VERSUCH NUMMER

TITEL

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Observations: DATUM

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3.1 data

The collected data for the stars magnitude is graphically displayed in the following depiction.

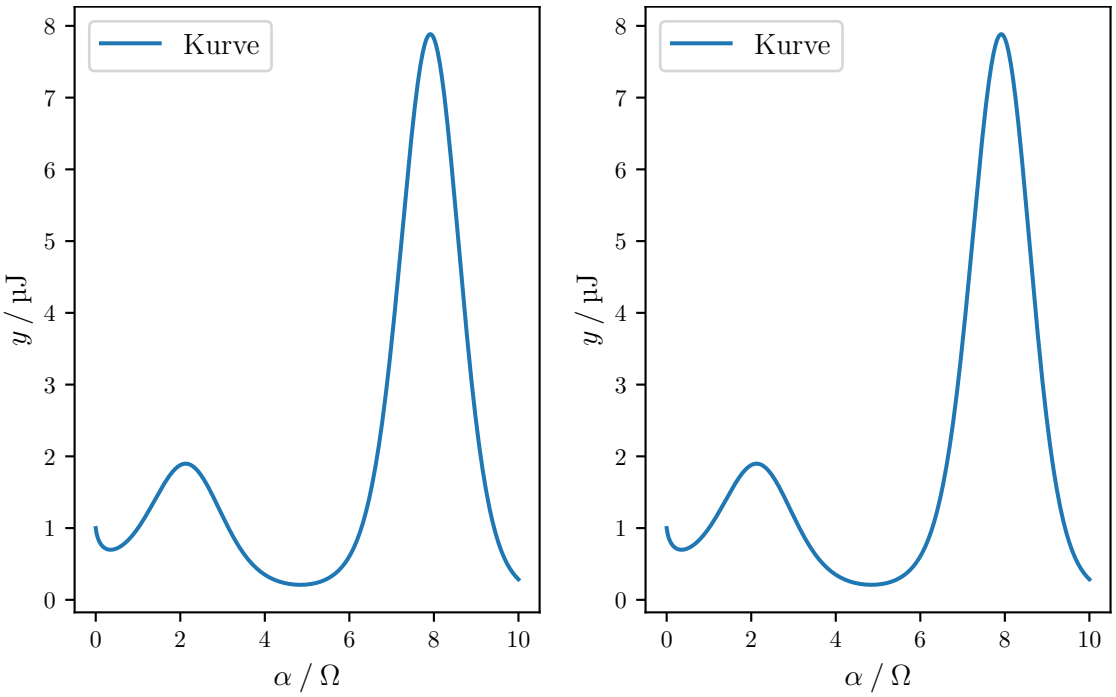

Figure 1: Magnitude of SW Lacertae

Additionally, data from two comparison stars was taken. The uncertainties are calculated with the package uncertainties from python.

3.2 Ensemble Photometry

In order to excluded errors caused from different exposures of light, caused by traffic or other unforseeable factors, the method of comparison stars is used. Hence, not the magnitude of the star is evaluated, but the difference between the star's and the magnitude of the comparison stars. For this study of SW Lacertae, the stars (1) TYC 3215-1586-1

and (2) TYC 3215-1406-1 were chosen as comparison stars. In the following image, their position in the sky in relation to SW Lacertae is shown.

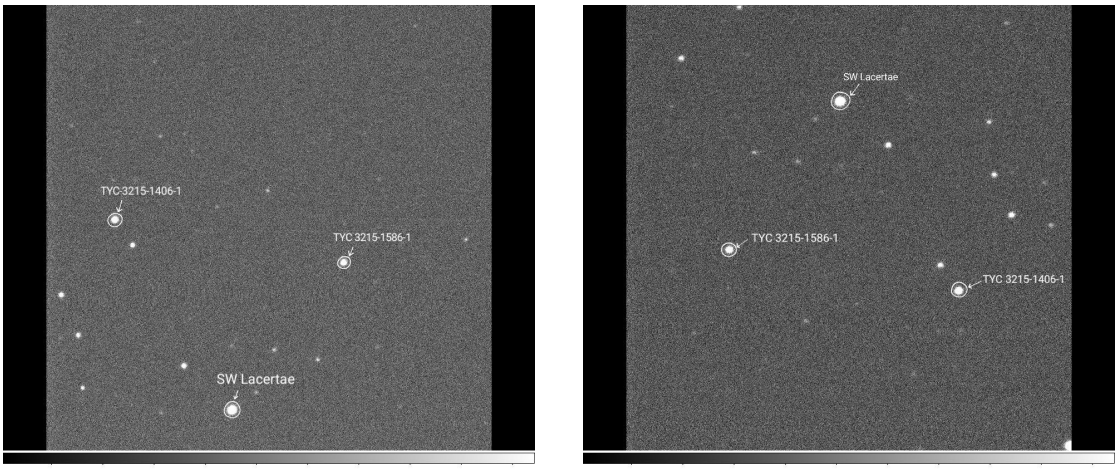

Figure 2: Position of comparison stars in the sky; western sky on the left, eastern sky on the right

The comparison to two stars was mainly used to reduce the likelihood of variation in the comparison star brightness and other intruding factors. This has to be done for each filter seperately, because of the different exposure times and the different colors of the stars. The resulting data for the V-filter is shown in the following plot.

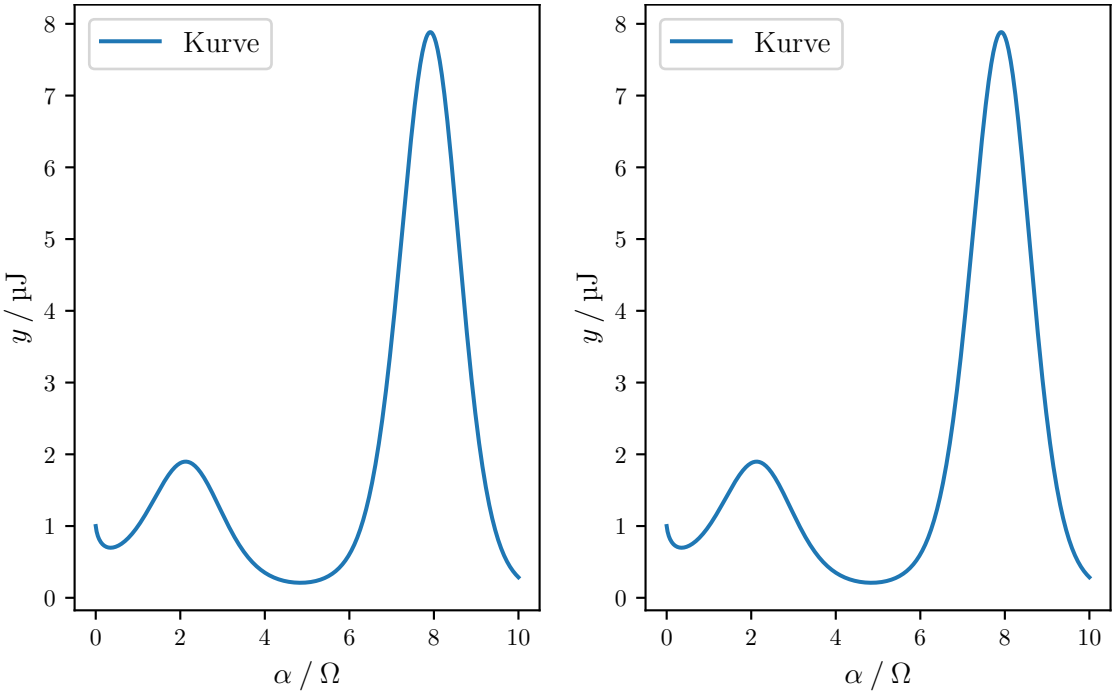

Figure 3: Magnitude Difference between SW Lacertae and TYC 3215-1586-1

3.3 Phase

In order to obtain the phase in relation to an earlier measured phase, the epoch

$$E_{measurements} = HJD - 240000000$$

is calculated in a first step. The data for an earlier Minimum were provided by the instructions for this lab.

$$E_{min} = 49594.4684$$
$$period = 0.3207209$$

The phase in comparison to the given data is retrieved through the formula

$$phase = \frac{((E_{measurements} - E_{min}) \ \% \ period)}{period}. \tag{1}$$

This leads us to the following results:

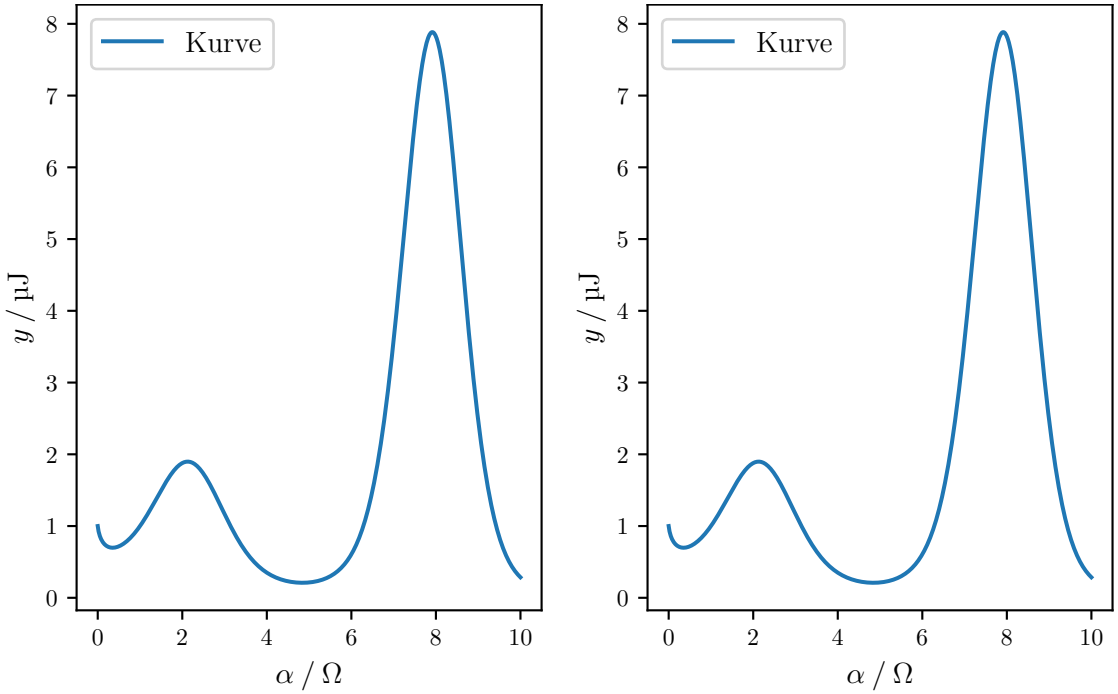

Figure 4: Magnitude against the Phase

In this graphic, data gathered from another goup is included. They observed this binary star system at the same observatory at the

3.4 Conclusion

On account of difficulties, which occured while recording the data, a full period could not be observed. The conclusions base therefore mostly on the data, collected by the other team. Saying this, the data of both observation nights fits perfectly to each other and therefore, it can be presumed, that the others group data will deliver results, which match those of our observations.
It can be clearly seen in plot 4, that there is an offset of the first minimum and $phase = 0$. That implies a period change of the system. This developement should be further researched, because it could lead to new knowlegde on mass transfer of contact binary star systems.

3.5 Discussion

Siehe Figure 3!

References

[1] TU Dortmund. *Versuch zum Literaturverzeichnis*. 2014.