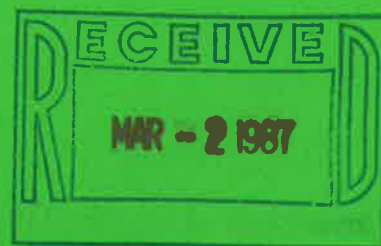


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# Be STAR NEWSLETTER

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( ' ' TO Be OR NOT TO Be ' ' )

NUMBER 14

October 1986

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The Be Star Newsletter is open to all contributions related to matters concerning Be stars. Please send manuscripts and all correspondence to the new editor:

Dr. Geraldine J. Peters  
Space Sciences Center  
University of Southern California  
University Park  
Los Angeles, CA 90089-1341  
USA

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*Acknowledgements:* On a partly very short notice, this issue of the Be Star Newsletter had to be produced entirely at ESO and the ST-ECF. The financial support received is gratefully acknowledged, and Britt Sjöberg and Harry Neumann, respectively, are thanked for their fast typing and copying the Newsletter.

## Editorial

At the recent IAU Colloquium on Be stars held in Boulder, CO, I announced that I have agreed to assume the responsibility of editing the *Be Star Newsletter*. Dietrich Baade will serve as co-editor and the Newsletter will be copied and mailed from the European Southern Observatory in Garching, W. Germany. I look forward to the experience and challenge of editing the Newsletter and especially, the opportunity to interact more directly with the Be star community. I would like to begin by thanking Mercedes Jaschek for serving as editor of the *Be Star Newsletter* for a long seven years and the Observatory of Strasbourg for their financial support. I will certainly try to maintain the high standards that have been established. This will indeed be a challenge since we are experiencing problems in securing funds to continue publishing the Newsletter. In view of these difficulties, we will experiment with various ways of keeping costs down. Our first thought is to limit the distribution to one copy per group or institution. We expect that all members of a group will be able to read the Newsletter and produce their own copies, if desired. We also need to update our mailing list. Therefore, if you wish to continue receiving the Newsletter, please fill out the form which is provided on the back cover and mail it to the address on it as soon as possible. State clearly to whose attention the Newsletter is to be sent. Please inform us if the restriction to one copy leads to unreasonable difficulties.

I am in favor of keeping the same format for the Newsletter, in general. I feel that we should continue to include sections on Correspondence, Contributions, Reports on Observing Campaigns and National Activities, and the Bibliography. Some new ideas are to include a preprint listing, a "classified advertisement" section, and a column in which readers can communicate to the readership which stars are active/inactive. I envision that the preprint list will take the place of the present section on abstracts. If you wish to have your paper listed in this section, please send me the title, the name of the journal or book where it will be published, an address where the reader can write for preprints, and a one or two sentence (i.e. very brief) abstract. The complexity of the Be phenomenon has inspired the present trend toward coordinated projects involving many participants worldwide. As an example of such a successful campaign, I refer you to Doazan, et al. 1985 (*Astron.Ap.* **152**, 182). I propose that the *Be Star Newsletter* be used as a vehicle for coordinating such projects. We could have a "classified ad" section "Observations Wanted/Available" or "Theoretical support Wanted/Available", etc. In our version of "What's Hot.....What's Not", I would like to experiment with a column "What's Active.....What's Inactive". Please send me such information on noteworthy Be stars including which spectral feature or region is varying. Of course, I will give credit to each person who sends me the information. I feel that such a column will be an effective way of informing the community which Be stars are displaying *interesting* behaviour but not striking enough to warrant publishing an announcement in the IAU Circulars.

As an aid in keeping down the publication costs, we are asking that all contributions longer than a sentence or two be sent in a "camera ready" condition. Please follow the format in previous issues of the Newsletter. Type titles in capital letters (underlined), skip one line, then type the names of all authors and their affiliations. Skip another

line, then begin the text **single spaced**. One line may be skipped between paragraphs. Please use elite (12 pitch) type and dark ribbon. Avoid dot matrix printers, as most do not produce a copy of high enough quality for good reproduction. Send contributions for issue No. 15 by **January 31, 1987** to: Dr. G. J. Peters, Space Sciences Center, University of Southern California, University Park, Los Angeles, CA 90089-1341, USA. I can be reached by telephone at 213-743-6962 or telex: 4720490 USC LSA.

Please write to me with your thoughts on the direction of the Newsletter. How can we make it more useful/interesting for you? I am looking forward to hearing from you.  
Best wishes,

Gerrie Peters.

### Activities within the Working Group

The following is an attempt to summarize the recent activities within our Working Group. The most prominent event was of course IAU Colloquium No. 92 *Physics of Be Stars* which took place at Boulder August 18-22. It was attended by over 90 registered participants, and several sessions saw an even larger audience. 18 review papers addressed at least that many observational and theoretical topics. Not unexpectedly, there is still no general accord on what Be stars are and why they exist. Therefore, to some extent the classification of these topics on a scale between "just marginally relevant for Be stars" and "peculiar to Be stars" continues to be a matter of personal preference. Topics that in the official program were given noticeably more weight than at IAU Sump. No. 98 in Munich included the infrared part of the spectrum (IRAS), magnetic fields, and short-term variability. Unfortunately, D. Hayes and R. Kippenhahn were unable to come to Boulder. On a very short notice, the review of stellar evolution theory was given by R. Smith; P. Barker and J. Cassinelli included observations and interpretational consequences of the intrinsic polarization of Be stars into their respective presentations.

While the need to give a coherent overview over a complicated subject in just 30 minutes for most invited speakers also meant a heroic fight against the clock, time limitations were even more severe for those who had to present the conclusions of a poster paper in as little as 5 minutes. Since it often is these more dedicated pieces of work which contain new results, already the number of close to 60 poster papers shows that quite some progress has been made. Most works had reached a degree of

completion which gives rise to the hope that in the near future they will appear also in a more complete version than only as a two-page abstract in the proceedings.

Although time limits were tough, most speakers exercised discipline so that there was much (needless to say: hardly ever enough) time for discussions. These were often lively but never exuberant. Under P. Conti's chairmanship, even the apparent fears of the organizers that the session on the competing models for Be stars might be less orderly proved unnecessary. At the end of the meeting, T. Bolton, H. Henrichs, T. Kogure, J. Peters and M. Smith were asked to turn the results of the previous four days into recommendations for our future work.

The last action at the colloquium was a poll by M. Plavec as to how many different populations of Be stars, the participants thought, probably exist. It turned out that most voters are convinced that the classification of topics in terms of their relevance (as alluded to above) is not just a matter of human prejudices but also practiced by their objects: Only a vanishingly small minority opted for viewing Be stars as an essentially monolithic block while the vast majority admitted to believe in at least three different populations.

From talking to a fair number of participants I sensed a broad agreement that the meeting was considered a very nice success. Our thanks are therefore due the Scientific Organizing Committee and especially to its chairman, Arne Slettebak, who took most of the initiative to let wishes for another large Be star meeting become reality and also accepted the tedious job of editing the proceedings (to be published by Cambridge University Press and probably appearing early in 1987). However, success or failure of a scientific meeting are often not determined by the scientific program but by the superficially much more banal technical frame work in which it takes place. Nobody could have wished a smoother organization and a more efficient handling of all the many individual needs than done by the local organizing team headed by Ted Snow.

Another significant event within the Working Group is the change in editorship of our Newsletter. After nearly 7 years and 13 issues, Mercedes Jaschek had the understandable wish that somebody else should take over. During this period, the circulation grew to nearly 400 copies which is certainly the best prove of the success of Mercedes Jaschek's initiative to call into life the Newsletter. As from 1987 January, Gerrie Peters agreed to edit the Newsletter for the following three years. During the Boulder colloquium, the Organizing Committee discussed possible changes to the style of the Newsletter, and on page 3 of this issue Gerrie Peters outlines her new concept. Please make life easier for her by following the technical instructions given, but also make extensive use of this service kindly offered by her since only then it is worth her efforts. Note that you must renew your subscription if you want to continue receiving the Newsletter (see page 3 and back cover). The European Southern Observatory kindly agreed to support the Newsletter by technically producing and distributing it.

With the colloquium still in full swing, the first suggestions for the next meeting came up already in Boulder. The main thrust of the proposals made was towards extremely extensive (maybe exhaustive?) discussions guided by a very small number of major formal presentations and held at a very isolated spot. It was suggested that

it might be advantageous to have this workshop shortly after the 1988 IAU General Assembly. The prospects of it being organized by and near a particular institute are currently being investigated. When these plans are sufficiently concrete, they will be announced in the Newsletter. Meanwhile other or additional suggestions are welcome (naturally, volunteers for the organization would be most appreciated).

Generally, if you have any comments or proposals regarding the activities of the Working Group, please contact any member of the Organizing Committee (until 1988: D. Baade, P. Barker, V. Doazan, M. Marlborough, G. Peters, A. Slettebak, and T. Snow). The Newsletter, too, should be very useful for many of your needs.

The least disputed and most frequent of all conclusions presented at Boulder has been that substantial progress can only be expected from the concentration of a very wide range of observational efforts on a very small number of suitable objects. To this end, a small informal group formed at the periphery of the meeting with the main aim to study in more detail the short-term variability of Be stars. The contact persons who will try to define this campaign are Huib Henrichs (UV spectroscopy), John Percy (photometry) and Myron Smith (ground-based spectroscopy). It is intended to inform the community about details via the Newsletter. Meanwhile, J. Percy has produced a questionnaire and circulated it among interested observers. If you wish to actively participate in defining and carrying through this campaign, please contact him directly.

Personally, I would like to strongly encourage also observers whose interests are more weighted towards other aspects of Be stars, to follow this example and to form similar study groups which select some principal targets, recommend observing procedures, etc. Since the usefulness of observations is hardly ever limited to the program within which they were obtained, a coordination of the recommendations of these study groups would be extremely helpful. We must keep in mind that the competition for the major observing facilities expected for the future will be tough and that this competition will have the character of a closed loop: Only classes of objects with a promise of interesting, digestible results demonstrated by previous work will be given time which, with an instrument of a new class, comes close to a guarantee for new interesting results and, therefore, for more observations.

Dietrich Baade

A B S T R A C T S

HR 8107: A New Bright Be Star

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Mitaka-shi, Tokyo 181

Abstract. A B6 IV star HR 8107 ( $v \sin i = 120 \text{ km s}^{-1}$ ) is found to show a weak double-peaked emission component at H $\alpha$  on Reticon spectra obtained on November 20 and 24, 1985. The UBV photometric data ( $V = 6^{\text{m}}.46$ ,  $B-V = -0^{\text{m}}.01$ , and  $U-B = -0^{\text{m}}.37$ ) obtained on December 20, 1985, are however in good agreement with the results published in the past 20 years.

The Ultraviolet Spectrum of the Peculiar  
Emission-Line Star GG Carinae

E. Brandi

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E. Gosset and J.-P. Swings

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Abstract. This paper presents the first study of the properties of the peculiar emission-line star GG Carinae in the ultraviolet wavelength domain.

From IUE high resolution spectra, we investigate the behaviour of different ions concerning their respective profiles as well as their radial velocities. A large number of ionization stages are actually simultaneously present. The ultraviolet spectrum is dominated by absorptions, mainly of FeII; but emissions are also present in some lines of OI, MgII, FeII. The absorption line widths increase with the ionization stages. No correlation appears between the radial velocities and the excitation potential whereas some correlation exists between the former and the ionization potentials. A Bowen mechanism is responsible for the observed emission (P Cygni type profile) of the resonance triplet of OI as well as for the resonance doublet of MgII. In the far UV, FeII is characterized by the presence of absorption lines with the remarkable exception of multiplet 191 which shows P Cygni profiles; these are explained as being due to a radiative pumping mechanism. In the near UV, FeII is characterized by double absorption lines with sometimes a complex emission feature on the redward side. It is also shown that resonance fluorescence is the main excitation of the FeII emission in the near ultraviolet, in the optical and in the infrared regions.

From IUE low resolution data, we propose a value of the B-V excess of  $E_{B-V} = 0.52 \pm 0.04$  ( $2 \sigma$ ). The continuum of GG Carinae from the UV to the visible is rather well represented by the theoretical flux of a  $T_{\text{eff}} = 18000 \text{ K}$ .



Kurucz standard model atmosphere. We investigate also the ultraviolet lightcurve, which is essentially similar to the one observed in the visible (Gosset et al., 1984, 1985).

Identifications of the lines in the UV spectrum of GG Carinae covered by IUE are being published separately (Brandi and Gosset, 1986) in the Supplement Series of this Journal.

(to appear in Astron. Astrophys.)

The Ultraviolet Spectrum of the Peculiar Emission-Line Star  
GG Carinae: the Line Identifications

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5, avenue de Coïnte, B-4200 Coïnte-Ougrée, Belgium

Abstract. Line features as well as the continuum of GG Carinae in the ultraviolet wavelength domain were described by Brandi et al. (1986) on the basis of a series of high and low resolution IUE spectra for which the line identifications are detailed here. The present contribution is thus the complement to the above-mentioned paper and enables the disentangling of the complex and rich spectrum of GG Carinae.

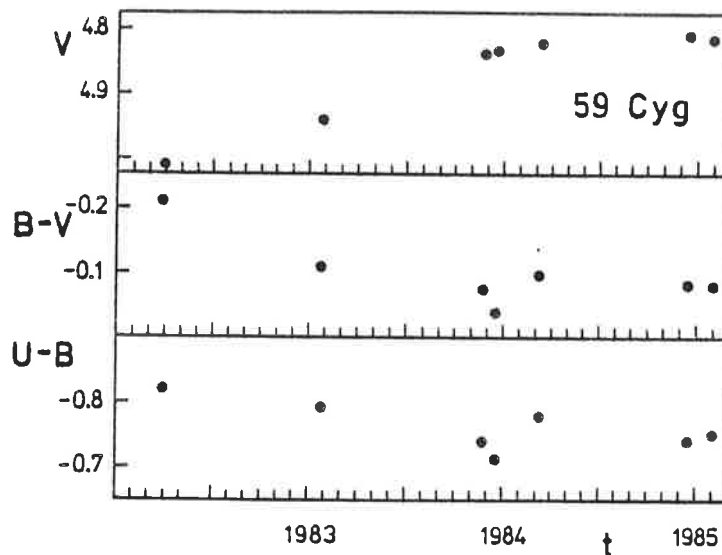
(to appear in Astron. Astrophys. Suppl. Ser.)

59 Cyg - Photometric Behaviour after its Active Period

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of the Bulgarian Academy of Sciences

Abstract. The photometric behaviour of the bright star 59 Cyg is estimated during the period of the development of a Be phase. The precise values of 453 photoelectric measurement in the three-colour UBV system, obtained on 19 nights over the period 1982-1985 have been listed. A continuous increase of light-intensity in the V-band of about  $0^m.2$ , as well as an increase of the colours of about  $0^m.1$  are observed during the whole period of observations. On a number of nights a similar behaviour of light intensity and colours has also been detected. It is presumably due to the appearance of active formations in the external layers of stellar atmosphere of lifetime no greater than 1 to 3 star rotation cycles. A variability of small amplitude on 10-20 minutes time scale is observed, too.

An important question arises as to the existence of periodicity in light intensity on a time scale of years.



Values of light intensity and colours, averaged by months

## MEETINGS

### Second Japan-China Workshop on "Stellar Activities and Observational Techniques"

The Workshop was held in Kyoto, Japan, in March 17-19, 1986. About 60 astronomers attended it, among which 14 were from China, 2 from Indonesia, 1 from France, and the others were from Japan. A total of 8 review and 34 contributed papers were presented, including the following 8 papers on Be Stars:

HUANG, L.: Observational Facts on Short-Term Variability of Be Stars (Review).

GAO, W.S., CAO, H.L., GUO, Y.L., and GUO, X.Z.: The Visual Spectrum of  $\zeta$  Tau in 1979-1985.

SUZUKI, M. and KOGURE, T.: On the Absorption Line Profile of the Be Star 88 Her.

HIRATA, R.: UBV Photometry of Be Stars at Okayama.

GUO, Z.H., and HUANG, L.: UBV Photoelectric Photometry of Bright Be Stars at Xinglong Station, Beijing Observatory. Preliminary Results for five Be Stars: X Per,  $\zeta$  Tau, 48 Lib, 59 Cyg and EW Lac.

ANDO, H.: Episodic Mass-Loss in Be Stars and Wave-Rotation Interaction.

OKAZAKI, A.T.: V/R Variations of Be Stars due to One-Armed Oscillations of Cool Disk-Like Envelopes.

WIRAMIHARDJA, S.D., KOGURE, T., OGURA, K., NAKANO, M., and YOSHIDA, S.: A Survey for Emission-Line Stars in the Orion Belt Region.

The Proceedings will be published by the Department of Astronomy, University of Kyoto, and will be available on request.

T. Kogure

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## B I B L I O G R A P H Y

(Compiled by A.M. and H. Hubert, Jun Jugaku, Pavel Koubský, M. Ruusalepp, and Arne Slettebak)

Wave-rotation interaction and episodic mass loss in Be stars  
ANDO H.: AA 163, 97 (1986)

The H $\alpha$  line in Ae and A shell stars  
ANDRILLAT V. - JASCHEK M. - JASCHEK C.: AA Suppl. 65, 347 (1986)

Periodic optical line intensity variations in X Persei  
APPARAO K.M.V. - TARAFDAR S.P.: AA 155, 42 (1986)

V/R variability in X-ray emitting Be star binaries  
APPARAO K.M.V. - TARAFDAR S.P.: AA 161, 271 (1986)

Equivalent widths of the spectral lines of the  $\beta$  Lyr system and their changes  
BAHYL V.: BAC 37, 42 (1986)

The nature of Be stars: periodic variables in the cluster NGC 3766  
BALONA L.A. - ENGELBRECHT C.A.: MNRAS 219, 131 (1986)

Variability in H $\alpha$ , polarization, and magnetic fields in early-type stars  
BARKER P.K.: PASP 98, 44 (1986)

Luminosity and colour variations of 88 Her through phase changes from the far UV to the visual region. I. A confrontation with traditional Be-star modeling  
BARYLAK M. - DOAZAN V.: AA 159, 65 (1986)

Photoelectric observations of  $\gamma$  Cas, X Per and BU Tau  
BOHME D.: IBVS N<sup>o</sup> 2893 (1986)

Rotational velocity of Be stars correlated with emission characteristics  
BRIOT D.: AA 163, 67 (1986)

Summary comments on the state of stellar-wind theory as it relates to nonradial pulsations  
CASTOR J.I.: PASP 98, 52(1986)

Far infrared observations of  $\gamma$  Cassiopeiae from the IRAS satellite  
COE M.J.: PASP 98, 334 (1986)

Geometry of rotating envelopes around Be stars derived from comparative analysis of H $\alpha$  emission line profiles  
DACHS J. - HANUSCHIK R. - KAISER D. - ROHE D.: AA 159, 276 (1986)

Ultraviolet and visual variability of  $\theta$  Cr B during a normal B phase following a shell phase (1980-1985)

DOAZAN V. - MARLBOROUGH J.M. - MOROSSO C. - PETERS G.J. - RUSCONI L. -  
SEDMAN G. - STALIO R. - THOMAS R.N. - WILLIS A.: AA 158, 1 (1986)

Luminosity and colour variations of 88 Her through phase changes from the far UV to the visual spectral regions. II. Empirical atmospheric modelling; an association between photospheric and envelope variation

DOAZAN V. - THOMAS R.N. - BARYLAK M.: AA 159, 75 (1986)

A rotating, magnetic, radiation-driven wind model applied to Be stars (abstract)

FRIEND D.B. - POE C.H.: BAAS 18, 667 (1986)

The comparison of spectral characteristics of Be stars:  $\phi$  Per,  $\theta$  CrB,  $\chi$  Per  
GALKINA T.S.: IKAO 74, 23 (1986)

On the rotation of 53 Be stars

GAO W. - CAO H.: Ac.Ap.Sinica 6, 143 (1985)

Recent mass loss episode of the Be star  $\alpha$  And

GHOSH K.K. - JAYKUMAR K. - ROSARIO M.J. - APPAKUTTY M.: IBVS N<sup>o</sup> 2897 (1986)

Continuum energy distribution and photometric behaviour of  $\pi$  AQR

GORAYA P.S.: MNRAS 215, 265 (1985)

Ultraviolet and infrared excess emission in Be stars

GORAYA P.S.: MNRAS 222, 121 (1986)

A brightening of the Be star HD 46380

HALBEDEL E.M.: IBVS N<sup>o</sup> 2877 (1986)

Current microvariability for the Be star  $\phi$  Per

HALBEDEL E.M.: IBVS N<sup>o</sup> 2885 (1986)

LQ And (HD 224559): The 0.62 - day /or the 0.31 - day/ period confirmed

HARMANEC P.: IBVS, N<sup>o</sup> 2859 (1986)

Variable absorption components in UV spectra of early-type stars

HENRICHS H.: PASP 98, 48 (1986)

HR 8107: A new bright Be star

HIRATA R. - SADAKANE K. - NISHIMURA S. - WATANABE E. - YUTANI M.: PASJ 38, 627 (1986)

An extraordinary variation of H $\alpha$  profile of  $\gamma$  Cassiopeiae

HU J. - SUN J. - DONG Y.: Ac.Ap.Sinica 5, 239 (1986)

H $\alpha$  variability in X-ray transient source X0331+53

IYE M. - KODAIRA K.: PASP 97, 1186 (1985)

High-resolution spectrum of the peculiar optical counterpart of the X-ray binary pulsar 4U 1907+09

IYE M.: PASJ 38, 463 (1986)

A-type shell stars and infrared sources

JASCHEK M. - JASCHEK C. - EGRET D.: AA 158, 325 (1986)

Photometric behaviour of the Be star EW Lacertae

JEONG J.H. - SUH C.W. - NHA I.: ASS 119, 73 (1986)

Frequency of Be and Ae stars in spectroscopic binaries

KOGURE T. - SUZUKI M.: ASS 120, 253 (1986)

Models and theoretical spectra of accretion discs in dwarf novae

KRIŽ S. - HUBENÝ I.: BAC 37, 129 (1986)

Spectral observations of Be stars in visual region. II.  $\nu$  Cyg, 48 Per, 16 Peg,  
o And and EW Lac

KRUGLOV V.D.: Kinematika i fizika nebesnoh tel 2, No. 4, 49 (1986)

Photometric variability of some early type stars

MATHYS G. - MANFROID J. - RENSON P.: AA Suppl. Series 63, 403 (1986)

Observations of W Serpentis stars

MARKWORTH N.L. - GANN R.L. - RAFERT J.B. - SMITH E. - WILSON R.E.: IBVS N°  
2887 (1986)

Multicolor polarimetry of selected Be stars: a long-term analysis

McDAVID D.: PASP 98, 572 (1986)

Nonradial pulsation theory of massive stars

OSAKI Y.: PASP 98, 30 (1986)

The photometric variability of  $\lambda$  Eridani

PERCY J.R.: PASP 98, 342 (1986)

Episodic mass motions and surface phenomena

PENROD G.D.: PASP 98, 35 (1986)

Observation of the onset of an emission episode in the Be star  $\mu$  Centauri

PETERS G.J.: Ap J 301, L61 (1986)

Spectrophotometric study of the star  $\zeta$  Tau from the observations in 1983-1984.

I. About the variability of the spectrum

RACHKOVSKAJA T.M. - NASIBOVA CH.M.: IKAO 74 34 (1986)

U Cep: an unusual development

RAFERT J.B. - SMITH E. - MARKWORTH N.L.: IBVS N° 2872 (1986)

Spectroscopy of some Be stars

SINGH M.: ASS 120, 133 (1986)

Nonradial pulsations in massive stars; observations and oddities

SMITH, M.A.: PASP 98, 33 (1986)

Active phenomena of the Be star EW Lac observed in 1978-1982

SUZUKI M. - KOGURE T.: ASS 119, 69 (1986)

On the variation of H $\alpha$  profile in the spectrum of Be star 28 Cyg  
TARASOV A.E. - SCHERBAKOV A.G.: IKAO 74, 19 (1986)

The density structure of discs around Be stars derived from IRAS observations  
WATERS L.B.F.M.: AA 162, 121 (1986)

Atmospheric structure and mass loss from pulsation with speculative  
application to B and Be stars  
WILLSON L.A.: PASP 98, 37 (1986)