell *et al.* (1993). No reddening correction has been applied lied to the data given in Table 6. The reddening vector corresponding to E_{B-V}=0.5 is shown. The symbols are: *filled circles* = confirmed CVs from the present paper; *open circles* = other programme stars; *plus signs* = validated CVs in quiescence from previous papers in this series.

Duerbeck H.W. 1987, *A Reference Catalogue and Atlas of Galactic Novae,* Space Science Reviews 45, 1 (D87)
Elliot J.L. & Liller W. 1972, ApJLett 175, L79
Green R.F., Schmidt M. & Liebert J. 1986, ApJS 61, 305
Haefner R. 1995, IBVS 4178
Iida M., Nogami D., Kato T. 1995, IBVS 4208
Lamla E. 1982, in: Landolt-Börnstein Series 2b, eds. K. Schaifers, H.H. Voight, Springer, Berlin
Misselt K.A. & Shafter A.W. 1995, AJ 109, 1757
Munari U., Zwitter T. & Bragaglia A. 1997, A&AS 122, 495, (Paper IV)
Ringwald F. 1993, Ph.D. dissertation
Tutukov A. & Yungelson L. 1996, MNRAS 280, 1035
Zwitter T. & Munari U. 1994, A&AS 107, 503, (Paper I)
Zwitter T. & Munari U. 1995, A&AS 114, 575, (Paper II)
Zwitter T. & Munari U. 1996, A&AS 117, 449, (Paper III)

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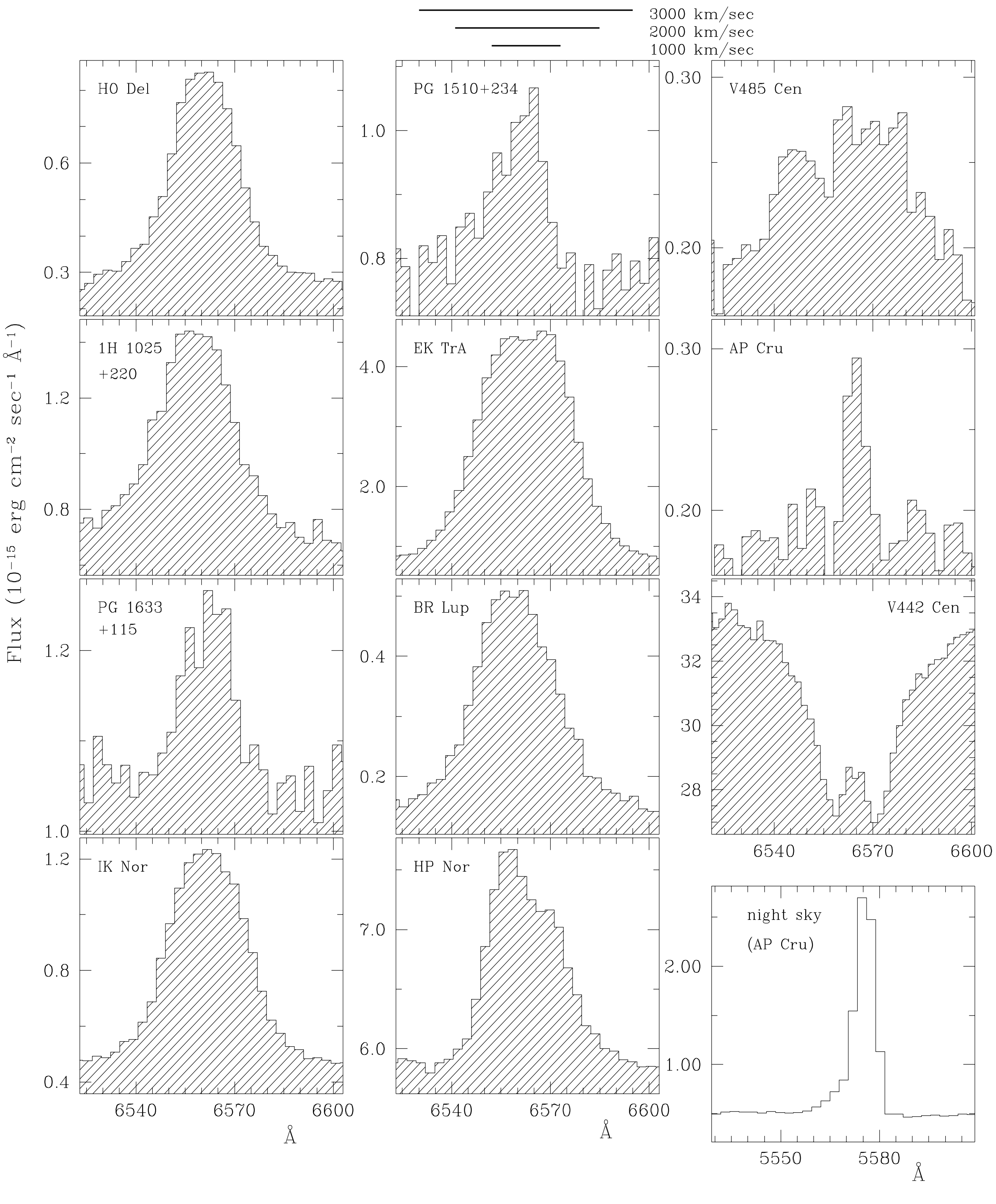

Fig. 3. Hα emission profiles for the validated CVs among the programme stars. Fluxes in units of 10^{-15} erg cm^{-2} sec^{-1} Å^{-1}. The night–sky line at 5577.4 Å from the NN Cen spectrum is shown on the same scale as a reference for the instrumental resolution and flux level of the background sky (computed on the same number of CCD columns as for the programme stars)

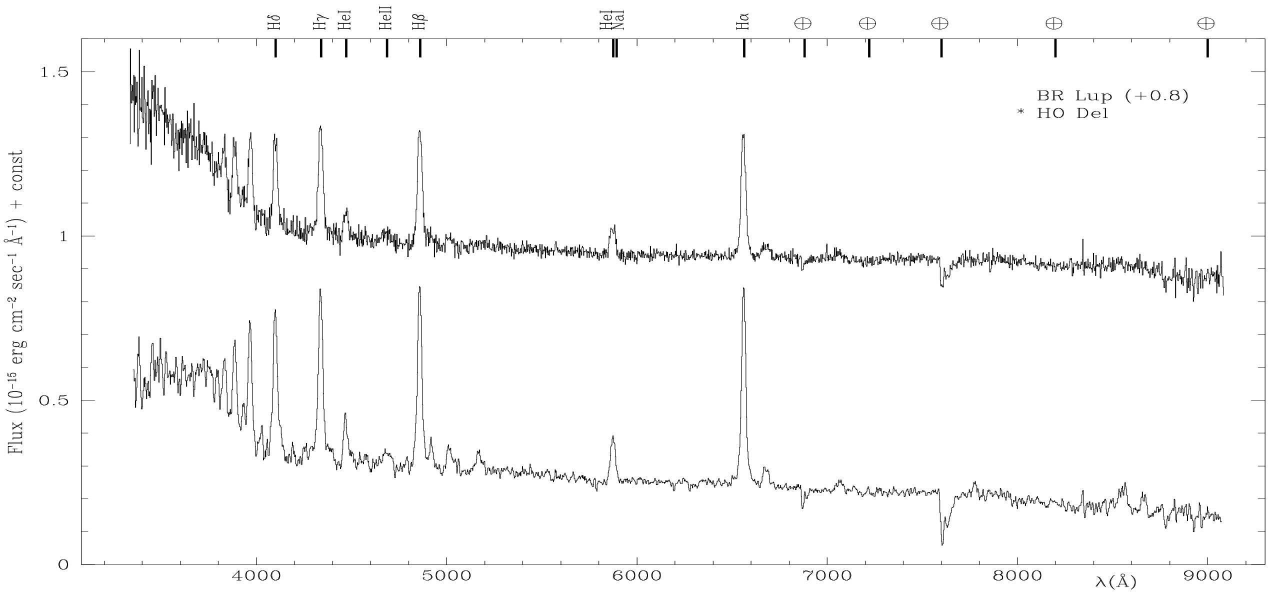

Fig. 4. Spectra of BR Lup and HO Del. The offset applied for plot clarity is given in brackets next to the star name. The spectra are not corrected for reddening. The asterisk means that a boxcar smoothing (3 pixels window) has been applied. Fluxes in units of 10^{-15} erg cm^{-2} sec^{-1} Å^{-1}

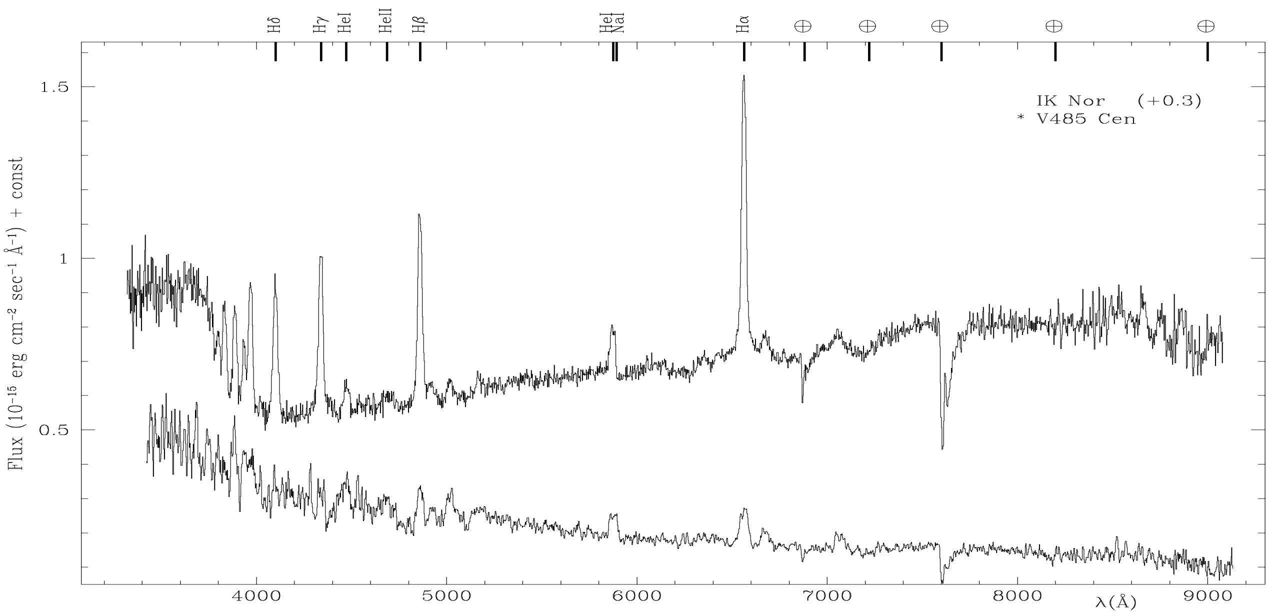

Fig. 5. Spectra of IK Nor and V485 Cen. The offset applied for plot clarity is given in brackets next to the star name. The spectra are not corrected for reddening. The asterisk means that a boxcar smoothing (3 pixels window) has been applied. Fluxes in units of 10^{-15} erg cm^{-2} sec^{-1} Å^{-1}

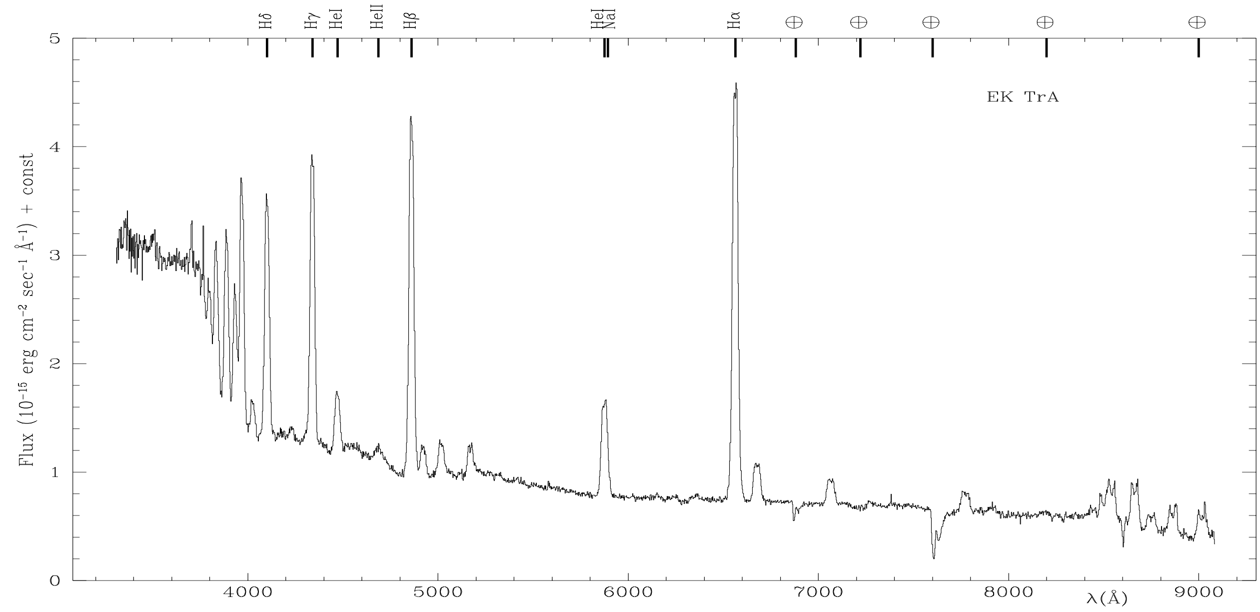

Fig. 6. Spectrum of EK TrA (not corrected for reddening). Fluxes in units of 10^{-15} erg cm^{-2} sec^{-1} Å^{-1}

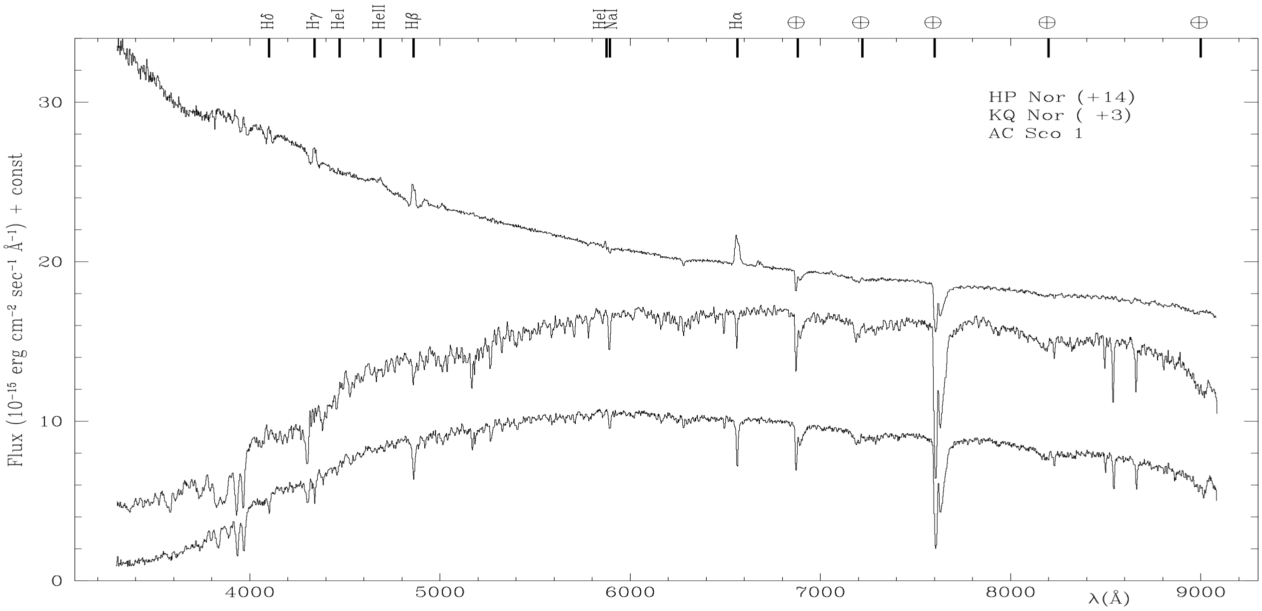

Fig. 7. Spectra of HP Nor, KQ Nor and AC Sco #1. The offset applied for plot clarity is given in brackets next to the star name. The spectra are not corrected for reddening. Fluxes in units of 10^{-15} erg cm^{-2} sec^{-1} Å^{-1}

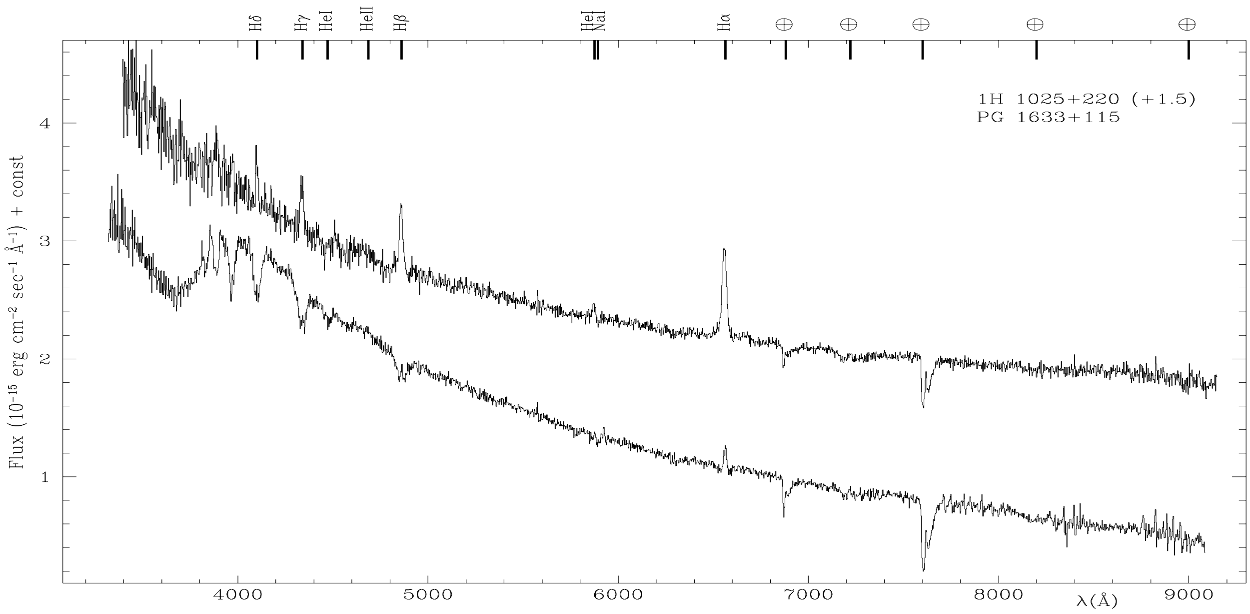

Fig. 8. Spectra of 1H 1025+220 and PG 1633+115. The offset applied for plot clarity is given in brackets next to the star name. The spectra are not corrected for reddening. Fluxes in units of 10^{-15} erg cm^{-2} sec^{-1} Å^{-1}

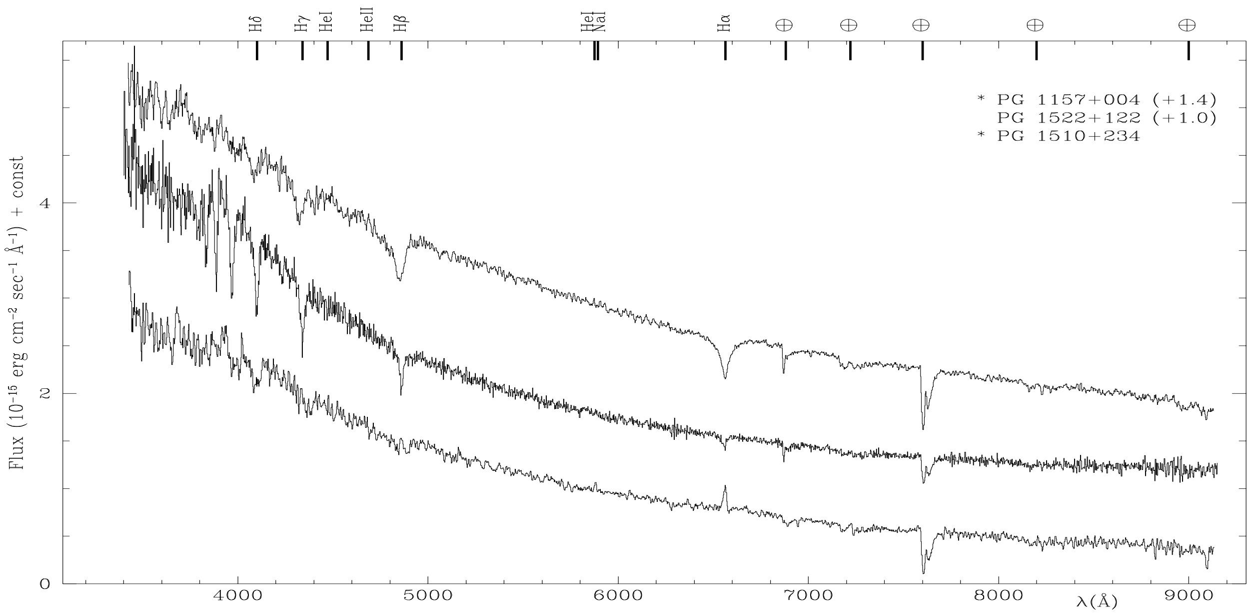

Fig. 9. Spectra of PG 1157+004, PG 1522+122 and PG 1510+234. The offset applied for plot clarity is given in brackets next to the star name. The spectra are not corrected for reddening. The asterisk means that a boxcar smoothing (3 pixels window) has been applied. Fluxes in units of 10^{-15} erg cm^{-2} sec^{-1} Å^{-1}

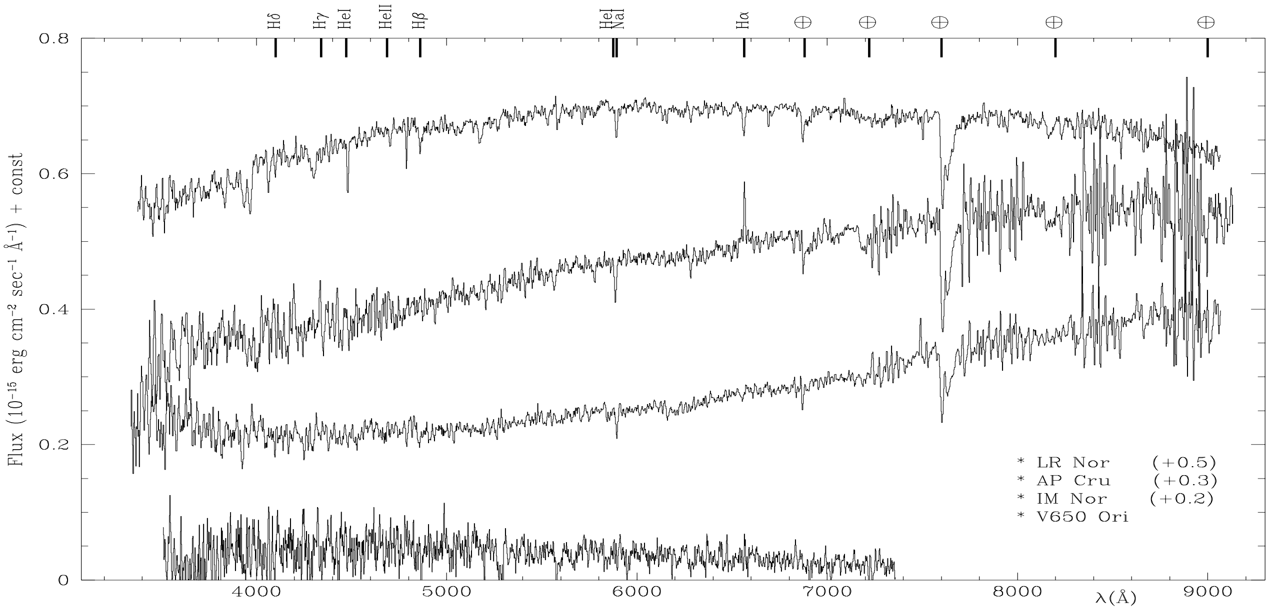

Fig. 10. Spectra of LR Nor, AP Cru, IM Nor and V650 Ori. The offset applied for plot clarity is given in brackets next to the star name. The spectra are not corrected for reddening. The asterisk means that a boxcar smoothing (3 pixels window) has been applied. Fluxes in units of 10^{-15} erg cm^{-2} sec^{-1} Å^{-1}

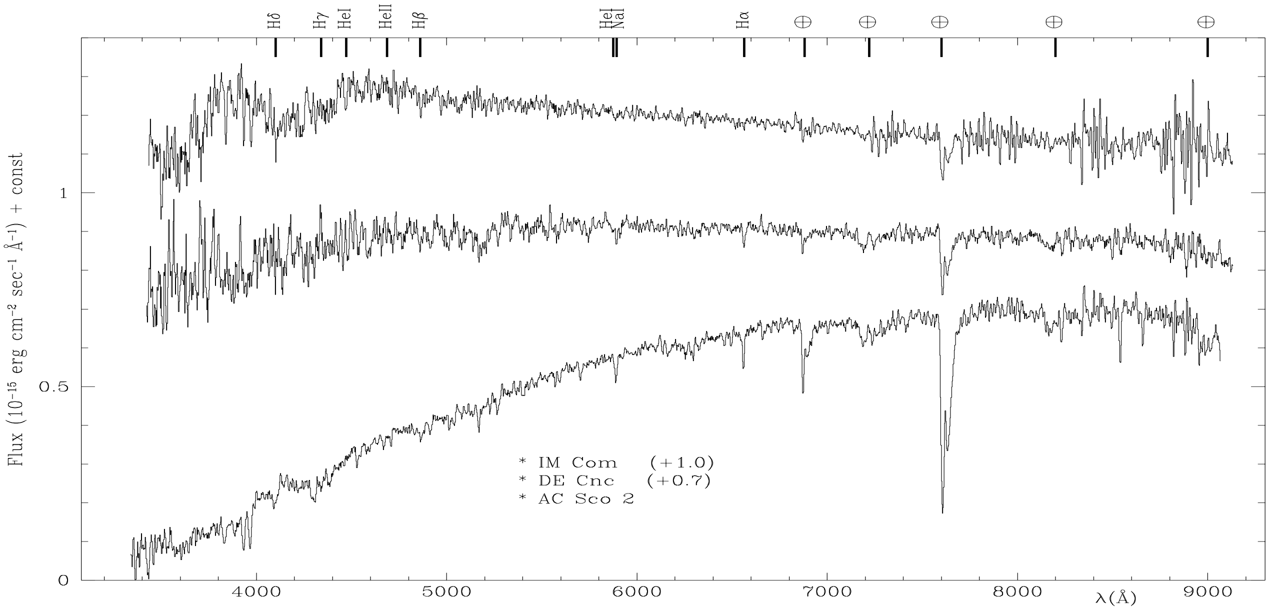

Fig. 11. Spectra of IM Com, DE Cnc and AC Sco #2. The offset applied for plot clarity is given in brackets next to the star name. The spectra are not corrected for reddening. The asterisk means that a boxcar smoothing (3 pixels window) has been applied. Fluxes in units of 10^{-15} erg cm^{-2} sec^{-1} Å^{-1}

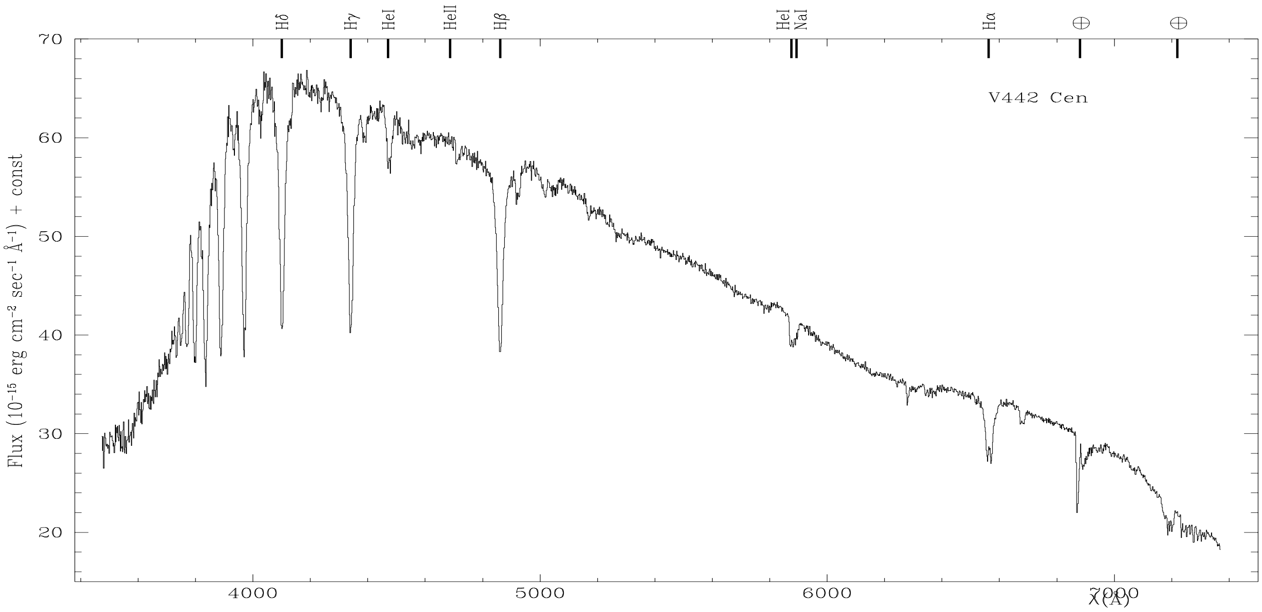

Fig. 12. Spectrum of V442 Cen. Fluxes in units of 10^{-15} erg cm^{-2} sec^{-1} Å^{-1}