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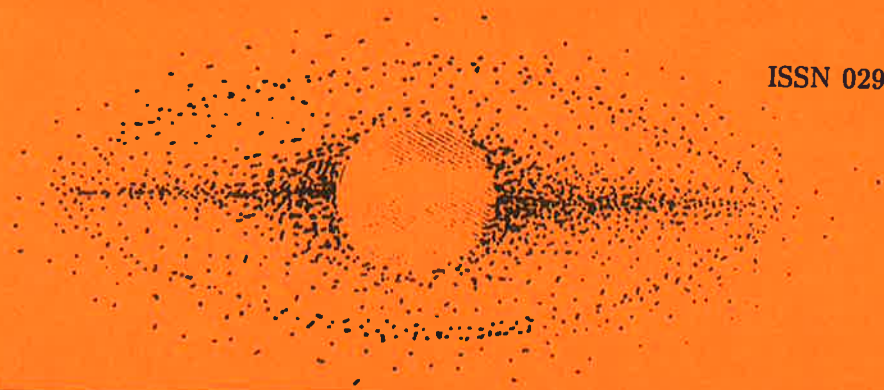

Be STAR NEWSLETTER

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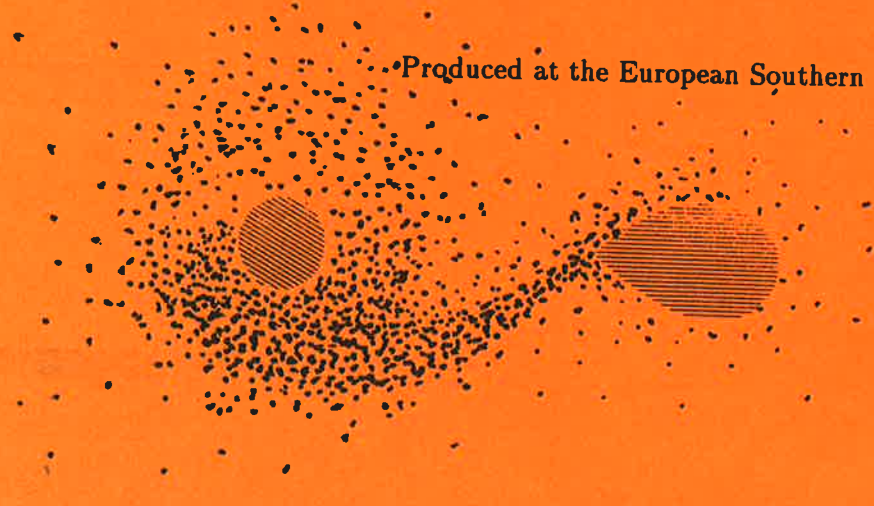

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The Be Star Newsletter is open to all contributions concerning early-type stars. Please send manuscripts and all correspondence to the editor's address given on the front page. In the case of very urgent late contributions directly contact the technical editor via one of the fast links listed below.
The Newsletter is distributed free of charge to all astronomical institutions which request it. If you wish that the Newsletter is also received at your institute, write to the technical editor:

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Acknowledgements: The Be Star Newsletter is produced at and financially supported by the European Southern Observatory. We thank Pam Bristow and Bruno Jørgensen for their active help in administrative and technical matters.

EDITORIAL

* * * * *

I am pleased to resume the publication of the *Be Star Newsletter*. I am sorry that some unusual demands on my time have delayed publication of the *Newsletter*, but now I foresee no problem in producing the former 2 – 3 issues a year. This issue is an abbreviated one. It contains the usual sections Working Group Matters, Contributions, What's Happening?, Bibliography, and Meetings, but publication of abstracts that I have received and the bibliographical references from 1993 will be deferred until the Issue 27, which will be published later this year.

I would like to thank all who contributed to this issue, especially those who helped with the compilation of the bibliography. As usual if we missed one of your papers or abstracts, or made a clerical or printing error, please let me know about it and I will correct the omission/error in the next issue.

In order that we can get the publication of the *Newsletter* back on track, please send contributions for Issue No 27 by:

October 15, 1993

We request that lengthy contributions containing illustrations be submitted in a camera-ready format (see papers in the current issue for style). For short communications I especially recommend Electronic Mail (SPAN/DECnet - HYADES::PETERS), telefax (telephone number: 213-740-6342), or telex (4720490 USC LSA). If possible, please send E-mail contributions as a Tex or LaTex file. Please note that my E-mail address has been changed. This is a temporary address, and a more permanent Internet address will be given in a future issue of the *Newsletter*.

I look forward to receiving contributions for Issue No. 27. I would like to thank the European Southern Observatory for their continued financial support.

Gerrie Peters, Editor

* * * * *

RESTRUCTURING OF IAU COMMISSIONS AND WORKING GROUPS

Many of you would have read the announcement in the latest IAU Bulletin (No. 69, p. 5) of the proposed restructuring of IAU Commissions and Working Groups. It is proposed to reduce the number of IAU Commissions but to broaden the scientific theme of the new Commissions. About a dozen new Commissions will replace the present ones which number about 40.

The role of the Working Groups under this new structure will be to study and execute the recommendations of the Commissions. In this scheme several current Commissions will be turned into Working Groups of the more broadly based Commissions. At present there are over 60 Working Groups, most of them fairly inactive. A Working Group will be dissolved if it does not have a clearly defined and active role. The life span of Working Groups will also be limited to ensure a real turnover of their activities. The activities of the Working Groups will be reviewed at each General Assembly and they will be reconstituted for another three-year term only if there is a genuine need to do so. Working Groups will be allocated a budget to help them accomplish their tasks.

These proposals will be discussed over the next two years between the Commission Presidents and vice-Presidents and the General Secretary. If adopted at the next General Assembly (1994 Aug 14-27, The Hague, Netherlands), it will be implemented at the following GA in 1997. This restructuring has obvious implications for the Working Group on Be Stars.

It is not possible to predict what may happen to it, but its future is assured only if it is serving a genuine need among the researchers in Be stars. I presume that at some stage we will need to produce evidence that this is the case. The main tasks of the WG over the past few years has been to provide this Newsletter, to motivate and organize scientific meetings on Be stars and to encourage and organize various observing campaigns. I would happy to receive any suggestions which you think might improve the service of the Working Group on Be stars.

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CONTRIBUTIONS

* * * * *

AN ERUPTION ON EPSILON CAPRICORNI?

L. A. Balona
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The bright B2.5Vpe star ϵ Cap (HR 8260) was observed photometrically for five nights during 1 to 14 September 1992. During this time the star showed a linear increase in brightness of nearly 0.1 mag. Superimposed upon this linear increase there is a sinusoidal variation with period very close to one day and peak-to-peak amplitude of 0.03 mag.

Previous photometric observations of this star (Cuypers, Balona & Marang 1989) showed poorly-defined variations with a period of 1.03 d for 1985, 1986 and 1987. In 1988 the amplitude suddenly increased to nearly 0.1 mag though the phase coverage is very poor.

The light variations of September 1992, though of smaller amplitude than in 1988, are far better defined owing to the more intensive coverage. The linear increase in brightness and the sinusoidal variations are very similar to that discovered by Balona (1990) in another Be star, κ CMa. It can be understood in terms of a localized eruption at or near the stellar photosphere which is carried around by stellar rotation. Spectroscopic observations of ϵ Cap obtained near this time would be very valuable in confirming this idea. I would also be very interested to know if anyone obtained spectroscopic observations of κ CMa at the time of its eruption: January 1987.

References:

Balona, L A, 1990. Mon. Not. Roy. Astr. Soc., 245, 92.
Cuypers, J, Balona, L. A. & Marang, F, 1989. Astron. & Astrophys. Suppl. 81, 151.

LIST OF Be STARS IN OPEN CLUSTERS WITH UBV DATA[1]

Alejandro Feinstein

Observatorio Astronomico
La Plata 1900
Argentina

Cluster	Star	V	B-V	U-B	Sp.Type	Remarks	$V_o - M_V$ (cluster)	E(B-V) (cluster)	Name
NGC 457	13	11.29	0.28	-0.49			12.3	0.50	
	128	9.63	0.36	-0.54	B6 Ve	−57.246	12.3	0.50	
	153	9.49	0.26	-0.55	B0 IVe	−57.243	12.3	0.50	
	236689	9.47	0.29	-0.48	B1.5 Vpe	−57.240	12.3	0.50	
NGC 581	87	11.35	0.26	-0.39	B3 V		12.16	0.39	
	178	10.04	0.19	-0.58			12.16	0.39	
	76	11.48	0.22	-0.30			12.16	0.39	
NGC 663	141	10.65	0.65	-0.34	B0 Vne		11.55	0.83	
NGC 869	309	9.62	0.32	-0.70	B1 IIIe	56.484	11.80	0.59	
h Persei	566	9.62	0.19	-0.66	B1 Vpe	56.493	11.80	0.59	
NGC 884	1702	9.30	0.46	-0.56	B1.5 IIIe	56.548	12.10	0.59	
chi Per	2088	9.45	0.32	-0.65	B1.5 Vne	56.563	12.10	0.59	
	14422	9.03	0.50	-0.65	B1 Vpe	56.565	12.10	0.59	
	2165	9.86	0.40	-0.62	B1 Vne	56.566	12.10	0.59	
	2284	9.66	0.40	-0.59	B1 Vne	56.573	12.10	0.59	
NGC 957	4	9.86	0.58	-0.32	B1 V	56.657	11.70	0.80	
	7	11.13	0.66	-0.38	B3 V		11.70	0.80	
	11	11.99	0.54	-0.28			11.70	0.80	
TR 2	16080	9.36	0.26	-0.06	B7 V		8.8	0.32	
NGC 1893	43	11.53	0.14	-0.68			12.8	0.40	
α Per	21551	5.83	-0.03	-0.33	B7 V	no em.	6.1	0.08	HR1051
	22192	4.23	-0.06	-0.58	B5 IIIe-sh		6.1	0.08	
	25940	4.04	-0.02	-0.58	B4 Ve		6.1	0.08	MX Per

[1]Discussion of data published in *Revista Mexicana de Astronomia y Astrofisica*, Vol. 21, p. 373, 1990

Cluster	Star	V	B-V	U-B	Sp.Type	Remarks	$V_o - M_V$ (cluster)	E(B-V) (cluster)	Name
Pleiades	23302	3.71	-0.11	-0.41	B6 IIIe		5.55	0.05	17 Tau
	23480	4.18	-0.06	-0.43	B6 IVe		5.55	0.05	23 Tau
	23630	2.87	-0.09	-0.34	B7 IIIe		5.55	0.05	η Tau
	23862	5.09	-0.08	-0.28	B8(V)e-sh	Pleione	5.55	0.05	BU Tau
NGC 1960	34.1113	9.23	0.05	-0.69	B2 (III)e		10.50	0.24	
(M36)	245493	8.63	0.02	-0.73	B2 (III)e	33.1103	10.50	0.24	
NGC 2244	33	11.95	0.34	-0.25	B6 Vne		10.96	0.46	
CR 121	48917	5.29	-0.13	-0.92	B2 Ve	around	9.0	0.03	FT CMa
	58978	5.64	-0.12	-1.05	B0 IVpe	around	9.0	0.03	FY CMa
NGC 2421	LSS579	11.48	0.24	-0.40	B7:		12.85	0.47	
	SS141	10.91	0.31	-0.32			12.85	0.47	
	SS142	12.24	0.26	-0.36			12.85	0.47	
NGC 2422	60855	5.68	-0.13	-0.74	B2 IV:e		8.4	0.07	
NGC 2439	6	10.48	0.21	-0.61			13.24	0.37	
	69	11.29	0.21	-0.27			13.24	0.37	
	81	11.30	0.16	-0.58			13.24	0.37	
NGC 2451	61925	5.99	-0.04	-0.45	B5 IIIne		7.6	0.04	
NGC 2453	40	12.89	0.36	-0.38	B5 (V)e		13.80	0.47	
RU 44	LS885	10.98:	0.34:	-0.62	B0 Ve	far fm.nuc.	13.27	0.64	-21.5154
NGC 2516	66194	5.76	-0.09	-0.80	B2 Vne		7.87	0.09	
	65663	6.77	0.00	-0.27	B7 V	Cox A	7.87	0.09	
	60.968	9.01	0.02	-0.09	(B9p)	Cox 41	7.87	0.09	
NGC 3105	7	13.25	0.99	0.42	B2:e		14.5	1.09	
IC 2581	302840	9.60	0.20	-0.62	B0.5 Ve	No.4	12.0	0.42	
	302842	9.90	0.27	-0.70	B1 Ve	No.7	12.0	0.42	
	90187	8.81:	0.25	-0.75:	B1 IIne		12.0	0.40	LSS 1524
NGC 3293	303075	9.90	0.13	-0.82	B1 IVne	bkgr.?	12.1	0.31	-57.3490
	32	12.87	0.20	-0.16	B8 Ve		12.1	0.31	
Tr 15	93190	8.58	0.33	-0.82	B0:IV:pe		12.1	0.48	
Cr 228	305515	10.35	0.09	-0.59	B1.5 Vsn	Fe 44	12.0	0.32	
	305533	10.32	0.13	-0.51	B0.5:Vnn	sh,Fe7	12.0	0.32	

Cluster	Star	V	B-V	U-B	Sp.Type	Remarks	$V_o - M_V$ (cluster)	E(B-V) (cluster)	Name
Tr 16	5	10.83	0.24	-0.67	B2:Vn	wk.sh?	12.0	0.53	
NGC 3766	100856	8.58	0.01	-0.61	B2 IVp(e)		11.4	0.20	
	-60.3157	8.56	0.07	-0.63	B2 III		11.4	0.20	
	-60.3125	9.06	-0.07	-0.60	B2 IVne		11.4	0.20	
	-60.3128	8.46	-0.04	-0.64	B2 IV-V		11.4	0.20	LSS 2400
	-60.3149	10.33	0.03	-0.50	B4 Vne		11.4	0.20	
	-60.3126	9.26	0.01	-0.61	B1.5 Vn		11.4	0.20	
	-60.3122	10.00	0.04	-0.21	Be npe	shell	11.4	0.20	
	306797	9.58	0.00	-0.58	B5		11.4	0.20	
	306798	9.45	-0.01	-0.62	B2 V		11.4	0.20	
IC 2944	308819	10.08	0.14	-0.22	B9 p(e)		11.50	0.33	
STOCK 14	101794	8.67	0.04	-0.76	B0.5 IVne		12.22	0.32	
NGC 4103	-60.3743	9.19	0.21	-0.70	B0:e	sm. β	11.35	0.30	
NGC 4463	108719	8.41	0.21	-0.63	B IIIe?		11.77	0.44	
NGC 4755	-59.4531	10.82	0.18	-0.56	Bnn		11.82	0.44	
	-59.4540	9.58	0.22	-0.59			11.82	0.44	
	-59.4546	9.73	0.22	-0.72	B2 IVne		11.82	0.44	
	-59.4553	9.72	0.20	-0.63	B1.5 pne		11.82	0.44	
	-59.4558	10.04	0.13	-0.61	B1 V		11.82	0.44	
	-59.4559	9.88	0.22	-0.65	B2 IVne		11.82	0.44	
	II-24	10.31	0.16	-0.62	B0 V		11.82	0.44	BV Cru
NGC 5168	-60.4735	10.36	0.13	-0.40	B III e?		10.55	0.32	
NGC 5281	119682	7.98	0.13	-0.88	e?		10.57	0.26	
NGC 6025	143448	7.30	-0.05	-0.76	B3 IVe	-60.6348	9.7	0.16	
NGC 6087	14	9.70	0.09	-0.26	B8 Ve	small β	9.60	0.20	-57.7791
NGC 6167	330950	9.49	0.51	-0.51	B1 Ve		11.7	0.89	
NGC 6231	326327	9.74	0.27	-0.60	B1.5 IVe-sh		11.4	0.42	
NGC 6383	317861	9.83	0.24	-0.40	Be:Vne		10.65	0.32	75
	24	11.35	0.18	-0.25	B8 VNe		10.85	0.32	

Cluster	Star	V	B-V	U-B	Sp.Type	Remarks	$V_o - M_V$ (cluster)	E(B-V) (cluster)	Name
NGC 6530	152	10.51	0.11	-0.59	B3 Ve		11.3	0.35	
(M 8)	315032	9.18	0.04	-0.75	B2 Vne		11.3	0.35	161
	315023	10.08	0.15	-0.64	B2.5 Ve		11.3	0.35	W55
	-24.13829	9.03	0.10	-0.71	B1.5 Vne		11.3	0.35	176
	-24.13830	9.86	0.18	-0.65	B2 Ve		11.3	0.35	180
	184	9.66	0.07	-0.66	B1 Ve		11.3	0.35	
	W61	10.29	0.12	-0.61	B2 Ve		11.3	0.35	
	164906	7.42	0.16	-0.76	B0 IV pne		11.3	0.35	193
	-24.13831	10.14	0.11	-0.65	B2 Vpe		11.3	0.35	192
	197	10.45	0.15	-0.61	B2 Ve		11.3	0.35	
	202	10.69	0.10	-0.56	B2.5 Ve		11.3	0.35	
	315024	9.56	0.06	-0.78	B2.5 Ve		11.3	0.35	204
	-24.13837	9.39	0.07	-0.72	B1 Ve		11.3	0.35	W80
	210	10.49	0.13	-0.61	B2.5 Vne		11.3	0.35	
	-24.13840	9.75	0.16	-0.58	B2 Vne		11.3	0.35	215
	-24.13844	10.81	0.09	-0.52	B2.5 Vne		11.3	0.35	230
	164947	8.88	0.06	-0.56	B2 IVe		11.3	0.35	W100
	315095	10.81	0.25	-0.45	B2.5 Ve		11.3	0.35	256
NGC 6611	210	11.41	0.49	-0.58	B1.5 V(e)		11.9	0.82	
	-13.4928	9.94	0.60	-0.50	B0.5 Vne		11.9	0.79	280
	351	11.30	0.46	-0.56	B1 Vne		11.9	0.77	
	503	9.83	0.50	-0.72	B0e		11.9	0.88(?)	
IC 4725	-19.6889	10.16	0.43	-0.18	B7 Vne		8.90	0.50	44
NGC 6709	10	10.88	0.18	-0.08	B9: V(e)		9.80	0.30	
NGC 6823	8	11.84	0.75	-0.29	B0 V:pe		12.30	0.82	
	E4	10.42	0.78	-0.30	B0 IVe		12.30	0.82	
NGC 6830	345105	10.44	0.38	-0.15	B6 IVe		11.20	0.53	
NGC 6871	227611	8.82	0.35	-0.70	B0pe		11.50	0.46	35.3950
BE 87	229059	8.71	1.52	0.40	B2Iabe		9.88	1.56	36.4024
NGC 6913	229239	8.89	0.83	-0.10	B0.5 IIe		10.85	1.13	38.4072
	229221	9.47	0.87	-0.34	B0 IIe		10.85	1.13	38.4062
TR 37	239712	8.56	0.44	-0.35	B3 Vnpe		10.0	0.64	57.2354
	57.2358	10.13	0.33	-0.33	B3 Vnnpe		10.0	0.53	
	206773	6.79	0.22	-0.84	B0 Vnnpe		10.0	0.52	57.2374
	57.2376	9.74	0.30	-0.38	B2.5 Vpnne		10.0	0.52	
	239758	9.50	0.24	-0.57	B2 IV:nnep		10.0	0.47	58.2320
NGC 7160	208392	7.04	0.26	-0.56	B1 IV		9.66	0.30	EM Cep
NGC 7380	4	10.19	0.40	-0.12	B6 Vne		12.6	0.58	57.2615
NGC 7654	778	11.90	0.56	-0.02	Be		11.0	0.72	
	930	11.57	0.51	-0.11	Be		11.0	0.69	
	989	11.85	0.41	-0.06			11.0	0.54	

THE EFFECTS OF ROTATION ON THE WINDS FROM HOT STARS [1]

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We present three studies in which we attempt to develop an understanding of both the geometry and origin of circumstellar disks in the winds from Be stars. In the first study, we use observational data to determine information about the geometry of the circumstellar disk. To accomplish this, we develop analytic expressions for the infrared excess and optical intrinsic polarization produced by an *ad hoc* density distribution that permits us to study the effect of the disk thickness and inclination angle on the observed IR flux and intrinsic polarization. The model is applied to the data for Be stars which have inclination angles near 90° (equator-on). Fits to the observed IR excess predict a polarization larger than observed unless the model has either of two quite different density distributions: a) the electrons are in a very narrow equatorial disk (HWHM $\sim 0.5°$), or b) the electron envelope is very broad (HWHM $\sim 43°$).

In the second study, we address the origin of the disk. We present a simple approximation that permits us to obtain the axisymmetric 2-D supersonic solution of a rotating radiation driven stellar wind from a 1-D model of the equatorial flow. Our solution predicts the formation of a dense equatorial disk if the rotation rate of the star is above a threshold value, which depends on the ratio of the terminal speed of the wind to the escape speed of the star. The change in this threshold as a function of spectral type can qualitatively explain the rapid decrease in frequency of Be stars earlier than B2. We find that the disk forms because the supersonic wind that leaves the stellar surface at high latitudes travels along trajectories that carry it down to the equatorial plane, where it passes through a standing oblique shock on top of the disk. The ram pressure of the polar wind thus confines and compresses the disk. Hence we call our model the wind-compressed disk (WCD) model. For Be stars, the disk is predicted to be quite thin ($\sim 0.5°$ opening angle) and has a density enhancement $\rho_{eq}/\rho_{pole} \sim 10^3$. Adjacent to the disk, the standing shock heats the flow that enters the equatorial region to temperatures of 10^5 to 10^6 K before the material finally mixes with the disk. This temperature is sufficient to produce the observed degree of superionization in the winds of Be stars, and the shock location explains the observations that indicate an equatorial concentration of C IV.

In the final study, we develop the fluid equations for a 1-D model of an equatorial circumstellar disk with finite thickness while accounting for the addition of mass and momentum from the stellar wind of a rapidly rotating star. We find that the disk rotation speed initially falls faster than $1/r$ and only asymptotically approaches a $1/r$ falloff. We also find that the location of the disk in the WCD model is determined by a critical point condition in the disk outflow. The location of the disk is important because the location determines the shock strength, which in turn governs the disk density and the shock temperature that is responsible for the superionization.

[1]**Abstract of a Ph.D. dissertation presented to the Astronomy Department, University of Wisconsin at Madison in April, 1992. Dissertation supervised by J. P. Cassinelli.**

BRIGHTENING OF THE Be STAR 6 CEPHEI

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The well known Be star 6 Cep = HR 8171 = HD 203467 has been remarkably stable from photometric point of view for years, the yearly mean values being:

V = 5.20 ; B-V = -0.06 ; U-B = -0.58 (1989),
V = 5.22 ; B-V = -0.05 ; U-B = -0.56 (1990),
V = 5.23 ; B-V = -0.06 ; U-B = -0.54 (1991),
V = 5.22 ; B-V = -0.05 ; U-B = -0.54 (1992).

In 1993, however, a definite brightening is observed which may indicate the commencement of a new activity phase. The recently obtained data are:

JD 2449137.36 V=5.10 ; B-V=-0.01 ; U-B=-0.61
JD 2449148.34 V=5.08 ; B-V=+0.01 ; U-B=-0.62
JD 2449148.44 V=5.09 ; B-V=-0.01 ; U-B=-0.62

These magnitudes have been measured at Konkoly using 7 Cep = HR 8227 as the comparison star, constancy of which was regularly checked against HR 8133. Spectroscopic observations are recommended in order to study the mass motion in the stellar atmosphere while this episode lasts.

Activity in μ Cen and 66 Oph

K.K. Ghosh[1], M.J. Rosario[1], G. Selvakumar[1], R. Krishnamurthy[2], K.C. Srinivasan[3] & K.R. Radhakrishnan[3]

μ Cen

After the major outburst of μCen in 1990 (Ghosh et al. 1991; Peters 1990) it continued to display weak emission features in H_α untill middle of 1991. Then this star entered into the shell phase by the end of 1991. From the comparison of the H_α profiles of μ Cen, obtained in 1992, it is clearly evident that another outburst of this star has taken place between 23 January and 21 March 1992 (see Fig. 1). Recent spectra of this star show strong emissions with V/R $<$ 1 in H_α and V/R $>$ 1 in He I(5876Å) (see Figs. 1&2) which suggest strong activity in μCen.

66 Oph

During last few years this star has displayed remarkable variability in the emission lines of H_α and He I (6678Å) (Peters 1990,1991,1992; Be Star Newsletter Nos. 21-25). On the basis of the spectra of 66 Oph, obtained between May 1991 and May 1992, we find the following variations: (1) Inverse P-Cygni profile of H_β (V/R $<$ 1 with emission intensity 2.2 I_{cont}) of May 1991 has changed to P-Cygni profile (with V/R = 0.54 and emission intensity = 2.3 I_{cont}) by May 1992. The blue absorption-edge velocity of H_β was $-$ (600$\pm$20) km s^{-1} on 15 May 1992. (2) The He I (5876Å) line was in absorption in May 1991 and in emission (intensity was 1.08 I_{cont} in May 1992 with blue-shift of the line-center by more than 6 Å ($-$ (310$\pm$10) km s^{-1}). (3) H_α emission intensity increased from 9.8 I_{cont} to 12.7 I_{cont} between May 1991 and May 1992 with remarkable changes in the structures of the profiles. Also two emission lines at 5317 Å and 5732 Å, may be due to Fe II, are present in May 1992 spectra of 66 Oph which were in absorption in May 1991.

1. Indian Institute of Astrophysics, VBO, Kavalur, India.
2. Periyar E. V. R. College, Trichy, India.
3. Govt. College for Men, Kumbakonam, India.

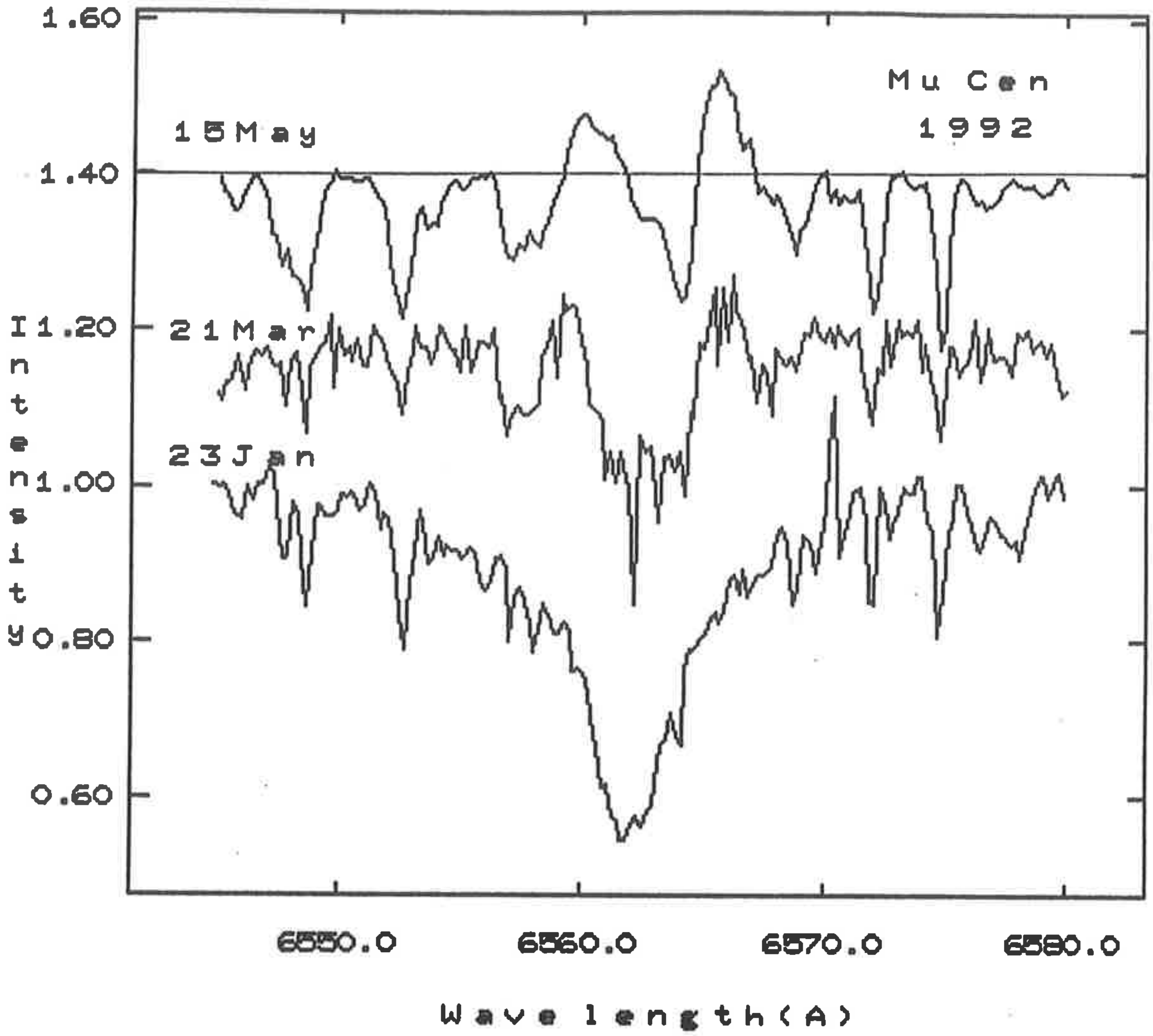

Fig. 1 H_α profiles of μ Cen

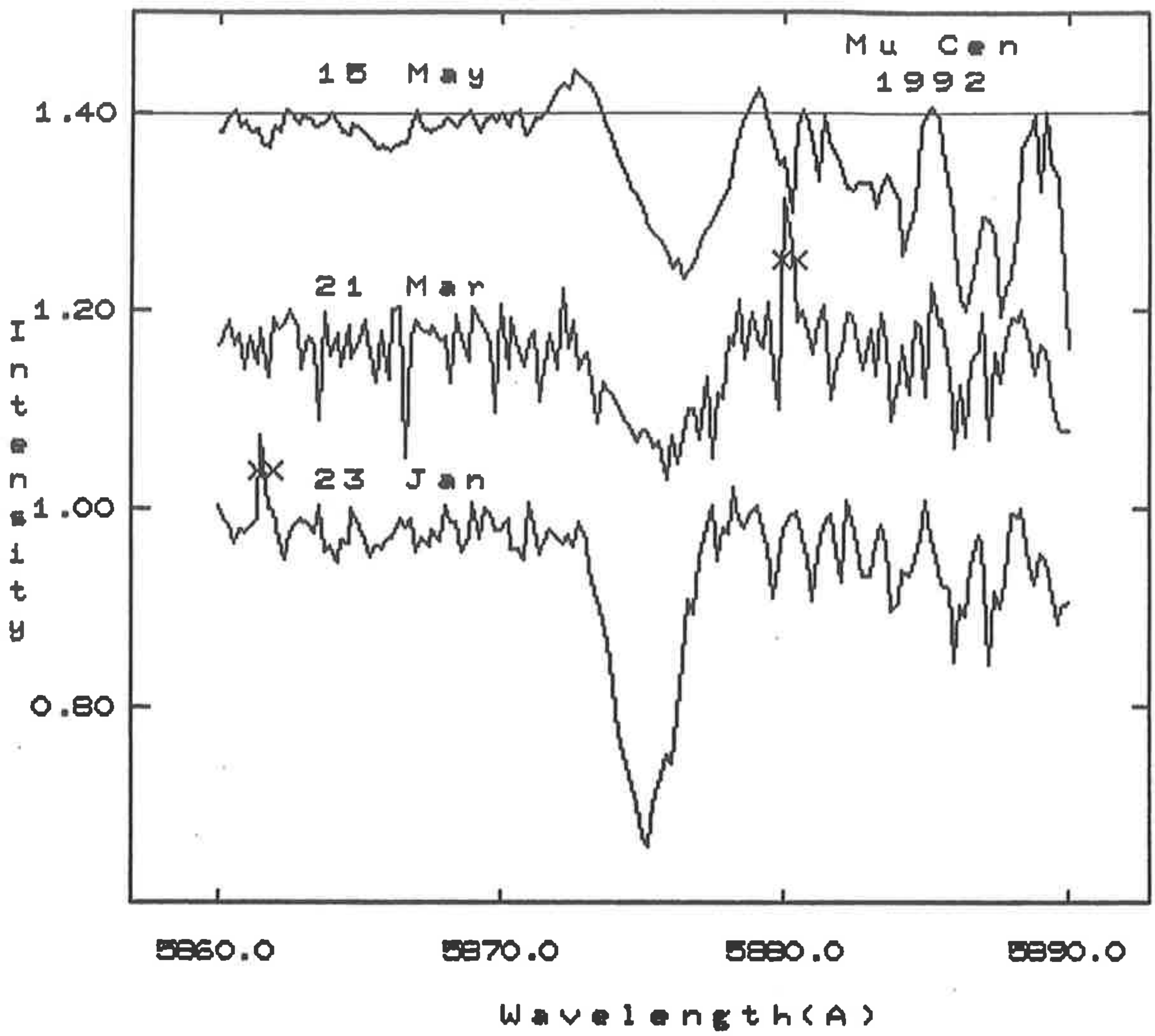

Fig. 2 He I (5876 Å) profiles of μ Cen

Simultaneous Infrared and H-alpha Measurements of Be stars

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In an earlier note (Apparao and Tarafdar, 1991), we had indicated that the observed H-alpha emission and infrared emission for a given Be star are not compatible with the notion that they arise from the same ionized region (see Table 1 and Apparao and Tarafdar, 1991). However, since the measurements of infrared and H-alpha emission were done at different times, the incompatibility, though unlikely, can be attributed to the time variability of the emissions. In order to verify this we made simultaneous observation of infrared and H-alpha emission from four Be stars.

The infrared observations were made with the 75 cm reflector telescope and the H-alpha observations were made with the 102 cm reflector telescope at the Vainu Bappu Observatory, Kavalur, India. The infrared observations were carried out in the JHK bands using a liquid nitrogen cooled InSb photometer. The H-alpha profile was obtained using a Coude Echelle spectrograph. The observation of the four Be stars η Tau (HR 1165), ζ Tau (HR1910), χ CMa (HR2538) and β CMi (HR2845) were made on the night of 24/25 February 1992. Several calibration stars were also observed throughout the night.

The J, H, K infrared magnitudes are obtained using the calibration and making the appropriate mean extinction corrections for the site. These are given in Table 2. The H-alpha equivalent widths are obtained in the usual fashion by integrating the flux under the profile and are given in Table 2. The equivalent widths are converted to H-alpha luminosity using the stellar atmospheric tables of Kurucz (1987) and these are also given in Table 2. The calculation of the near infrared luminosity L_{IR} from the J, H, K magnitudes was outlined by Ashok et. al. (1984) and using these we obtained the values given in Table 2. The ratios of the infrared luminosity to the H-alpha luminosity (R) are also given in Table 2.

The assumption that both the infrared and H-alpha emission arise due to free-free and free-bound emission from the same ionized gas leads to a luminosity ratio R of about 3. (Ashok et. al., 1984). The ratios obtained for three of the four observed stars are clearly much larger than 3. In Table 1, the ratio of the infrared luminosity L_{IR} to the luminosity of the Lyman continuum L_L is given. It is seen that for later types of Be stars $L_{IR}>L_L$. This again suggests that the bulk of the infrared emission may not arise from regions ionized by the Lyman continuum. On the other hand the ratio of L_{IR} to the luminosity of the star L_* is of the order of one percent. In the later types most of the energy is in the Balmer continuum. It seems necessary therefore to convert part of this Balmer continuum to infrared luminosity. It is also possible that other mechanisms may operate, for example C-shocks in the gas envelope around the Be star, which can heat the gas without ionizing, thus leading to infrared luminosity without H-alpha emission. Some of these possibilities are under investigation.

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Table 1

Infrared and H-alpha luminosities of Be stars

Spectral Type	Log (EM)* (cm^{-3})	Log E(H_α) (calc.) (ergs s^{-1})	Log E(H_α)* (obs.)	L_{IR}/L_L+	L_{IR}/L* ($X10^{-2}$)
BO-B1.5	60.6-61.1	36-36.5	33.6-34.4	0.04-0.54	0.57-6.67
B2-B3	59.4-60.4	34.8-35.8	33.1-34.0	0.09-1.13	0.57-5.27
B4-B5	59.2-59.9	34.6-35.3	32.2-33.7	2.02-5.57	2.68-3.75
B6-B7	58.2-59.5	33.6-34.9	32.1-33	9.26-11.67	3.93-4.14
B8-B9	57.7-58.2	33.1-33.6	32.4-32.8	15.42-22.56	1.67-2.44

*from Lamers (1987), +see Ashok et al (1984).

Table 2
Infrared and H-alpha Observation of Be stars

Star	Spectral Type	Magnitudes J	H	K	H-alpha Eq. Width A	L_{IR} ergs s^{-1}	$L_{H\alpha}$ ergs s^{-1}	$L_{IR}/L_{H\alpha}$ R
η Tau HR 1165	B7 III	3.01	2.76	2.98	6.9	$<3\times10^{34}$	1.5×10^{33}	<20
ζ Tau HR 1910	B2 III	3.33	3.08	3.08	21.5	1.0×10^{36} (±0.3)	3.3×10^{34}	30
χ CMa HR 2538	B2 V	3.96	3.63	3.35	22.18	1.1×10^{36} (±0.1)	6×10^{33}	180
β CMi HR 2845	B8 V	3.01	2.86	3.00	6.34	1.5×10^{34} (±1.0)	1.3×10^{32}	115

The Rapid Profile Variation of Hα on κ CMa in March 1993

Jinxin Hao

Joint laboratory for Optical Astronomy, Chinese Academy of Sciences

New observation of Hα line on κ CMa is presented here. The observation was performed on 1 meter reflector at Yunnan Astronomical Observatory. The spectrograph is located at coude focus with a CCD as the detector. The dispersion is 4.16mm/A and the spectral resolving power is greater than 30000 around Hα. During three day observation, total fo 13 spectra were obtained. The observation log is list in the table.

The spectra displayed in Fig.1 are wavelength-calibrated and continum-normalized. In order to see the rapid variation of the profile clearly, we made the mean spectrum of the all and subtract it from each one of them. Then we obtained the residual spectra, which are showed in Fig.2. We can see that during this period, the profile of Hα varied evidently with the trend of intensity increasing. In addition, we also find the variation in the fine structure of the profile. This observation strongly supports the report about the activities of Be star κ CMa given by G. Wallerstein (IAU Circ. No. 5694, Jan. 21,1993), who found that the Be star κ CMa was exhibiting very strong emmission at Hα, the Paschen lines, and *OI* at 844.6*nm* in an echelle spectrogram, indicating that the star is in a very active stage.

Table Observation log

No.	Begin time	Exposure time	Date
1	12:53:40UT	1200s	Mar. 3, 1993
2	13:21:51UT	1500s	
3	13:56:24UT	1500s	
4	14:28:38UT	1500s	
5	12:38:53UT	1500s	Mar. 4, 1993
6	13:18:26UT	1500s	
7	13:44:54UT	1500s	
8	14:15:52UT	1500s	
9	13:15:50UT	1200s	Mar. 4, 1993
10	13:41:26UT	1200s	
11	14:06:00UT	1200s	
12	14:31:20UT	1200s	
13	15:24:03UT	1500s	

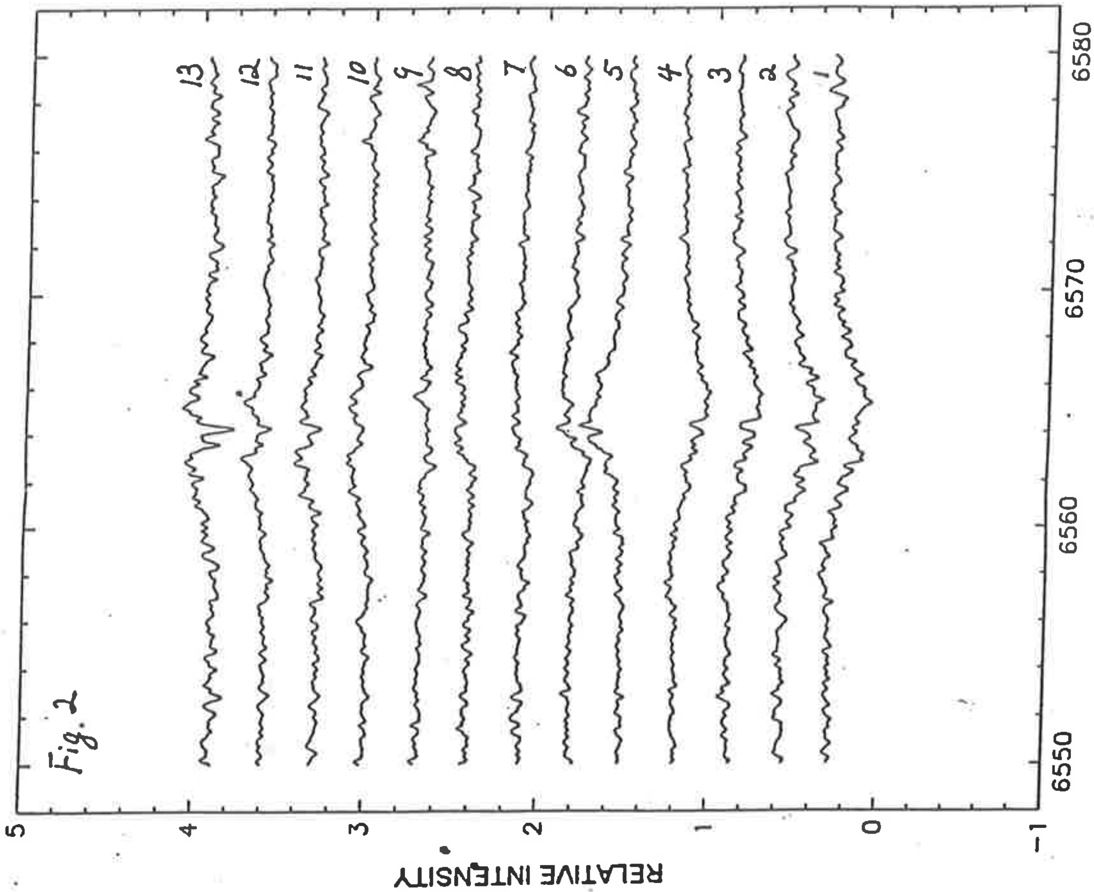
Fig. 2
RELATIVE INTENSITY
WAVELENGTH (Å)
6550
6560
6570
6580
-1
0
1
2
3
4
5
1
2
3
4
5
6
7
8
9
10
11
12
13

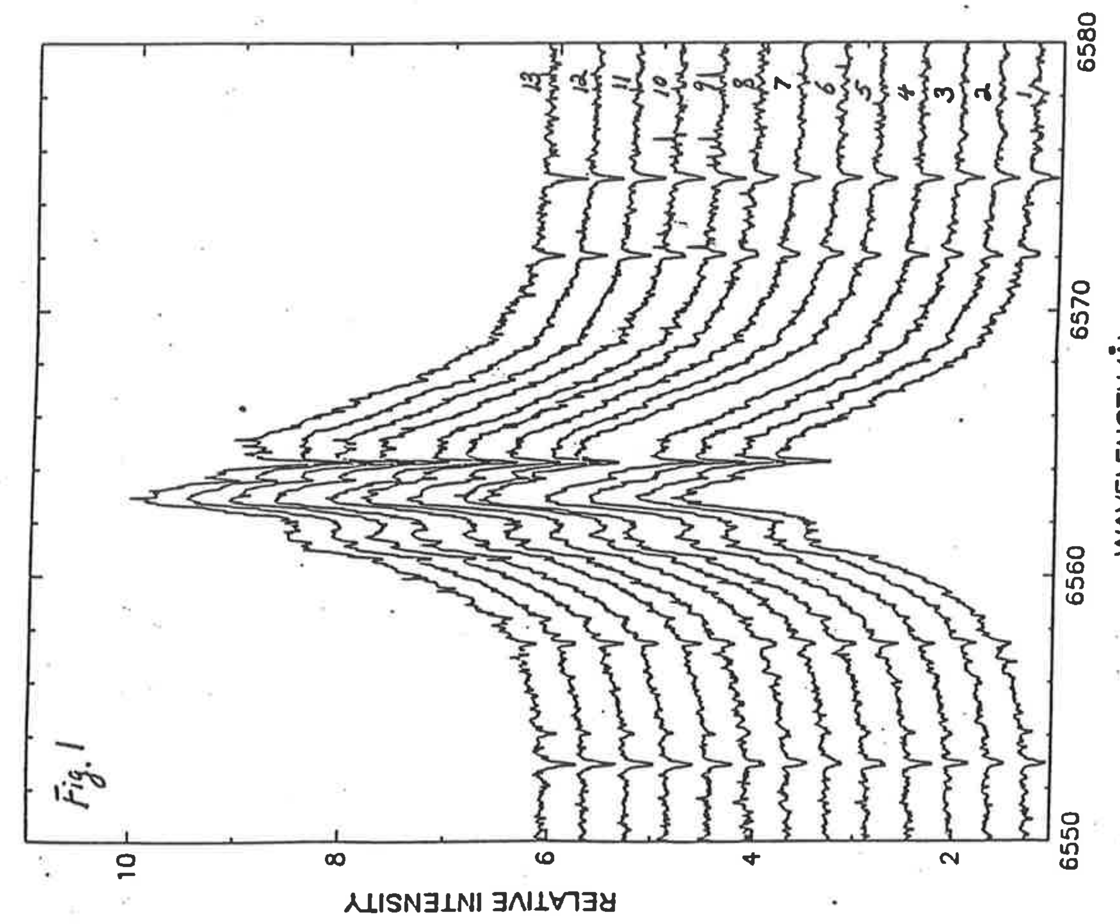
Fig. 1
RELATIVE INTENSITY
WAVELENGTH (Å)
6550
6560
6570
6580
2
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WHAT'S HAPPENING ?

* * * * *

ANNOUNCEMENT ON NEW CAMPAIGN SERIES ON Be STARS

We (Ryuko Hirata at Kyoto, Anne Marie Hubert-Delplace at Meudon, Eiji Kambe, now at Univ. British Columbia) are going to perform the multisite, high- dispersion spectroscopy of the line profile variations (lpv) in some Be stars (Okayama, Haute-Provence, Dominion) in the latter half of 1993.

Our present interests on the short-term variation of Be stars are:

1. The origin of the short-term variation in Be stars,
2. Physical relation between lpv and mass loss (stellar activity cycle),
3. Investigation of the nature of lpv itself towards stellar seismology.

For these purposes, it is highly desirable to perform the multi-line spectroscopy and simultaneous photometric and spectroscopic observations. This announcement is written for asking your participation in our project, through either spectroscopy or photometry.

We are now planning to make international campaigns for the following targets:

*ζ Oph (O9.5Ve, RA=16:37:09, DEC=-10:34:02(2000), V=2.6mag) (This campaign was agreed by Stefl, Kambe, Ando and Hirata.) April 30-May 6 (7 nights, Okayama 1.88m/Hirata, accepted) :HeI6678 May 2-5 (4 nights, ESO-CAT/Stefl, accepted) :HeI6678 Kambe will also observe this star spectroscopically at Dominion. The uvby-beta observations are done at ESO Danish 50-cm telescope(14 nights in May 1-14, accepted) and at Dodaira 91-cm telescope near Tokyo. (objective) the firm determination of multiple periods, the determination of NRP parameters and their variations in B phase, the relation between lpv and photometric variation.

*EW Lac (B2p, RA=22:57:04, DEC=48:41:03, V=5.4mag) one week from Aug 30 to Sept 5:HeI6678 at OHP, DAO and Okayama (objective) participation in the IUE campaign proposed by Dr.Gerrie Peters(please contact her for details). We expect fruitful results in UV and optical spectroscopy and photometry for this remarkable variable.

*γ Cas (B0IVe, RA=00:56:42, DEC=60:43:00, V=2.2mag) one week from Oct 27 to Nov 2: HeI4471+MgII4481 at OHP, DAO & Okayama (objective) overall analysis in terms of NRP. Its variable nature in lpv (periods, amplitudes) is quite interesting.

As candidates for our future campaigns:

*λ Eri (B2IVe, RA=05:04:22, DEC=-08:45:15, V=4.3mag)
ω Ori (B3IIIe, RA=05:39:11, DEC=+04:07:17, V=4.6mag)
θ CrB (B6III, RA=15:32:56, DEC=+31:21:32, V=4.1mag)

Our current principle for the data reduction and circulation is:

0. The aims and targets should be discussed in advance (for future campaigns).

1. The conversion of spectroscopic data into one-dimensinal form in FITS (including reference-line frames) is done by each observer. All one- dimensional data are concentrated to the manager, who checks them and performs the conversion into wavelength scale, including heliocentric correction, to avoid the multiple interpolations. Then, all data in unified system are distributed to all participants who have tools for subsequent analyses (normalization, period analysis etc.).

2. For the photometric data, one specialist should be responsible for the selection of comparison, check and standard stars, and also for assembling and unification of the data. The results are also distributed to all.

3. The basic results are summarized as a joint paper. Further study originated from her or his own view can be published by each participant or group.

We basically agree to keep our network(northern hemisphere network) for future campaigns. Since the observatory sites locate at rather high latitudes, northern Be stars are appropriate but equatorial belt stars are also conceivable as campaign stars. It could be also imagined to link our network with other campaigns when the scientific subject is in common.

We are much pleased if you are interested in this project. We are disposed to have your initiative of the paticipation in our ongoing campaigns, your suggestions on the targets in the year 1994 and after, and your comments and discussions of our campaign strategy. Please note that the targets for the 1994 Jan-June season should be determined before 1993 mid-August, since deadlines of applications for most major telescopes will come soon after that.

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* *

ANNOUNCEMENT OF A MULTIWAVELENGTH CAMPAIGN ON EW LACERTAE

From September 1-7, 1993 we will be carrying through multiwavelength observations of the Be-shell star EW Lac. In a continuing project aimed at exploring the cause for rapid photometric and spectroscopic variability in the Be-shell stars, we plan 24 hours of continuous repeated *IUE* observations, which will be supported by extensive ground-based spectroscopic, photometric, and polarimetric observations that will commence as early as August 31. The *IUE* observations are currently scheduled to begin at 7:00 UT on September 6.

Participants in this project include J. R. Percy, H. F. Henrichs, D. R. Gies, D. McDavid, R. Hirata, E. Kambe, A.-M. Hubert, A. Tarasov, J. Ziznovsky, L. Huang, and G. J. Peters, and we invite interested observers to join our effort. In addition to simultaneous observations, we are especially interested in the behavior of the program stars before and after the campaign. 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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Quel Vsini pour χ Oph?
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Abbreviations used for the Publications

AA	Astronomy and Astrophysics
AASS	Astronomy and Astrophysics Supplement Series
AAS	Acta Astronomica Sinica
AAPS	Acta Astrophysica Sinica
AJ	Astronomical Journal
APJ	Astrophysical Journal

APJS	Astrophysical Journal Supplement
ASS	Astrophysics and Space Science
BAAS	Bulletin of the American Astronomical Society
BAC	Bulletin of the Astronomical Institutes of Czechoslovakia
CRASP	Comptes rendus de l'Academie des Sciences de Paris
IAUC	IAU Circular
IBVS	Information Bulletin on Variable Stars
JAA	Journal of Astronomy and Astrophysics
MNRAS	Monthly Notices of the Royal Astronomical Society
MSAI	Memorie della Societa Astronomica Italiana
PASJ	Publications of the Astronomical Society of Japan
PASP	Publications of the Astronomical Society of the Pacific
PBAO	Publications of the Beijing Astronomical Observatory
PICM	Proceedings of the International Colloquium "The Infrared Spectral Region of Stars", held in Montpellier, France, 16 - 19 Oct 1990, eds C. Jaschek and Y. Andrillat
RMAA	Revista Mexicana de Astronomia y Astrofisica

MEETINGS

* * * * *

IAU Symposium No. 162

PULSATION, ROTATION AND MASS LOSS IN EARLY-TYPE STARS

5 - 8 October 1993, Juan Les Pins (near Nice, France).

Most readers of this *Newsletter* will have received the first announcement on IAU Symposium 162. There has been great interest in this meeting: over 200 respondents to the first announcement have signaled their intention of participating. Although the symposium is not specifically directed at Be stars, they will be the focus of the meeting. There is the possibility that we may at last be close to understanding the source of the enhanced mass loss rate in Be stars.

The discovery of periodic line-profile and photometric variations in Be stars and the realization that the recently revised metal opacities lead to pulsational instability among the B stars are particularly relevant, but the field is rapidly changing and controversial. This should make for an exciting meeting.

The members of the Scientific Organizing Committee are:

D. Baade (Germany), L. Balona (South Africa, chairperson), J. Cassinelli (USA), H. Henrichs (The Netherlands), A. M. Hubert (France), M. Jerzykiewicz (Poland), S. Owocki (USA), J. Percy (Canada), H. Saio (Japan), M. Smith (USA) and F. Vakili (France).

Our hosts will be the Observatoire de la Cote d'Azur who are pioneering the optical resolution of Be star envelopes. Dr Farrokh Vakili is the chairperson of the Local Organizing Committee.

The meeting will consist of invited talks and poster papers. No oral contributions will be accepted, but there will be a lengthy discussion period after each invited talk. We hope the talks will be provocative and that lively debates will be stimulated during the discussion time. You should come prepared to make your point of view during these periods. If it is to illustrate a point in the discussion, a slide may be presented. There will be plenty of room to present poster papers. All invited talks and discussions will be published. The editors will include as many of the poster papers as space will allow.

The confirmed speakers and topics are as follows:

W. Dziembowski (Poland)	New opacities and B-star pulsations
M. Jerzykiewicz (Poland)	Observations of pulsating B stars
C. Aerts (Belgium)	Mode identification in pulsating stars
M. Clement (Canada)	Pulsation in rapidly-rotating stars
S. Sofia (USA)	Evolution of rapidly-rotating stars
J. Cassinelli (USA)	ROSAT results on B stars
K. Bjorkman (USA)	WUPPE results on B stars
M. Smith (USA)	Photospheric activity in Be stars
H. Saio (Japan)	Periodic variations and mass loss in Be stars
D. Bohlender (USA)	Observations of magnetic B stars
D. Moss (UK)	Origin of magnetic fields in B stars
R. Waters (Holland)	The circumstellar environment in Be stars
A. Hubert (France)	Variability in circumstellar Be-star disks
F. Vakili (France)	Optical resolution of Be star disks
S. Owocki (USA)	Winds from hot stars
J. Bjorkman (USA)	Effects or rotation and magnetism on hot star winds
R. Prinja (UK)	Time-dependent phenomena in hot star winds

The titles of the talks will be made known at a latter stage.

We hope that all readers of this *Newsletter* will be able to attend this meeting. If you wish to attend this meeting and have not replied to the first announcement, please contact:

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