WW And: No decrease of amplitude

(Ralf Meyer)

I compare reported visual observations of the eclipsing binary WW Andromedae of the 1920ies with professional photometries of 1991 and with my own visual data. Contrary to some presumptions in the professional literature, the amplitude of light variation since its discovery probably never changed and always was as bad as 0,6mag. WW And therefore is no rewarding object of visual observation.

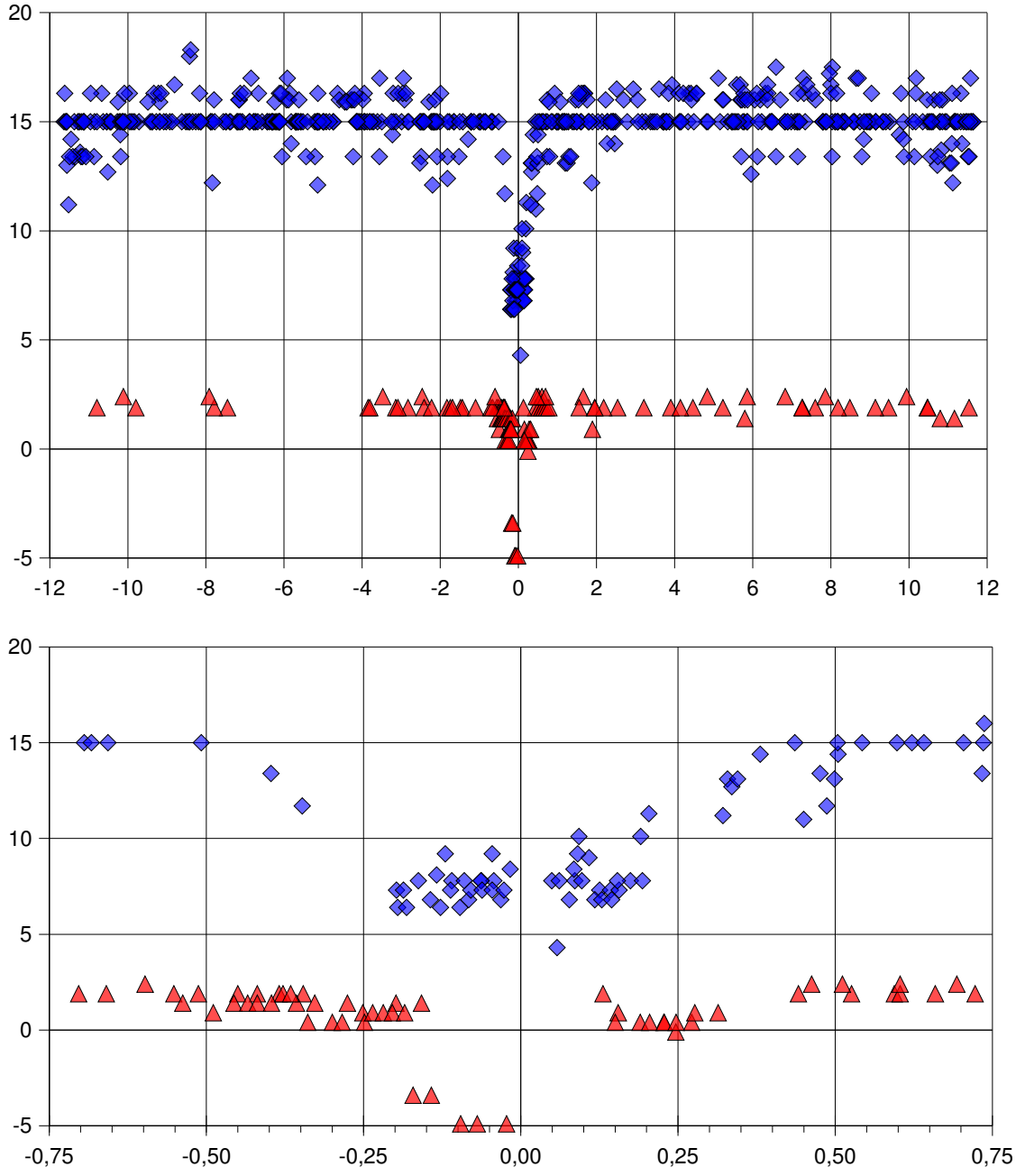
Finnish astronomer Ragnar Furuhjelm discovered the variability of WW Andromedae on Helsinki observatory plates in 1919. From 1921 till 1926 German amateur observer Erich Leiner collected 572 visual brightness estimates of the star. He found a long period of about 23,3 days and an eclipse of little more than a day. Leiner had no sufficient information on the real magnitudes of his comparison stars and therefore reported in artificial step magnitudes. Nevertheless in his summary he claims an amplitude of 1,1mag and a constant minimum brightness taking 6,5 hours. Only few months after Leiner's publication in 1927 astronomer Zinner of Bamberg observatory reported his own visual data set and came to a much shallower eclipse of only 0,5mag, which lasted 4 days and showed no constant minimum light. Both observers could not establish a secondary minimum.

From Leiner's informations professionals of the 1930ies and 1940ies deduced, that the eclipse of WW And must be total. In 1991 photoelectric observations of Olson and Etzel showed an amplitude of 0,6mag(V). The authors were puzzled by the fact, that, contrary to what their colleagues had found 50 years ago, the new data yielded a detached geometry and a clearly partial primary eclipse. They referred to references of Erich Leiner's papers and speculated, whether the geometry of the binary might have changed meanwhile. I typed Leiner's original data set into a computer and reduced the time arguments into one single standard epoch with the period of the GCVS, given in the diagrams. Between 2002SPT and 2004NOV I collected 110 own brightness estimates of WW And and reduced them into the same epoch.

Each composite diagram shows the two sets, Leiner's on top and mine on bottom. The abscissae are scaled in traditional phases, that is in "differential days related to the calculated minimum". The ordinates are scaled in step magnitudes, where the zero points of the two step scales have been shifted to graphically convenient places, but the spread (the range of values) has been left unchanged. The first diagram shows the complete epoch, the second a close-up of the minimum. Erich Leiner extracts from his set two definite standard epochs, which are not filed in the Lichtenknecker-Database, namely: JD2423231,7 and JD2424326,1 Gr.M.T. My own data are not sufficient to derive a new time of minimum and I present them for the only purpose of comparison. Erich Leiner tried to be precise and adopted a rather complicated set of comparison stars. I instead confined myself to two step intervals and consequently to only one crucial comparison star B. Nevertheless the diagramm shows, that the ratio of scatter outside minimum to the amplitude of the minimum itself is about the same in Leiner's lightcurve and in mine. Obviously Erich Leiner's sophisticated step scale helped little in the visual observer's struggle with bad amplitude.

There are several possible reasons, why a visual observer claims a faulty amplitude of his observations. Generally in the catalogues of the 1920ies still were many wrong magnitudes. Even with today's precise comparison star magnitudes the methodical drawbacks of visual brightness estimates can simulate unrealistic amplitudes. We overstress visual lightcurves derived under unfavourable circumstances, when we extract further details of the light variation like a constant minimum light. Such visual data sets yield only one reliable information: An approximate time of minimum. Adding the fact, that Zinner found in his visual observations several different features, namely a longer eclipse and a smaller amplitude, I conclude, that Leiner's observations do not yield substantial evidence, that the amplitude of the light variation of WW And in the early 1920ies was different from the one found with precise methods by Olson and Etzel in 1991.

WW Andromedae: JD(min1) = 2422719,40 + 23,28527 * E (GCVS2001)



References:

Furuhjelm R	Astron.Nachr._209_47_(1919)
GCVS	http://www.sai.msu.su/groups/cluster/gcvs/gcvs/
Leiner E	Astron.Nachr._229_273_(1927)
LK-Database	CD-ROM can be obtained from the BAV, Münchener Straße 26, D-10825 Berlin; e-mail: braune.bav@t-online.de
Olson EC, PB Etzel	The Astron.Journ._106_759_(1993)
Zinner E	Astron.Nachr._230_16_(1927)

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