



News from The Society for Astronomical Sciences

Vol. 3, Number 3

Pre-Symposium Workshops being put in place for 2006 meeting

If you recall, we had two surveys during the course of the 2005 SAS Symposium. One was an internal survey conducted by the SAS Committee in order to get a better feel for what was good/bad/neutral about this years Symposium. One of the results of this survey was a strong interest in continuing and even expanding the pre-symposium workshops, the first of which were carried out before the 2005 Symposium. As it stands now at the writing of this edition of the Newsletter, it appears we are going to have several workshops, most likely running in parallel sessions: 1) Using Binary Maker 101, David Bradstreet, 2) Producing light curves with MPO Canopus, Brian Warner, 3) Photometric reduction with MPO Canopus/PhotoRed, Brian Warner, 4) Using PerAnSo (Period Analysis Software, endorsed by AAVSO), Tonny Vanmunster of the CBA and 5) Getting started in Research,

Jerry Foote.

The series by Jerry will consist of several parts, each about 60-90 minutes in length. The topics will be:

Choosing a CCD Camera – 90 minutes

This workshop covers CCD basics including the principle of operation, types, blooming vs. anti-blooming, associated readout electronics, sources of noise, color response, resolution, matching to a telescope, field of view, sampling, binning, and image file formats. The handout will contain links to most of the CCD camera manufacturers however specific recommendations will not be made. The workshop is designed for the beginner that wants information to guide them in the selection of a CCD camera.

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SAS and CBA to hold Joint Symposium

A very recent development for our 2006 Symposium began when Joe Patterson, the leader of the CBA group suggested a joint meeting with SAS. As the emails flashed back and forth, we finally settled into adding the CBA as a joint meeting. What this means is our 2006 meeting may be a little larger since it is not anticipated that there will be a lot of attendees other than more local types of CBA members. It also means we will have papers and/or posters interspersed within the

usual SAS program. This is of course a good thing. In addition, Tonny Vanmunster, a very active variable star observer and CBA member, who has written a nice piece of analysis software which is very inexpensive called Per-

AnSo(Period Analysis Software will be present and presenting a workshop on the use of this software and in general on period determinations in variable stars.

This years meeting is again at Northwoods Resort.

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- Lee Snyder – Co-Chairman
- Robert Stephens – Co-Chairman
- Robert Gill – Audio Visual Webmaster
- Dave Kenyon – Program Co-Chairman
- Dale Mais – Program Co-Chairman, Newsletter editor
- Brian Warner – Program Co-Chairman
- Jerry Foote – Program Co-Chairman

Advisors:

- Arne Henden
- Dirk Terrell
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We thank our 2005 Sponsors whose support makes our meeting possible:

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Spectroscopy article on starting on page 5 by Ernst Pollmann. Ernst is an active amateur spectroscopist in Germany where there are many amateurs active in this area



*News from The Society
for Astronomical
Sciences*

Workshops, continued

Automated Telescope Basics
– 90 minutes

This workshop will discuss the important features of automating a telescope for overnight un-attended operation. Included topics are scripting, field synchronization, UPS power, remote vs. local PC, cable runs, weather sensors, camera control, accurate time sources, image storage, and how to protect against the unknown. This workshop will not cover full un-attended operation but assumes that operator intervention is available nearby on a daily basis. The handout will contain links to most of the automated telescope control software vendors however specific recommendations will not be made. The workshop is designed for the astronomer that is ready to get some sleep while his telescope continues to gather images throughout the night.

Taking and Processing a CCD Image for Research – 90 minutes

This workshop will cover in detail the conversion of a raw

CCD image into an accurate scientifically usable CCD image. Topics include exposure levels, sampling, bias subtraction, dark subtraction, flat fielding, noise reduction, artifact sources, and how to take and use master flats and darks. The handout will contain examples of common image problems and how to recognize and resolve them. Good practices will be stressed as well as pipelined processing to avoid errors.

There will be some fees associated with these. Tentatively these are shown below and may be slightly greater by a few dollars to cover SAS costs for room/refreshments.

Bradstreet, \$50 (\$150 if you need to purchase software)

Warner, \$25 for each session, software purchased separately

Foote, \$10 each session, \$30 for all three

Vanmunster, \$50 which includes the software



This year the organizational committee of SAS met at Jerry Foote's home in Kanab, Utah to put together the program for 2006. Shown in the background is one of Jerry's automated scopes. Lee Snyder was also present but in back practicing his jokes on the pine trees. (The trees were not laughing)

Call for Papers for 2006 Symposium

The 2006 Symposium is beginning to take shape. The Speakers committee continues to solicit participation from various Professionals. At this point there is nothing definite we can comment on with regard to invited speakers. As always when dealing with Professionals, their busy schedules make it difficult at times to commit to far in advance.

you to submit an abstract to present a paper. Below are important dates to keep in mind as deadlines approach. Remember, posters are just as viable as a means to present some of your work, indeed in many ways I prefer it because of the interesting interactions with those who come by and to see what your up to.

As always we actively invite

Important Future dates for 2005 Symposium

February 24, 2006	Last date to submit abstracts
March 3, 2006	Acceptance Information to speakers
April 7, 2006	Final papers submitted based on accepted abstracts for proceedings
May 5, 2006	Anticipated printing run
May 23, 2006	Workshops
May 24, 2005	Distribution of Proceedings at conference

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Membership Information

Membership in the Society for Astronomical Sciences (SAS).

As has been pointed out in previous issues, it was felt that a modest membership fee would greatly help SAS to produce a better product for its members. This fee will be \$25.00 per year. What will this membership fee provide? Well for one thing it WILL NOT go to any committee members as part of their efforts within SAS. We volunteer our time for The Society.

Members will receive a discount for the registration fee each year for the Symposium at Big Bear. It will assure you that you will get a copy of the published proceedings each year, even if you do not attend the Symposium. It will help defray costs in bringing in outside speakers (professionals) to the symposium. And of course, members receive this outstanding Newsletter.

Membership is annual and runs from July to June of the following year. To become a member, send \$25 to: Society for Astronomical Sciences, 8300 Utica Avenue, Suite 105, Rancho Cucamonga, CA 91730. You may also join online at the registration page of the web site. Membership dues are tax deductible. We currently have 82 members with many renewals due in by June 1.

The SAS is a 501(c)(3) charitable organization.

<http://socastrosci.org/Default.htm>

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Your Participation Wanted!

As I have mentioned in previous Newsletters, we need your participation in the Newsletter. We don't want this to become a one person or just a couple person show. If you have an article which can cover a variety of topics, please put it together for a future Newsletter. Work in progress is always welcome. In addition, we have started a "letters to the Editor" section where we would like to add 2-3

letters from the members/participants. We had no letters to incorporate into this Newsletter edition. Constructive comments are always welcome as we are always looking for ways to improve not only the quality of the Newsletter but also the quality of the Symposium. We want the SAS to become a year around organization not just a once a year group.



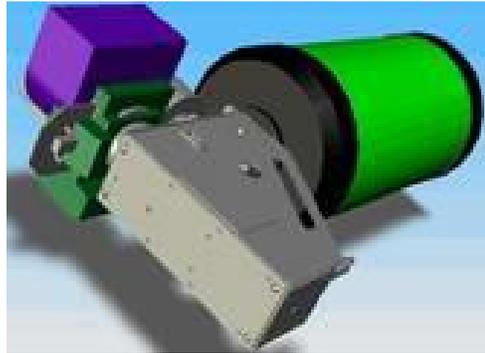
Last years Workshop was divided into 2 parts. Arne did one in the morning covering photometry/CCD basics followed by Brian's tutorial using MPO Canopus for astrometry and photometry. The results from the survey carried out at the last Symposium clearly indicated a desire for these to not only continue but to have them expanded. This picture is from the workshop last May where 50 people attended on the Tuesday before the SAS Symposium.

New High Resolution Spectrometer available in Kit form

The spectral resolution of the Lhires III can be modified. The standard version uses a 2400 lines/mm grating, giving a resolution $R=17,000$. With the KAF400 family of CCD cameras (Audine, ST7,...), the spectral range is approximately 80Å with a dispersion of around 0.12Å/pixel. These values are ideal for instruments with focal ratios of f/10 and the acceptable range is f/8-f/12. For amateurs with faster optical systems a Barlow lens can be employed to increase the f-number, but you should check that your telescope has sufficient back-focus, particularly if using a Newtonian reflector. For completeness, a neon calibration lamp is integrated in the spectrograph for reference emission line comparison. And as for the colour of the spectrograph: to paraphrase Henry Ford, Lhires III comes in any colour you want, as long as it's black!!

More information at:
<http://astrosurf.com/thizy/lhires3/index-en.html>

Note: deadline to subscribe is December 20th.



Computer schematic of the spectrometer on the left and actual unit attached to a telescope (C11 or Meade 10 or 12?)



Some of the components of the kit along with a picture of partially assembled unit. The price of the base unit is 1200 Euros = ~1400 US Dollars

Ha - Longterm - Monitoring of ζ Tau

While the geometry of the Be star's circum stellar gas rings (or disks/shells) seems to be well understood there is still a lack of understanding as far as their physical properties i.e. density distribution is concerned. As far as radial disturbances are involved the density oscillation model (Okazaki, 1991) which is based on theoretical results proposes instabilities of thin Keplerian discs without gravitational interaction. Altogether there may be an initiation of a one-armed-mode resulting in a respective density wave spreading across the entire disc. The generation of such a one-armed density wave will be explained in figure 1. Due to a radial disturbance the gas atoms are moving on eccentric orbits resulting in a one-armed density wave located in their common periastron. This global pattern remains to be stable.

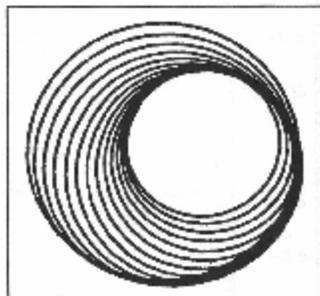


Fig. 1: Development of a one-armed density wave by disturbed orbits

Regarding the double star system ζ Tau this density wave precesses within a time frame of several years around the star. In case this density disturbance is situated at the disc's edge approaching us the result will be $V > R$. In the opposite case i.e. the disturbance is receding from us the result will be $R > V$. In those two cases where the disturbances are situated either directly in front or behind the star both result in $V = R$.

The author's V/R monitoring was continuously done since Nov. 2000 with his own slit-less grating spectrograph mounted to an 8" Schmidt-Cassegrain Telescope (F/4) which itself is being owned by Observatory of Amateur Astronomers in Cologne. This monitoring was just temporarily stopped due to bad weather conditions or the star's season's invisibility. Until Apr. 2002 the dispersion in use was 0,39 A/Pix (42 A/mm), since Sept. 2003 it was 0,25 A/Pix. (28 A/mm).

Own V/R observations (Nov. 2000 – Dec. 2004) were merged with respective data provided by Bjorkman et al. (2000), Buil (2004), Rivinius (2004) in a private communication measurements of the Landessternwarte Heidelberg and Astron. Inst. Acad. of Science Czech Rep., Ondrejov, and Stober (member of our spectroscopy group). They are depicted as a long time overview chart (fig. 2, top). You may easily recognise the apside rotation of the periastron as well as at least at JD 2450450 and JD 2451800 a maximum clearly can be defined which corresponds to a period of 1350 days or 3,7 years

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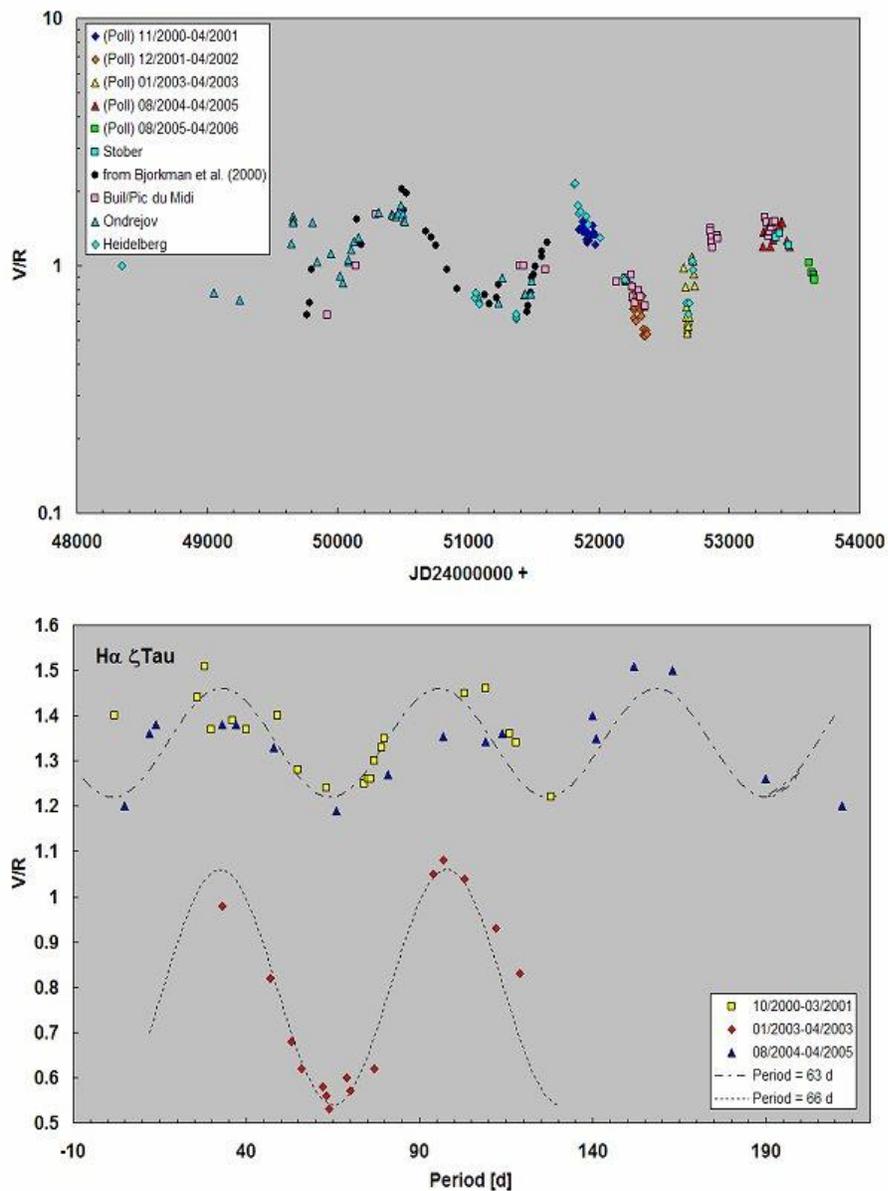


Fig. 2: Quasi-periodic behavior of the V/R-ratio in the period 02/1995-12/2004

<http://www.pollmann.ernst.org/index.htm>

Although the data appear a bit phase shifted, the periodic behaviour published by Bjorkman et al. (2000) seems to reflect quite well the radial velocity component's long time variations discovered by these authors. For the first time this kind of long time V/R-variations were observed in the time frame 1960 – 1980. The authors expected even more short-time-variations to be present.

Each of the author's individual observation campaigns (fig. 2, bottom) indicate a periodicity of about 63 – 66 d (exception: campaign Dec. 2001 – April 2002). All respective time axis have been shifted in order to get the best sinus approximation match. It seems to be worth mentioning that these periodicities represent about half the orbital period (132,97 d) of the star system. Moreover the individual amplitudes turned out to be different. According to Miroshnichenko (2003) the V/R ratio will be influenced by the orbital movement and its interactive tidal influence upon the disc. Hence, period modulations of the reported kind are to be expected.

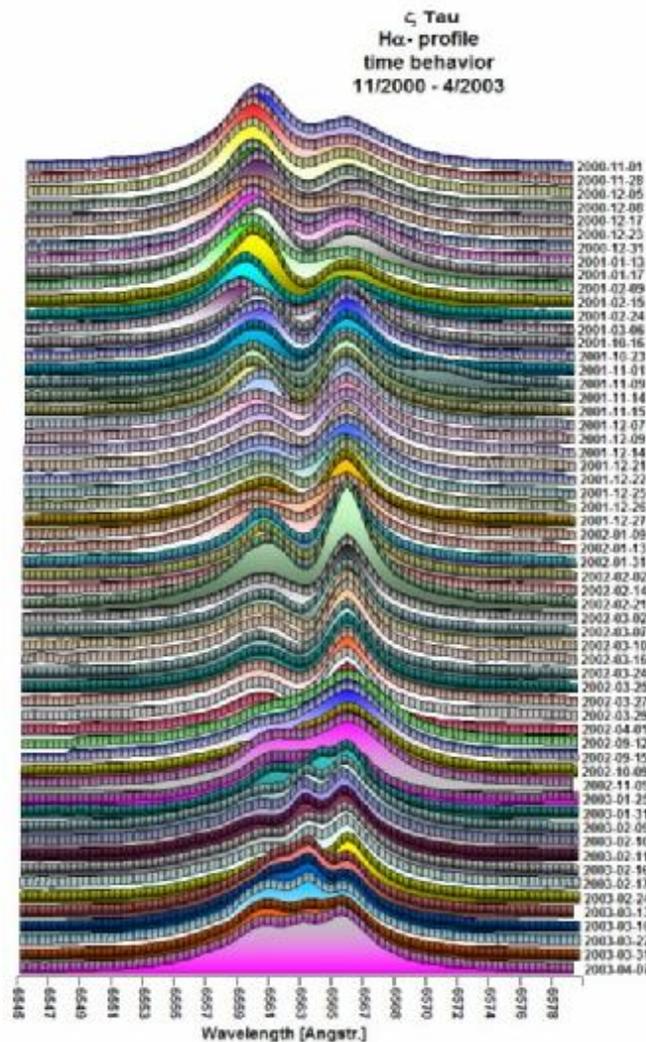


Fig. 3: Total summary to the $H\alpha$ -profile behavior from 11/2000 to 4/2003 for elucidation of the V/R phase reversal

An overview depicting the $H\alpha$ -profiles and their development until April 2003 is shown in figure 3. Evaluating the data as of Nov. 2000 until March 2001 one determines the V/R ratio to be >1 . On occasion of its first autumn visibility (date: 16 Oct. 2001) the system's spectrum provides beyond any doubt a respective ratio of >1 . Further on, this typical appearance seems to remain stable in essence until the end of Nov. 2002. Beginning approximately Jan. 2003 the $H\alpha$ -emission appears to be a triple-peak-structure, i.e. the violet wing of the emission is overlaid by a weak absorption dip. This phenomenon was already observed in Be-double stars although it is not explicable by the star's discs or shells.

One of the earliest publications covering the V/R long time behavior (Delplace, 1970) determines the V/R turn-around-cycle to be 6 – 7 years. These observations took place between March 1960 and Sept. 1967 and were based on 2 – 3 observations per year. Should the exact point of the phase reversal be of interest there is a clear necessity for a more dense observation sequence of approximately 20 per year as you may conclude from fig. 2.

Beginning with the season's visibility in Sept. 2003 until Oct. 2005 the spectra were taken based on a dispersion of 29 Angstr./mm (= 0,25 Angstr./Pix.) and a spectral resolution $R = D/\lambda \sim 12000$ (at $H\alpha$). Their profile's time behavior is depicted in fig. 4.

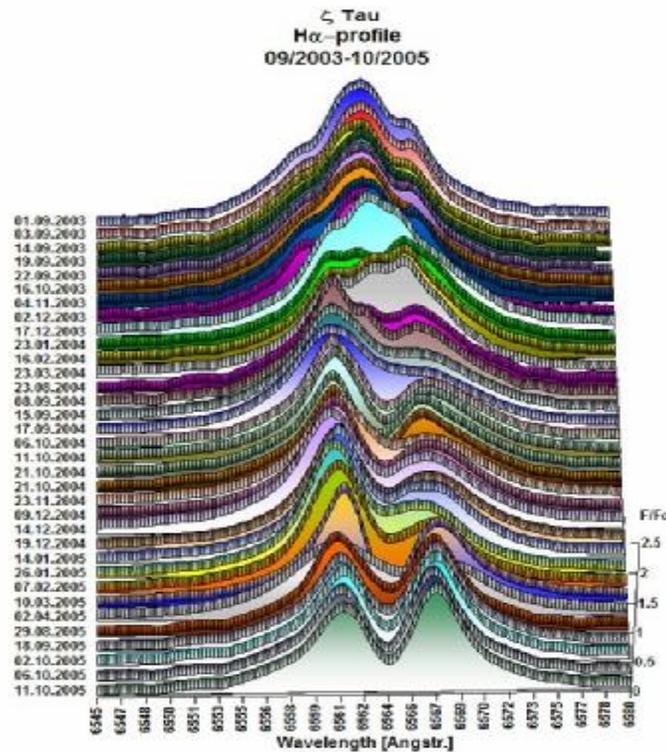


Fig.4: Elucidation of the H α -profile behavior from Sept. 2003 to Oct. 2005

The profile shows normally two separate emission peaks with an absorption core (Nov.2000 until Apr. 2002, fig. 3) whereby the emissions can have occasionally complicated appearance either as „simply emission“, or as asymmetrical complicated structures (fig. 3, Jan. – Apr./2003). Y. Guo et al. (1995) assumed these profile structures to be in close relation to the quasi cyclic change of the V/R ratio. During the following visible phase since September 2003 these triple peak structures show up again from Dec. 2003 till Sept. 2004 (fig. 4). In the future one should keep a close eye on these features.

These so far discussed variations are in close relation to changes and activities of the shell formed H II disc which in case of Be double stars are determined by material transfer from the secondary component to the primary star. Here in today's judgment the V/R variations are being interpreted as the result of the so called "binary interaction" [Harmanec (1982); Tomokazu & Ryuko (1982); Slettebak & Reynolds (1978)] whereas expectedly these interactions are reflected in the H α -emission strength's temporal behavior.

According to literature of recent decades available H α -EW measurements date back to Dec. 1975. Fig. 5 summarizes all H α -EW's long time data beginning Dec. 1975 until Dec. 2004 covering almost 30 years.

These data are based on

- published papers (Slettebak & Reynolds (1978), Fontaine et al. (1978) and Andriolat & Fehrenbach (1982))
- private communication with Rivius (2004) including data (Landessternwarte Heidelberg and Astron. Inst. Acad. of Science Czech Rep., Ondrejov)
- grating spectra derived by Stober (member of our spectroscopy group, Littrow-Spectrograph)
- author's results (prism and grating spectra)

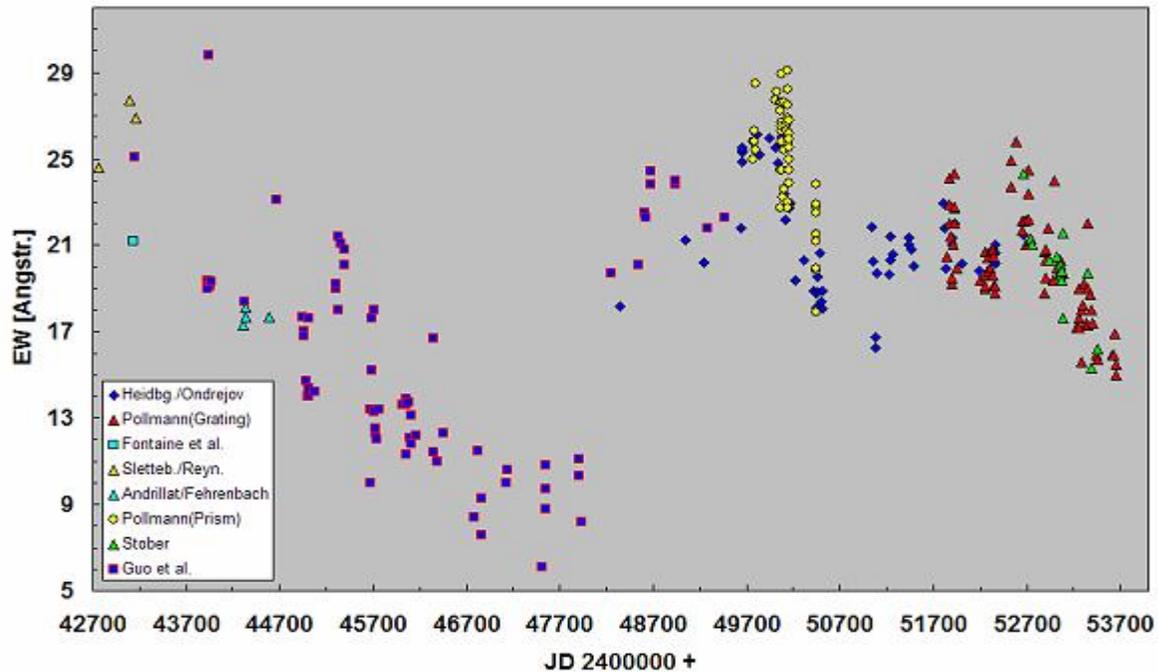


Fig.5: The $H\alpha$ equivalent width in the past decades, comparing measurements by professional instruments

Beginning with 42700 until 47900 the summary indicates a circum stellar disc's decrease in density and/or a reduction of the disc's volume. Further it seems to indicate that an adjacent outburst with an influx of material into the disc has taken place. Theoretically a smaller disc comprising a smaller mass but equal density may be imaginable since expectedly neither the disc's orientation nor the star's radiation have changed. The a.m. decrease in density seems to be the more likely candidate since Be star discs are being fed from the inner region as well as being diluted at the outer regions.

The course taken after the outburst until approximately 50200 is determined by further increasing emissivity with adjacent relatively steep decrease until approximately 51000. The part beginning 51000 is less pregnant in the sense of in-/decreasing emission strength less the fact that the EW level is significant lower than its maximum at 50200.

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