

Estimating the brightness of a Variable Star. Dave Eagle FRAS

First you need to pick a suitable target. Make sure you pick a star that is easy to observe at the time you make your observations. Have a good finder chart to hand when stalking your prey. Finder charts are available to download for free from the American Association of Variable Star Observers (AAVSO) website: <http://www.aavso.org/>

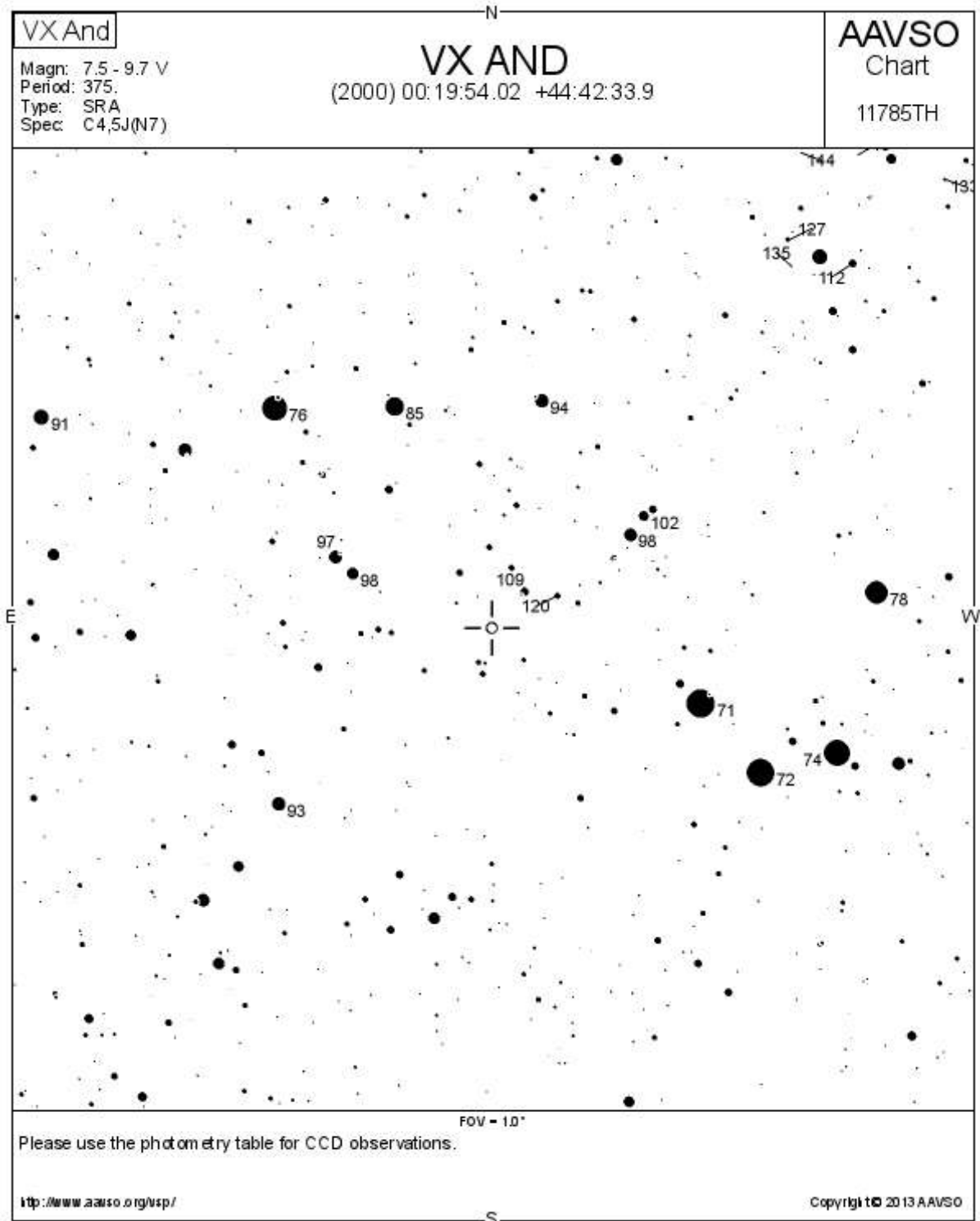


Figure 1. Finder and comparison chart for VX Andromeda.

If you know the star name a finder chart can be created from the AAVSO Star finder on their Web site.

Using a wider field map, Star-Hop your way to the intended target. Make sure you identify the field of view of

your variable star correctly. When tackling fainter stars in star fields relatively unknown, it can take some time to identify the star and its associated comparison stars. The AAVSO charts usually show field stars that are visible in a telescope around the variable star. Once you have identified field stars included in the variable star chart, switch to using that. The chart is designed to help the observer. A telescope will possibly show some fainter stars than are shown on the chart. This could confuse you initially, but you will soon learn to find your way round, identifying the brightest stars that are shown. The AAVSO charts list magnitudes of comparison stars on their charts that are known not to be variable. The decimal point is omitted on the charts so that it is not confused with a star plotted on the chart, so a star labeled on the map with 45 would be magnitude 4.5, and so on.

Once you have found the correct field of view identify the variable star itself. Once you have found your target, you then need to compare it to some of the comparison stars identified on the chart.

As in the previous exercise, estimating the brightness of a star, the comparison stars you choose should lie either side in brightness of the star of interest at the time you observe it. It is then down to your own judgment to decide how bright the variable star is compared to your chosen comparison stars. Is it halfway between them, or is it somewhere else in between, being closer to one than the other? Make your own judgment but again always be consistent in how you make your comparison. Once you have decided, you now have a comparative estimate of the brightness when compared to these two stars. Knowing the magnitudes of the two comparison stars enables you to obtain a reasonable estimate of the magnitude of our star. In this example we will pretend that there are two comparison stars shown at magnitudes 8.0 and 7.0 magnitude. If our star is one third from the faintest star towards the brightest, this gives us an estimated magnitude of about 7.7. You will become more proficient and more accurate the more times you make estimates. As in all things, practice makes near(ly) perfect.

Of course taking just a single measurement of a star is not really of much scientific use. Only by following the stars over time, as they change in brightness, up and down, can its behavior be properly determined. Pick your variable star of interest with care and you can make its observation into an ongoing project that could last for many years. Follow it over an extended period of time and keep making accurate records of its behavior, you could even confirm possible changes in a known variable stars behavior. In some instances, you might even discover a new variable star.

Once you have obtained a number of magnitude estimates, you can plot those figures into a graph and see if you can see any trend in the fading or brightening of the star in question.

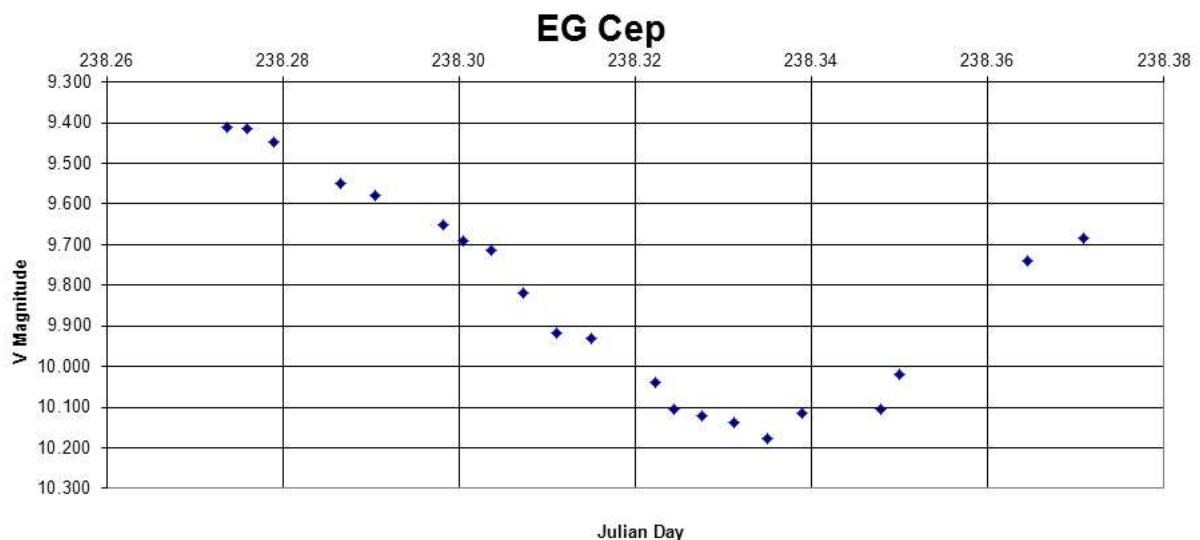


Fig2 Chart of EG Cephei. Courtesy of Steve Parkinson.

EG Cephei is a near contact binary system, where the two stars orbit almost in contact with one another.

Luckily there is an army of willing amateur astronomers ready and willing to participate in estimating the

brightness of variable stars and keep an eye out for any unusual behavior. It is quite often amateurs that spot these sort of changes and really do add to the knowledge base to understand the behavior and nature of variable stars. By submitting observations, a vast collection of data can be collated. These combined efforts give a more accurate picture than a single observation or observer ever could. If you are interested in making variable star estimations it is always well worthwhile getting involved and taking part. Your seemingly small contribution really can make a difference to our understanding of the way variable stars develop and change.

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