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CONTENTS

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Normally only one copy per institute will be mailed. By default, it will be sent to the institute's library; please name a contact person if this is not desirable.

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EDITORIAL

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I am happy to send you the twentieth issue of the *Be Star Newsletter*. As the *Newsletter* begins its ninth year, it continues to be an important source of current information and bibliographical material for the astronomical community. Included in this issue are the usual Working Group Matters, Contributions, What's Active/Inactive?, Observations . . . Theoretical Support Wanted/Available, Preprints Received, and Bibliography. It is your input that makes the *Newsletter* so useful and I extend many thanks to the researchers who have sent contributions. I especially appreciate the help with the bibliography. As always, if your recent paper is not listed (or cited incorrectly), I will mention it in the next issue if you call my attention to the omission.

The multiwavelength aspect of contemporary Be star astronomy is illustrated well in this issue. Included are reports on recent UV monitoring of the active Be stars HR 2855 (FY CMa, HD 58978) and λ Eri, an X-ray outburst from the binary system A0535+26 + HDE 245770, the oscillatory envelope of the Herbig Ae/Be star HD 200775 (which displays behavior much like that seen in a classical Be star), and a search for radio emission from nineteen bright Be stars. In the *abstracts* we also find information on the possible binary nature of some Be stars.

Next year will mark the tenth anniversary of the publication of the *Be Star Newsletter* and I would like for you to send me your ideas on how to best celebrate this event. I continue to find your comments on the *Newsletter* valuable in my quest to make it more useful to the readership.

Since biannual publication of the *Newsletter* seems to be preferred, the next issue should be distributed in October. Therefore, contributions for Issue No. 21 should be received by:

September 1, 1989

Lengthy contributions should be submitted in a camera-ready format (see Issue No. 14 for instructions), but for short communications I recommend FAX mail (telephone number: 213-746-5684), Electronic Mail (SPAN, temporary address: CYGNUS::PETERS), or telex (4720490 USC LSA).

I would like to wish you a happy springtime and success in your research in 1989. I hope that your summer produces many new discoveries, which you will announce in future *Newsletters*!

I thank the European Southern Observatory for their continued financial support.

Gerrie Peters, Editor

CONTRIBUTIONS

* * * * *

Recent UV Observations of Bright Be Stars

C.A. Grady

Astronomy Programs, Computer Sciences Corporation

HR 2855 (FY CMa, HD 58978): This star continues to show strong absorption in N V, C IV, Si IV, and Si III, with strong emission in N V and a trace of emission in C IV as it has for the past decade. The 138 day period noted for N V and Fe III continues. Analysis of the continuum variation at 1255 Å, corrected for the gradual loss of sensitivity of the SWP camera, shows that the continuum near N V varies by at least 30% (significant at the 6σ level). The continuum variability occurs on time scales of a few weeks to months, and is uncorrelated with the 138 day period. We did not observe a repeat of the 1988 March 20 continuum fading and wind ionization decrease during our intensive monitoring run in December 1988, implying that the flux decrease was not part of an eclipse. Additional observations of this star were made in January, February, and April 1989 at VILSPA, but have not yet arrived at GSFC for analysis.

Lambda Eri (HD 33328): IUE observations made December 19-23, 1988 showed moderately strong C IV absorption, indicating that this star was once again in a Be/strong wind state. An *IUE* observation made by G. Peters on November 19, 1988 examined following the quick-look analysis of the December data showed that the strong wind episode had begun by at least that time. Additional IUE observations of this star were made in January, February, and April 1989, but have yet to be analyzed.

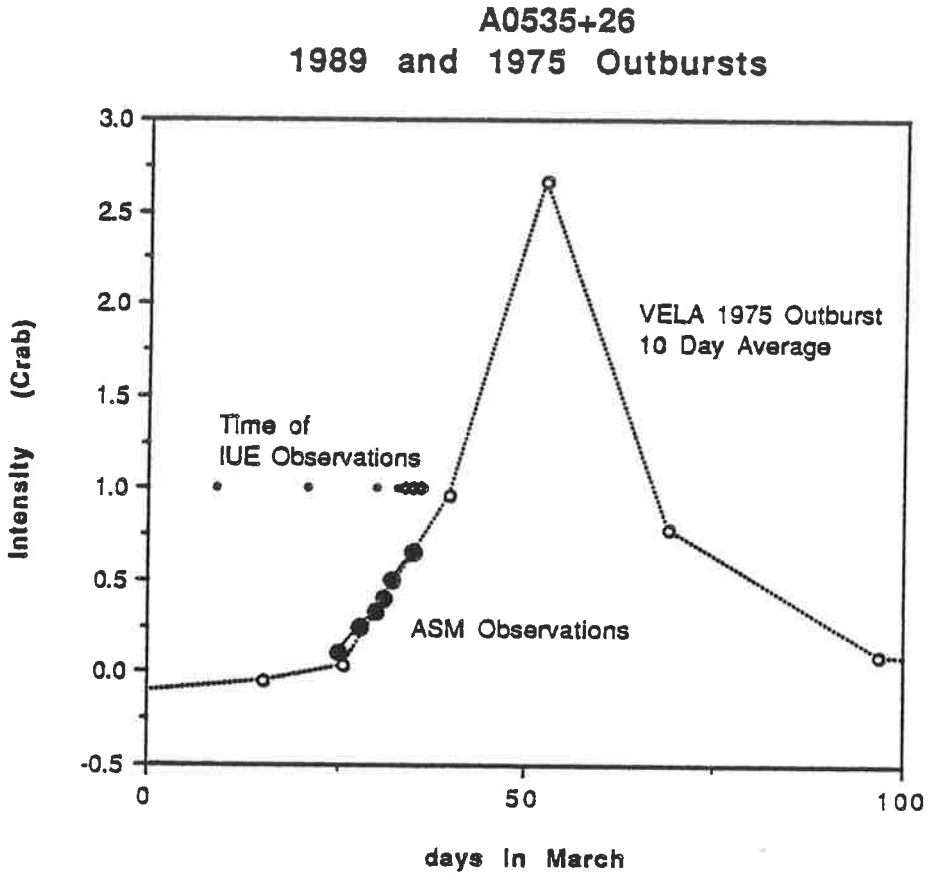
1989 X-ray Outburst from A0535+26 (HDE245770 or V725 Tau)

D. Roussel-Dupré*, and S. Kitamoto†
(*Los Alamos National Laboratory and †University of Osaka)

The ALL SKY MONITOR (ASM) detector on the Ginga satellite discovered an x-ray outburst from A0535+26 on 28 March, 1989. The timing of this outburst is consistent with the 111 day ephemeris of Priedhorsky and Terrell (1983). At the time of this writing, the source strength is 600-700 mCrab in the 1-6 keV range (approximately 600-700 μJy).

The ASM experiment consists of 2 proportional counters each with 3 sets of fan beam collimators (1^o x 45^o). Source positions can be determined to 0.5^o with a detection limit of better than 50 mCrab. The energy range is 1-20 keV. ASM observes the sky once per day in its normal survey mode.

A0535+26 is a Be/x-ray binary system which exhibits periodic outbursts in the range of 0.1 - 3 Crab. It is known to have a 104 s pulsation period, and a binary period of 111 days is inferred from the outburst frequency. Optical enhancement has been observed 7-8 days prior to the x-ray outburst for two outburst.



Observations of the current outburst include:

1) *Ginga* observations by both ASM and LAC continue to be made. LAC observations, made under the target of opportunity program, will monitor changes in the 104 s pulse period; routine monitoring observations by ASM will provide the long term s-ray light curve for this source.

2) VLA observations were made by Bob Hjellming and France Córdova on 10 April, between 0:30-2:30 UT at VLA in both the standard aperture synthesis mode and in a new high time resolution processor (HTRP) mode. Follow on observations will be made at the VLA during test times on 12 and 26 April.

3) IUE observations by Giovannelli used the SWP in high dispersion prior to the x-ray alert. Target of opportunity observations in low dispersion were subsequently made by Chris Shrader with both the SWP and LWP cameras on 3, 4, and 5 April, 1989. Unfortunately, additional IUE observations are now impossible due to the close proximity to the Sun. A visual light curve has been constructed from SES data.

Like other Be/x-ray binary systems, x-ray outbursts from this source usually last about 30 days. Because this source is approximately 9th magnitude and because the outburst is several tens of days long, it is an ideal target for multiwavelength campaigns. One such campaign was mounted during the 1981 outburst (de Loore, et al, A & A, 141, 279, 1984). We are hopeful that the observations already obtained and the ones planned in the future will produce very interesting and fruitful results, although the proximity of the Sun will limit the amount of data to be obtained. If anyone has any data from this outburst, we would appreciate being sent preliminary results so we can compare it with our data. The point of contact is:

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One of us (D. R.-D.) was partially funded under the auspices of the US Department of Energy.

ON THE PULSATING ENVELOPE OF HD 200775

M. Ruusalepp
W. Struve Tartu Astrophysical Observatory, Tõravere, Estonia, 202444, USSR

Abstract. The variability of H_β line intensity is studied on the basis of observations made during 1976-1986. On the ground of V/R ratio, peak separation and W_λ variations it has been concluded that the envelope of HD 200775 is pulsating with $P \approx 220^d$.

HD 200775(=BD+67°1283= MWC361, B3IV-Ve), the central star of reflecting nebula NGC 7023 is one the brightest Herbig Ae/Be stars. The early history of spectral investigations of HD 200775 has been described by Viotti (1969) and Baschek et al. (1982) who adopted $T_{eff}=(17000\pm1000)$K and $\log g(cm\ s^{-2})=3.6\pm0.3$. This star is not a fast rotator. Using the FWHM of HeI λ4471 Å and MgII λ4481 Å lines we found for i=45°-60°, w=0.30-0.35 and vsini=103 km s^{-1} (Ruusalepp, 1986).

The emission line spectrum of this star provokes interest due to the unusual strength of Hα emission compared with the emission strength of the other Balmer lines. The present paper is based on the spectra observed during 1976-1986 with the 1.5 m telescope of Tartu Observatory. To study the dynamics and physics of the envelope we used the H_β profile since the observational equipment has the maximum resolution in this spectral region. The line profile is typical for Be stars: on the absorption component of the star there is an emission feature from the envelope and a shell absorption, which divides the emission into V and R components. In addition to the V/R and E/C variations we found substantial changes in the V and R component peak separation from 2.4 Å (148 km s^{-1}) up to 4.0 Å (247 km s^{-1}). According to Hutchings' (1970) calculations the peak separation is a function of inclination angle i, temperature and radial expansion velocity. The peaks widen, when inclination angle i and radial expansion velocity are increasing, while temperature increase induces the peak separation decreasing. In our case we exclude the i variations, because precession of rotational axes does not cause so large variations of peak separation.

Pulsational nature of the envelope should be seen also in the intensities of emission lines as the dimensions of the emitting region, the density distribution and velocity field in the envelope are varying. Using the normal star i Her as a comparison star and assuming that photospheric absorption lines of both stars are identical we determined the emission equivalent widths (W_λ) by subtracting the absorption profiles of i Her from the profiles of HD 200775 similarly to Baschek et al. (1982).

Using the pulsation period $P=220^d$, the V/R ratio, the peak separation and W_λ variations are plotted against the phase on Figs. 1a, 1b and 1c, respectively. We can see that during the 0.0-0.6 phase the envelope is expanding, whereas increasing peak separation indicates the growth of the outer radius of the envelope as the radial expansion velocity is increasing. This is accompanied by the decrease of the W_λ value, which is caused by the diminishing of the emitting gas density. During the contraction phase W_λ is increasing which may be caused by the growth of the density and temperature of emitting gas.

It seems that HD 200775 is a very interesting star and much more data about E/C, V/R, peak separation and radial velocity variations of all Balmer lines are needed for modelling of this star and its envelope.

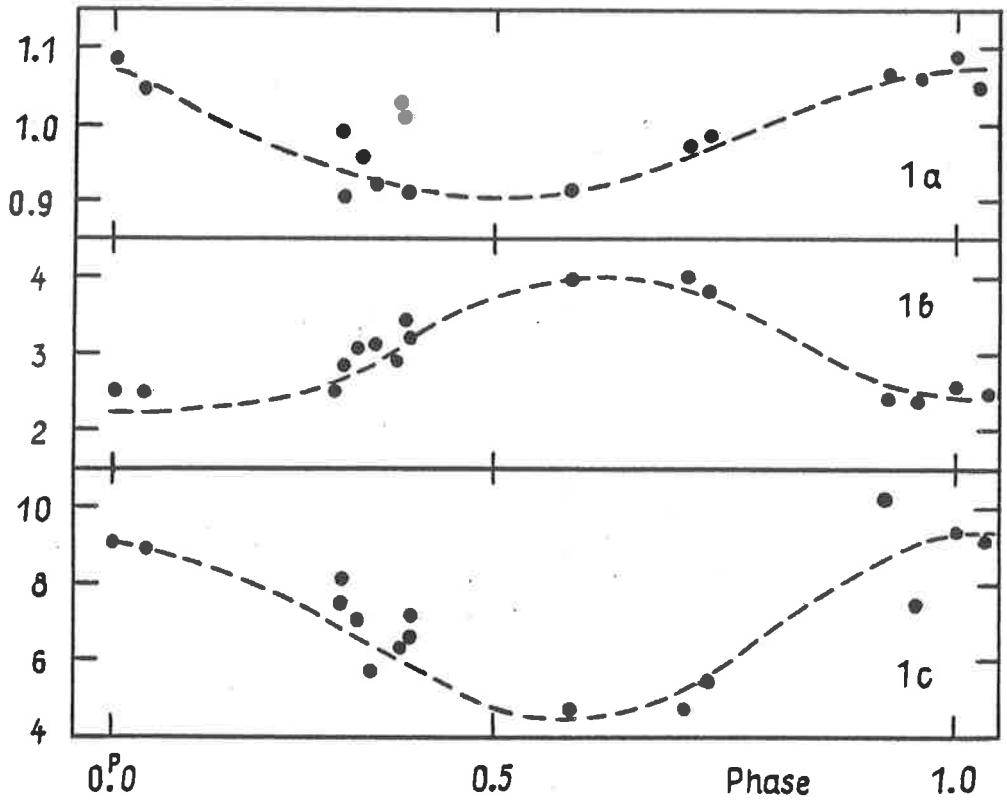

Fig 1. The variations of the V/R ratio, V and R peak separation (in Å) and equivalent widths of H_β emission component (in Å) for HD 200775 envelope are plotted against the phase in 1a, 1b and 1c, respectively. The pulsational period $P=220^d$.

References:

Baschek B. et al. (1982). On the Spectrum of Herbig Be Star HD 200775. Astr. Ap. 105, pp. 300-305.

Hutchings J.B. (1970). Rotationally Extended Stellar Envelopes: γCas. MN 150, No1, pp. 55-66.

Ruusalepp M. (1986). Determination of w and i Values for B0-B3 Rotating Stars. Publ. Tartu Astrofüüs. Obs. 51, pp. 89-97.

Viotti R. (1969). On the Stellar Nucleus of NGC 7023. Mem. Soc. Astron. Ital. 40, pp. 75-81.

Simultaneous Radio and H-alpha observations of Be stars

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We have observed 18 Be stars in the radio continuum with the VLA radio telescope on 7th February 1987. The same night we observed 12 of them with a grating spectrograph attached to the 1 meter telescope of the Vainu Bappu Observatory and obtained H-alpha fluxes and profiles. Subsequently we observed the rest of the Be stars in the optical. The radio observations were made at 2 cm and no flux was observed from any of the stars. We obtain a 3σ upper limit of 0.5 mJy for the radio flux density at 2 cm. The details of the stars observed and the H-alpha equivalent widths are given in the Table.

It is seen from the table that several of the Be stars are in the emission phase, suggesting the presence of an ionized gas envelope. In spite of this no radio flux was observed. The reason for it is as follows : strong H-alpha emission means a gas density and size which is optically thick at 2 cm radio wave length. Then the observed flux is proportional to the area of the gas envelope. When the H-alpha flux is strong, the envelope is close to the Be star ($\lesssim 10^{12}$ cm) and the radio flux emitted is below the observable threshold. Radio flux can be observed only when the envelope, in its expansion, reaches a sufficiently large size. Some of the details of this will be presented elsewhere.

HR	HD	Name	V_{mag}	MK	W(α) (Å)
193	4180	o Cas	4.54	B 5 IIIe	- 39.45*
264	5394	γ Cas	2.47	B 0 IVe	- 24.40
496	10516	ϕ Per	4.07	B 2 Ve	- 24.61
1087	22192	ψ Per	4.23	B 5 Ve	- 25.89
1142	23302	17 Tau	3.70	B 6 IIIe	+ 3.28
1273	25940	48 Per	4.04	B 3 Ve	- 14.41
1789	35439	25 Ori	4.95	B 1 Ve	- 8.24
1910	37202	ζ Tau	3.00	B 4 IIIe	- 5.94
1934	37490	w Ori	4.51	B 2 IIIe	- 7.11
2010	38899	134 Tau	4.91	B 9 IV	+ 9.44
2356	45725	β^1 Mon	4.57	B 4 Ve	- 16.51
2538	50013	k CMa	3.47	B 2 IVe	- 13.90
3034	63462	o Pup	4.48	B 1 IVe	- 7.77
4787	109387	k Dra	3.87	B 6 IIIe	- 15.74
4897	112078	λ Cru	4.62	B 4 Ve	+ 8.27
5941	142983	48 Lib	4.88	B 5 IIIe	- 14.83
6118	148184	X Oph	4.42	B 2 IVe	- 44.67
6712	164284	66 Oph	4.64	B 2 Ve	- 51.38
7708	191610	28 Cyg	4.93	B 2.5 Ve	- 20.15

* Negative value implies emission.

WHAT'S ACTIVE/INACTIVE?

* * * * *

ANOTHER BALMER EMISSION OUTBURST IN μ CENTAURI

Another emission event, apparently similar to the ones observed in 1985 and 1987 (Peters 1986, *Ap.J.* 301, L61; Baade, Dachs, van de Weygaert, and Steeman 1988, *Astr.Ap.* 198, 211), was observed in μ Cen in February. Observations were made at Kitt Peak National Observatory with the Coude Feed Telescope and the TI3 CCD detector between 1989 February 3 (10:20 UT) and February 5 (10:17 UT). The instrumental setup was identical to the one described in Peters 1986.

When μ Cen was first observed at 10:20 UT on February 3, weak double emission could be discerned in the center of Hα (Figure 1, below). No change was seen in Hα over the next two hours, but the profile of He I 6678 displayed variations and the structure and asymmetry was suggestive of the presence of low and high-order nonradial modes. When the star was next observed at 11:20 UT on February 4, one could clearly see emission in Hα with R > V. The strength of the emission slowly increased during the two hours that followed. The last spectrum obtained on February 4 is also shown below. Poor weather on the following night precluded further study of the event other than to confirm in a weak exposure that the Hα emission was at the continuum level and V > R.

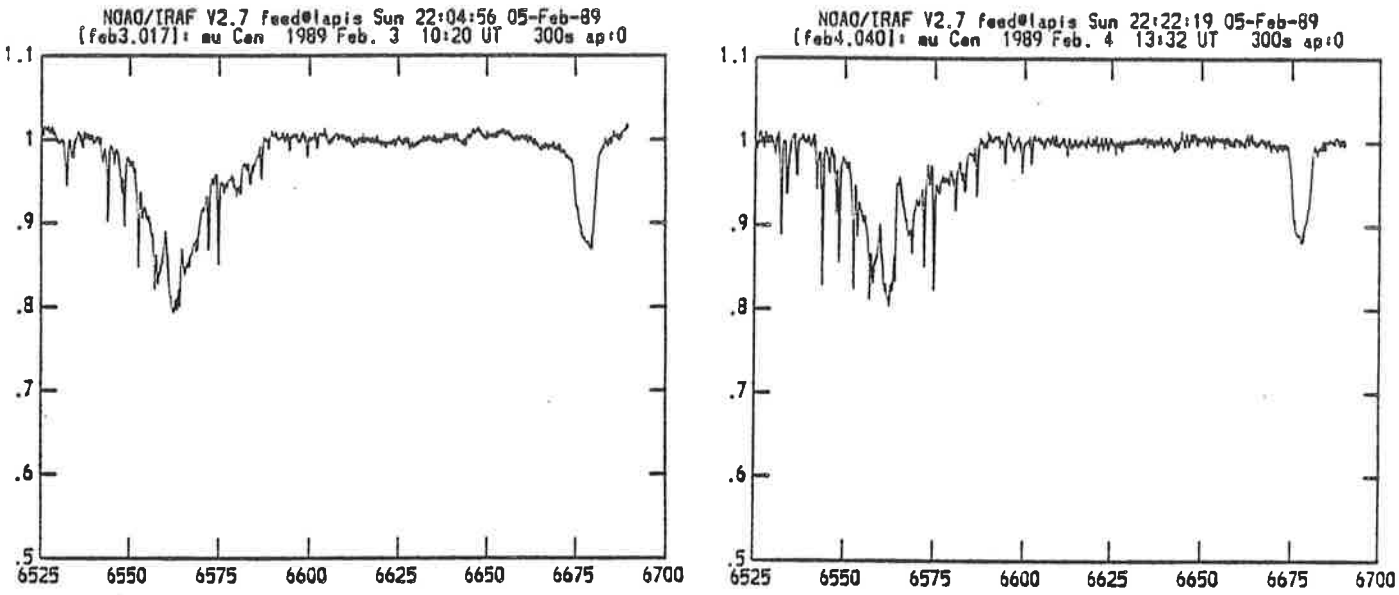

Fig. 1 - Hα / He I 6678 observations of μ Cen on 1989 February 3 and 4 reveal the onset of an emission episode in about one day. Note the fine structure in the He I line. The strong, sharp absorption features are the ubiquitous telluric H_2O lines which pervade the Hα region.

RECENT Hα OBSERVATIONS AT KITT PEAK NATIONAL OBSERVATORY

This report continues a series of updates on the changes in Hα and He I 6678 in selected Be stars of current interest to the community. Observations were made with the Coude Feed Telescope at KPNO from 1989 February 2-5 with the TI3 CCD detector and camera No. 5. The resolution for a line width of 2 pixels is 0.44 Å, and the S/N for the observations range from 100 - 200 averaged over twenty pixels. The observations described below will be compared with those reported in Issue No. 19 of the *Be Star Newsletter (BSN19)* from an observing run in 1988 November.

γ Cas - The peak intensity of Hα continues to be 4.3 ± 0.1 I_c A very weak core continues to be seen on the red portion of this generally triangular profile. He I 6678 is still completely filled with emission, V > R, and the peak intensity of the V lobe remains at 1.03 ± .01 (as reported in *BSN19*).

28 Tau - The Hα emission was weaker than reported in *BSN19*. A peak intensity of 4.0 I_c was recorded, and V ≈ R. No emission above the continuum could be discerned in He I 6678.

λ Eri - This active Be star began another emission episode in 1988 November. No Hα emission was evident during my observing run in early November. However, from the presence of ephemeral V/R emission in He I 6678 in mid-November, Myron Smith predicted (E-mail message distributed to several colleagues) that an outburst might be forthcoming. D. Baade reported in an E-mail message on December 22 that R. Ferlet (Paris) observed double Hα emission (V = R) with a peak intensity of 1.08 I_c (spectrum obtained with the CAT+CES at La Silla). My observations in early February showed Hα to be a prominent, double emission feature, V ≈ R, with a peak strength of 1.10 I_c. Emission in He I 6678 (1.02 I_c) and variable fine structure in the absorption profile were seen. *IUE* observations revealed that the C IV wind line increased in strength sometime before November 19 but after September 9 (see report by C. Grady in this issue).

HR 2855 (FY CMa) - Hα showed a peak intensity of 1.9 I_c with V < R (R = 1.7 I_c). The emission in He I 6678 was less prominent than reported in *BSN19*, but the profile was generally the same. However, reversals in the V/R ratio were observed on successive nights. See the report on the UV behavior written by C. A. Grady in this issue.

66 Oph - The strength of the Hα emission continues to increase in this star. The peak intensity observed during this run was a record 9.0 ± 0.1. Absorption is still seen on the red side of the line as reported in *BSN19*. The He I 6678 line remains a P Cygni feature with R = 1.03 I_c (slightly weaker than in 1988 November).

o And - The Hα emission was slightly stronger than observed in 1988 November. The profile remains about the same with the V lobe dominating (V = 1.05 I_c). There has been no change in the strength of the Hα core since the last report (*BSN19*).

Gerrie Peters

Kitt Peak Hα spectroscopy: addendum

While the master copy of the *Newsletter* was still on its way to Garching, Gerrie Peters was again observing at Kitt Peak National Observatory, from where she sent the following addendum via SPAN. More up to date information the *Newsletter* probably never had to offer before (and we have always been trying hard!).

"Observations on April 20 and 21 at KPNO showed:

1. The Hα emission in 66 Oph continues to grow; on April 20 it was at 9.1 I_{cont}, one day later it reached 9.5 I_{cont} (where will it stop?).
2. No emission is evident in μ Cen.
3. The Hα emission in λ Eri is pretty much gone."

Another chapter of the λ Eridani story

One of the most intensively monitored Be stars has in this decade been λ Eri (= HR 1671), the main reason of course being the wide spectrum of variations observed in this star. The following is a personalized log of the recent observing activity that resulted from another hickup of λ Eri.

19 Dec. 1988: Myron Smith SPANs an e-mail to Garching saying that according to an IUE spectrum taking by Carol Grady in the morning of the same day 'λ Eri may be in the process of turning on again'. He adds that on the basis of some observations of HeI λ 667.8 he had already been speculating that the star might burst again.

20 Dec. 1988: No further news. I have no telescope. Shall I broadcast the message anyway? Carol and Myron rush to point out that the enhancement of the C IV absoprtion was diagnosed from the raw IUE image. Even if done by a professional as Carol this is subject to very large uncertainties.

21 Dec. 1988: In the morning on the way to the office, I suddenly realize that Roger Ferlet, an old room mate of mine at ESO and now working at the Institute d'Astrophysique in Paris, is observing at La Silla with the CAT telescope and CES spectrograph. Fortunately, I arrive very early, at 7 a.m., which in the northern winter means 3 a.m. La Silla time. I can immediately establish contact with Roger at the telescope via the telephone line permanently leased by ESO for remote control observations at La Silla from Garching. λ Eri will set for the CAT within the next 30 minutes, and this is Roger's last night in the red spectral region, i.e. this is the last opportunity for several days to obtain an Hα profile and to see if there is any emission. Roger very kindly agrees to suspend his own program for a short while and take the requested spectrum.

I call him again 20 minutes later: yes, there seems to be some weak emission. A few hours later I have the telefax with Roger's on-line reduced spectrum on my desk, the case is perfectly clear now (Fig. 1). Using the Be Star Working Group electronic mailing list I distribute the announcement which I had prepared earlier.

22 Dec. 1988: Carol Grady reports that inspection of the reduced IUE spectrum of Dec. 19th confirms the presence of high-velocity discrete components 20-30% below the component. The total C IV equivalent width is 0.246 nm, λ Eri is in a strong wind state.

A few telexes are sent to sites which I cannot reach electronically. However, finding the proper telex numbers is not always easier; Pam Bristow, our secretary, has a hard time.

23 Dec. 1988: A second IUE spectrum taken by Carol Grady still shows the discrete components. They appear to have become narrower. Roger Ferlet has meanwhile moved to the 3.6-m telescope where he has obtained a spectrum at lower resolution ('only' 20,000) but with nearly 100 nm spectral coverage.

Stanislav Štefl of Ondřejov Observatory heard the news from Tom Bolton, Toronto, with whom he had been working for a couple of weeks. Stanislav is on the way to the airport in Toronto to return home. But he briefly describes some spectra he has obtained on Nov. 15 and Dec. 6-8, 1988 at the David Dunlap Observatory. There were conspicuous variations in HeI λ 447.1. The violet wing appears peculiar, at least two spectra indicate a violet secondary component. The radial velocity variations seem to violate the usual 0.7 day period known from quiescent phases. – Did the outburst start already a month earlier?

At about this time (I lost the mail message, so I am quoting from my memory), Gerrie Peters informs me that she observed λ Eri with IUE already in October or November, 1988. Unfortunately, the C IV region of the spectrum suffers from a radiation event. She is still waiting for the re-processed image.

24 Dec. 1988: David McDavid received my e-mail just before his departure to McDonald Observatory where he will continue his polarimetry monitoring program. λ Eri is on his target list.

10 Jan. 1989: K.K. Ghosh sends a letter. By Dec. 31, only two nights since Dec. 23 could not be used for observations of λ Eri. Monitoring will continue for another two weeks.

9 Jan. 1989: For reasons unrelated to λ Eri I call Kailash Sahu (Groningen, now La Palma) at the CES. But I also don't miss this opportunity to approach him, too, about another Hα profile of λ Eri. He readily agrees, the spectrum gets taken on 11 Jan.

I send an electronic mail with the same request to Roland Gredel, staff astronomer at La Silla and scheduled to observe with the CES some 10 days later.

21 Jan. 1989: The fax with Roland's spectrum (Fig. 2) is received in Garching. The emission is still there.

Mid-January 1989: (This is again as correct as I can remember because I did not keep the original e-mail message.) The re-processing of Gerrie Peters's IUE spectrum has been completed. λ Eri's wind was 'on' already in October/November.

Although in the end the sequence of events and their spacing in time was somewhat less fortunate than one might have wished them to be, I have no doubt that the combination of all observations will permit another step forward to be made in our knowledge and understanding of the episodic character of the mass loss from Be stars.

The main reason why I have described the activities which evolved around λ Eri in so much detail is that I want to demonstrate how much coordination can with some luck be possible even on a short timescale. That we are not (yet) in a position to predict the willingness of our targets to cooperate should not discourage us. Maybe, in the case of the recent outburst of the X-ray binary A0535+26 (V725 Tau) we were already somewhat luckier. I was alarmed by Diane Roussel-Dupré on April 4 and immediately forwarded her message to all addresses on my electronic mail distribution list, i.e. still a few days ahead of *IAU Circular No. 4768*. For more details see the *contribution* by Roussel-Dupré and Kitamoto in this issue of the *Newsletter*.

Organizing the little campaign on λ Eri was fun, not at last because of the cooperative spirit demonstrated by all involved. I wish to thank all participants, especially Drs. Roger Ferlet, Roland Gredel and Kailash Sahu who so readily contributed some of their own observing time.

I have done my best to minimize misquotations and omissions in my description, and I accept full responsability for any residual errors. However, it should go without saying that the information given is not quotable in scientific publications; you need to contact the respective observers directly.

(For the very latest news on λ Eri, see the section 'WHAT'S ACTIVE/INACTIVE' in this issue of the *Newsletter*.)

Dietrich Baade

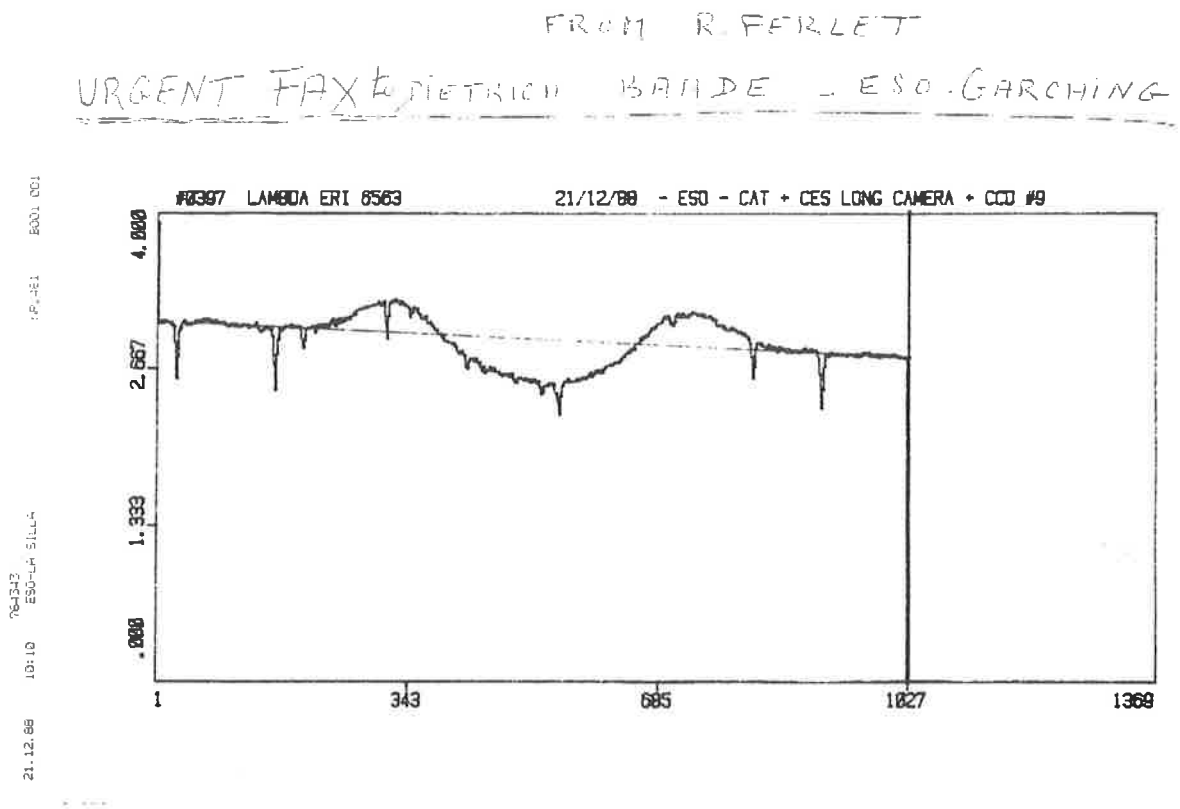

Fig. 1: Roger Ferlet's telefax to Garching with his on–line reduced Hα observation of λ Eri on December 21, 1989. The narrow features are due to telluric wator vapor.

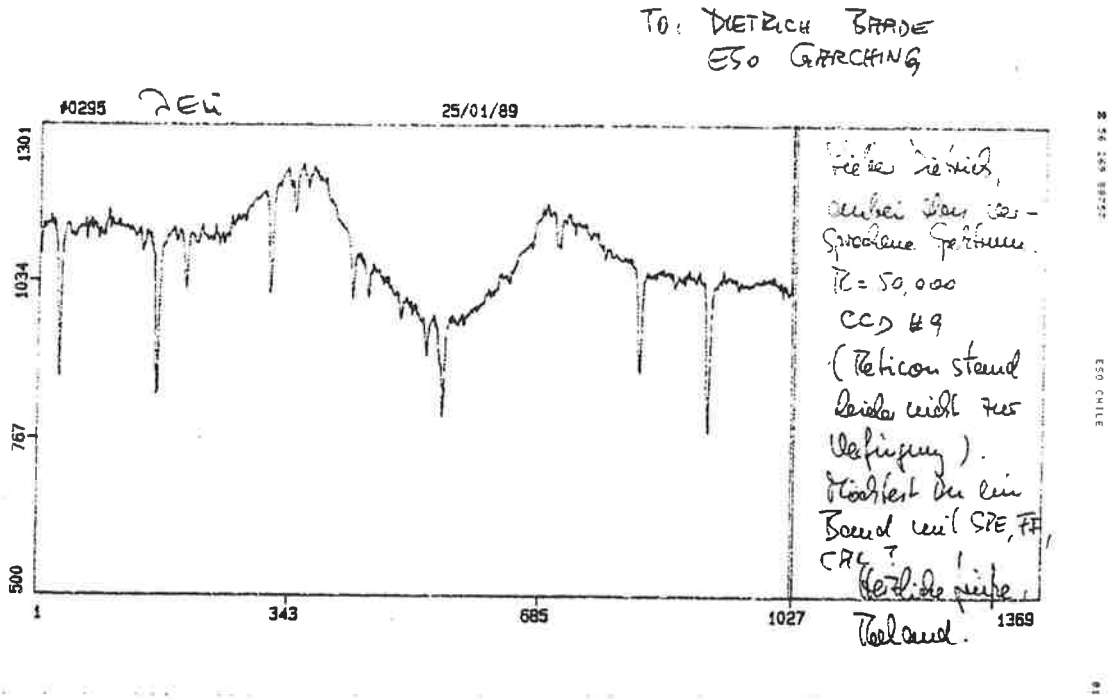

Fig. 2: Roland Gredel's telefax and report on his observation of Hα on January 25, 1989. (The flux scales of Figs. 1 and 2 are both arbitray and different.)

OBSERVATIONS....THEORETICAL SUPPORT....WANTED/AVAILABLE

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ANNOUNCEMENT OF A MULTIWAVELENGTH CAMPAIGN ON 28 CYGNI

Following successful multiwavelength campaigns on o And, λ Eri, ω Ori, and ϵ Cap in 1987 and 1988 (*Be Star Newsletter*, No. 15, 16, and 18), we have undertaken another such venture. The primary target for our campaign, which will occur in 1989 September, will be 28 Cyg. Coordinated *IUE* and ground-based Reticon observations in 1985 revealed an interesting correlation between the equivalent width of the C IV wind line and the phase of this star's $\ell = 2$ nonradial mode (Peters and Penrod 1988, in *A Decade of UV Astronomy with IUE*, ESA SP-281, Vol. 2, p. 117). An important objective of the forthcoming campaign will be to confirm this observation, which yields strong support for a link between nonradial pulsations and mass loss in Be stars.

Current participants in the project include R. C. Dempsey, D. R. Gies, H. F. Henrichs, D. McDavid, J. R. Percy, G. J. Peters, and M. A. Smith, and we invite interested observers to join our effort. We plan to obtain simultaneous *IUE* and ground-based spectroscopic, photometric, and polarimetric observations. The *IUE* coverage will span 56 hours during which we will obtain 48 hours of repeated observations. We have requested that the program be scheduled in mid-September, but the start date has not yet been assigned. If you are interested in participating in this campaign, please contact either John Percy, Department of Astronomy, University of Toronto, Toronto, Ontario M5S 1A1; Canada (photometric observations) or Gerrie Peters, Space Sciences Center, University of Southern California, Los Angeles, CA 90089-1341; USA (spectroscopic observations).

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FORTHCOMING MULTIWAVELENGTH CAMPAIGN ON THREE ALGOL BINARIES

Edward F. Guinan (Astronomy Department, Villanova University, Villanova, PA 19085, USA) announces that there will be a multiwavelength campaign on the Algol binaries U Cep ($P=2.^{d}49$, β Per ($P=2^{d}.87$), and R Ara ($P=4^{d}.43$) in early August 1989 to study the circumstellar material in these systems. For a duration of 4.5 days these systems will be sequentially observed with the *IUE* spacecraft. These observations will be supported with data from the McMath Telescope on Kitt Peak (Hα) and the VLA. If you are interested in participating in this campaign, please contact Ed Guinan at the above address.

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Who has taken spectra of ζ Tau and/or 120 Tau in 1988/89?

Dr. M. Bossi of Merate writes: "During the past winter, we could perform a remarkable series of observations of ζ Tau and 120 Tau. Owing to persistently dry conditions, unusual in that season, our light curves allowed very good period analyses, leading to interesting results. Unfortunately, our spectrograph was not available in that period. So, we have no spectrographic checking for our conclusions. Therefore, if somebody is in the possession of spectrograms of these objects, we wish he would contact us at the following address: Dr. Michele Bossi, Osservatorio Astronomico di Brera, Via Bianchi 46, I–22055 Merate CO, Italy."

PREPRINTS RECEIVED

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Long-Term and Mid-Term Spectroscopic Variations of the Be-Shell Star HD 184279 (V1294 Aql)
BALLEREAU D. - CHAUVILLE J.; DASGAL, Observatoire de Paris-Meudon, 5 Place Jules Janssen, 92195 Meudon Cédex, France.
To be Published in: *Astronomy and Astrophysics (accepted 1988 October 17)*
Preprints: D. Ballereau at the above address.

Abstract: We present here, on the basis of the spectroscopic data described in a preceding paper, a structural modelling of the shell of the Be star HD 184279 (V1294 Aql, B1 IV-V). After a review of the main spectroscopic features and their variations between 1976 and 1987, several structural modellings are summarized to explain the V/R variations undergone by the spectrum of this star. Two possibilities can be retained: the hypothesis of the elongated disk model with orbital and apsidal motions (geometrical model), and the axisymmetric rotating-pulsating model (physical model). After comparison of the spectroscopic variations observed with those predicted, the elongated disk is selected. From radial velocity measurements of emission and absorption features on the Hβ line profile, orbital elements (eccentricity and semi-major axis of inner and outer boundary ellipses) are calculated for two privileged configurations in phase (1977 and 1981). The results are compared with other envelope size measurements found in the literature.

Spectroscopic Observations of the Be Star Zeta Tauri
BOSSI M. - GUERRERO M. - SCARDIA M.; Osservatorio Astronomico di Brera-Merate (Milano), via E. Bianchi 46, 22055 Merate (Como), Italy.
Submitted to: *Astronomy and Astrophysics (Suppl. Ser.)*
Preprints: M. Bossi at the above address.

Abstract: Spectroscopic observations of the Be Star Zeta Tau (HR 1910) for the period Jan. 17-24, 1983 are reported. Radial velocities of the measured lines seem to indicate that the inner layers of the shell were falling to the stellar surface, while the outer ones were going away. There are indications of short-term variability of the line profiles. A brief discussion is carried out about the meaning of this behavior. While short-term variability of the Balmer emission is very questionable, mainly because of the low resolution and S/N ratio of the photographic plates, the periodic variations (P = $0^d.85$) of the He I 6678 profiles seem quite well established.

Search for Cool Giant Companions of the Be Stars ζ Tau and KX And
FLOQUET M. - HUBERT A.M. - MAILLARD J.P. - CHAUVILLE J.- CHATZICHRISTOU H.; DASGAL, Observatoire de Paris-Meudon, 5 Place Jules Janssen, 92195 Meudon Cédex, France.
To be Published in: *Astronomy and Astrophysics (accepted 1988 October)*
Preprints: M. Floquet at the above address.

Abstract: A search of the presumed cool luminous giant companions of two well-know Be-shell stars ζ Tau and KX And, often proposed as prototypes of interacting binary Be stars with a cool companion, has been performed on August 27-30, 1985, in the K-band, with the CFHT Fourier Transform Spectrometer. No spectral lines susceptible to be formed in the photosphere of such a cool luminous giant star have been detected in this wavelength range on high resolution spectra (40000 for ζ Tau and 24000 for KX And) with a rather good signal to noise ratio (20-40 = 2σ). The observed absolute energy distribution in the visual and the IR range of these two stars has been compared with the composite flux of a hot star of spectral type similar to that of ζ Tau and KX And and of a cool star (K0III and K0II). It has been shown that in the case of ζ Tau the observed IR flux is not sufficient to be consistent with the presence of a cool luminous star which overflows its Roche lobe. On the contrary, in the case of KX And the observed IR energy distribution is compatible with such a companion. As we do not observe it, a veiling effect due to the free-free emission of the cool envelope which would strongly reduce the narrow absorption lines of the secondary star in this wavelength range can be considered, as in late type high luminosity stars. In addition, the CO molecule can be partially destroyed by the UV radiation of the primary star.

Observation of an Hα Outburst in the Be Star HR 4123
GHOSH K.K. - APPARAO K.M.V. - TARAFDAR S.P.; Vainu Bappu Observatory, Indian Institute of Astrophysics, Kavalur, Alangayam, Tamilnadu, India; Tata Institute of Fundamental Research, Homi Bhabha Road, Bombay 400005, India.
To be Published in: *Astrophysical Journal (1989 August 1)*
Preprints: K. K. Ghosh at the first address.

Abstract: During routine monitoring of the Be star HR 4123 during the year 1987-88, a burst of Hα emission was observed on 11 May, 1987. The increase was observed on 9 May, 1987 and lasted until 7 June, 1987 peaking to an equivalent width of 31.6 Å on 11 May, 1987. This short-term burst is interpreted as due to the presence of a compact object in binary motion around the Be star, which accretes the matter ejected by the Be star to give out X-rays, which in turn produce ionization in the gas to give out the Hα emission. The broad line at λ6577.5 Å observed to accompany Hα emission during the burst is suggested to be emission from dielectronic recombination from C III ions in a C II-region around the H II region formed by the X-radiation.

Be Stars from the IRAS Catalogue and the Dependence of Their Envelope Characteristics on i and w/w_c

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Published in: *Astrofizika* 29, 310 (1988), in Russian
Reprints: M. Ruusalepp at the above address.

Abstract: The inclination angle of the rotational axis i and the reduced angular velocity w/w_c for 125 B and Be stars have been separately determined by many authors. For 53 stars from this sample the observational data on the envelopes are available: the fluxes at λ = 12 and 25μ have been registered by IRAS, the equivalent widths of the Hα emission line, $W_\lambda(H\alpha)$, and the linear polarization ratio, P%, have been published. We have searched for a correlation between the observational data of the envelope (E_{12}, E_{25}, $W_\lambda(H\alpha)$, P%). We also tried to find out whether these data depend on the rotational parameters (i and w/w_c) of the underlying star. We found that for an intensive mass loss from the central star the rotational angular velocity $w/w_c > 0.5$ is needed. The correlation between the IR excesses E_{12}, E_{25}, $W_\lambda(H\alpha)$ and P% shows that the IR excesses, the emission in Balmer lines, and linear polarization originate in the same regions of the envelopes. The lack of correlation between the envelope characteristics and i is an indication that the envelopes are thin for the radiation from the central star at these wavelengths. It is proposed that the stars 6 Cep and 23 Tau have cold dust envelopes with $T_{max} \simeq 100$ K.

KX And: Possibly a Strongly Interacting Binary

STEFL S. - HARMANEC P. - HORN J. - KOUBSKY P. - KRIZ S. - HADRAVA P.- BOZIC H. - PAVLOVSKI K.; Astronomical Institute, Czechoslovak Academy of Sciences, 251 65 Ondrejov, Czechoslovakia.

To be Published in: Proc. from IAU Colloquium No. 107, *Algols*, ed. A. H. Batten
Preprints: S. Stefl at the above address.

Abstract: The contribution summarizes all observational results on the interacting Be + K binary KX And. It includes an overview of detailed investigations of all archival IUE images, of an extensive set of Ondrejov optical spectra, and of ten years of photometric observations performed at the Hvar observatory. Interpretation of the data results in a preliminary model of the system.

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Abbreviations used for the Publications

AA	Astronomy and Astrophysics
AA Suppl.	Astronomy and Astrophysics Supplement
AAS	Acta Astrophysica Sinica
AF	Astrofizika
AJ	Astronomical Journal
APJ	Astrophysical Journal
APJ Suppl.	Astrophysical Journal Supplement

ASS	Astrophysics and Space Science
BAAS	Bulletin of the American Astronomical Society
BAC	Bulletin of the Astronomical Institutes of Czechoslovakia
BASI	Bulletin of the Astronomical Society of India
IAJ	The Irish Astronomical Journal
IAUC	IAU Circular
IBVS	Information Bulletin on Variable Stars
IKAO	Izvestia Krimskoj Astrofiziceskoj Observatorii
MNRAS	Monthly Notices of the Royal Astronomical Society
MSAI	Memorie della Societa Astronomica Italiana
OBS	The Observatory
PAAO	Publications of the Alma-Ata Observatory
PAJ	Pisma Astronomical Journal
PASJ	Publications of the Astronomical Society of Japan
PASP	Publications of the Astronomical Society of the Pacific
QJRAS	Quarterly Journal of the Royal Astronomical Society
RMAA	Revista Mexicana de Astronomia y Astrofisica

MEETINGS

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