Hello Alex,

Your project *Variable Star Monitoring* (P #026) received a grade of 45/50 (90 %).

Overall, this was an excellent project that covered all important topics about the issue. Your understanding of the whys and the wherefores of this project, what tasks to perform and how to proceed, were very good. Clearly, you did a hard, enthusiastic and successful job at field gathering the right images for this project. Two of your outcomes were very good, in close agreement with actual values. Your Error Analysis section was very good.

On the other hand, at the data analysis section – repeatedly pointed out as the most important part of any observational project – you totally omitted any attempt to explain which physical processes might be occurring at any time within your targets in order to justify the shape of corresponding lightcurves. For each target, prior to assess the quality of the obtained lightcurve by comparing period and amplitude to published values, you should have discussed in detail the validity of your data according to a proper qualitative interpretation of your own lightcurves.

I also have the following observations to formulate:

At the first page, on several times you use the lower case letter 'm' to refer to the stellar magnitude. However, "m" is technically used as the symbol of the SI longitude unit (the meter), or to represent the apparent magnitude of a star. The correct way to abbreviate the stellar magnitude unit is 'mag' – which later on you correctly used.

At the end of page 3 you should have presented the H-R diagram you were referring to.

On page 4, you should have explained what the terms "Population I" and "Population II" (key terms for this project) actually mean.

On your Equipment section you omitted to mention the place (coordinates) from where you obtained your images.

On page 5 you stated *"The smaller image size was also an advantage, as more comparison stars were included in the field of view, making it easier for the photometry …"*. This is not correct – quite the opposite.

On page 9 you mentioned *"… and a short enough exposure time to reduce the effects of light pollution where the background sky level would eventually overwhelm the signal from the stars."* However, from your Observation Log it comes that all exposure times were 60 seconds, no matter the fact that on several nights you imaged with almost Full Moon.

Also on page 9 you correctly mentioned that you tried *"to keep the signal levels below one-half of its overall range"*, but without stating which such important parameter actually was.

Data about your targets should have included corresponding color indexes.

Finally, the Observation Log should also have included information about corresponding airmasses at the time of each session.

As already said, this was an excellent project, Alex! It is my impression that a lot of effort was expended in order to complete this successful work – as you also did when I supervised P#140 and P#143, respectively two and three years ago. I would be pleased to continue providing assistance if I'm able to, and hearing from you about further plans and progress – perhaps even sharing a fourth observational project in the near future.

Adios,
Eduardo

Hello Christian,

Your project *Observing and Measuring Visual Double Stars* (P #140) received a grade of 35/50 (70 %).

Overall, this was an acceptable project that covered some important topics about measuring double stars, but at the same time it notoriously presented three major flaws:

(i) a permanent misinterpretation of the technical terms ‘double’ and ‘binary’ stars (an essential matter for this project);
(ii) a totally unsuitable selection of targets to work with (also an essential matter for this project, as explicitly and emphatically stated at the project kick-off), and
(iii) a fairly poor measurement of those few measurable targets (an obvious essential matter for this project) and therefore a shallow data analysis (the ultimate essential matter for this project) with inexistent error discussion.

Despite the obvious effort and enthusiasm you put at work, having failed to select a proper target selection make the whole project to be based on weak pillars. In reality, given your own observational equipment you chose only one suitable target (145 Canis Majoris). The remaining doubles you worked with – all of them having angular separations smaller than 10 arcseconds – resulted almost impossible to resolve with your optical gear – and consequently, practically impossible to measure.

Within your own text I have inserted in red bold letters all my particular observations – by the way, quite a lot.

As already said, this was a fair project, Christian – evidently much more challenging than the project Observing Galaxies I supervised you just one year ago! I would be pleased to continue providing assistance if I’m able to – perhaps even sharing a third observational project in the near future.

Adios,
Eduardo

Hello Don,

Your project *Variable Star Monitoring* (P #026) received a grade of 46/50 (92 %).

Overall, this was an excellent project that covered all important topics about the issue. Your understanding of the whys and the wherefores of this project, what tasks to perform and how to proceed, were very good. Clearly, you did a hard, enthusiastic and successful job at field gathering the right images for this project. You presented an excellent analysis of corresponding lightcurves – although not based on your own ones. Your period outcomes were very good, in agreement with actual values. Your Error Analysis was also quite appropriate. You have produced a comprehensive, trustable and large enough list of references.

On the other hand, despite having mentioned it on page 5, you omitted to explain why classical Cepheids are so important for distance estimations – the essential issue about this type of variable stars. For RR Lyrae variables, your explanation about their usefulness as distance measurements from Clement et al. (2001) is not clear at all. You should have attempted the determination of the absolute magnitudes of your targets (at least, in a first approximation). Finally, found distances were large apart from actual values, and not compared to published data.

I also have the following minor observations to formulate:

On page 2, you stated that *"Variable stars are those that change magnitude over time"*. This is not a proper definition – as a matter of fact, according to such definition all stars are variable.

Also on page 2, your Nomenclature part (i) is not totally correct. After ZZ, the next star became "AA", "AB" to "AZ" – as you stated – but then the next one is not "BA" but "BB". The second letter never corresponds to a prior one.

On page 5, you should have explained what the terms "Population I", "Population II" and "metallicity" (key terms for this project) actually mean.

Also, on pages 6 and 7, you referred to several technical issues ("Ib supergiants", "red giants", "white dwarf", "Chandrasekhar limit", etc, etc) without any explanation about their meaning. Each time you introduce at your report a new technical term you should properly define it (at least, very briefly) so that the reader could aptly follow your idea/explanation.

At your Equipment section, you should have stated the place (coordinates) from where you obtained your images. Also omitted was important technical data as CCD size, pixels array, pixel scale and/or field of view.

On page 13, several parameters of your formula were not properly defined.

On page 18 you computed the distance to KS Cen, but then omitted to assess such value by comparing it to published data. The same next happened to R Mus.

Finally, your Observation Log omitted essential information such as exposure times, CCD temperatures, and airmasses.

As already said, this was an excellent project, Don! It is my impression that a lot of effort was expended in order to complete this successful work. I would be pleased to continue providing

assistance if I’m able to, and hearing from you about further plans and progress – perhaps even sharing a second observational project in the near future.

Adios,
Eduardo

Hello Fred,

Your project *Building and Using a Simple Radio Telescope* (P #143) received a grade of 42/50 (84 %).

Overall, this was a very good project that covered important topics about the issue. Your understanding of the whys and the wherefores of this project, what tasks to perform and how to proceed, were very appropriate. Clearly, you did an enthusiastic and quite successful job, nicely described at your detailed Observational Log.

On the other hand, other than the beamwidth you didn't present any formula about the different technical attributes of your radio telescope. Consequently, no quantitative test for assessing the real performance of your built instrument was attempted – as explicitly required. Finally, as acquired solar radio images did not achieve a reasonable quality level, your data analysis was poor – just a few qualitative considerations.

In particular, I have the following observations to formulate:

You didn't mention a single word about which type of solar signals your instrument was supposed to detect and their correspondent physical interpretation.

A block diagram of your radio telescope should have been included.

opening ionosphere description was very good. Just to make it much more illustrative you should have included a picture showing its different layers.

You presented two different "Figure 1": one on page 4 and another on page 7.

No picture of your built radio telescope was included – just a partial block diagram with separate tiny images, in exactly the same format as included in Andrews' book.

On page 10 you stated that: *"Two main types of interference were identified in the setup of the SSRT. AC voltages from domestic sources caused a persistent interference that was broadband. This comprises of amplitude spikes at 60 Hz intervals across the bandpass."* Why 60 Hz? Isn't Australia's AC supply 220V, 50 Hz?

More graphs of your own ionosphere monitoring, clearly and conveniently discussed, should have been very enlightening about the actual potential of your built instrument.

No Observation Log was included.

Finally, two required report formats were not observed: (a) the page size should have been A4, and (b) the pages were not numbered.

As already mentioned, this was an excellent project, Jamie – well done! I would be pleased to continue providing assistance if I'm able to, and hearing from you about further plans and progress – perhaps even sharing a second observational project in the near future.

Adios,
Eduardo

Hello Paulina,

Your project *Astrophotography Techniques* (P #071) received a grade of 34/50 (68 %).

Overall, this was an acceptable project that properly covered some important topics about astronomical imaging equipment – mainly, the description of DSLR cameras – but lacked its critical testing at field. Basically, you only attempted the same technique on just three targets and definitively fell short on objectively assessing the images that you actually were able to take. Creativity for experimenting different ways for finding out the real astronomical potential of your available imaging equipment was very poor. Neither a single 'bench' test – for instance, CCD linearity or colour response – was initially performed, nor a single quantitative outcome – for instance, magnitude vs. exposure times or field of view or sky light pollution gradient or noise or vignetting – were derived from taken images. Thus irremediably, your image assessment was based only on personal impressions and not on objective parameters – as it should have been.

With respect to specific aspects, I have the following observations:

1) The essential topic of 'linearity' – the pillar supporting the actual benefit of digital imaging for astronomy – was barely mentioned, let alone discussed in depth – as it should have been.

2) Despite referring right from the beginning to Digital Single Lens Reflex (DSLR) cameras, at no place you explained what the term 'reflex' actually means.

3) On page 4 you mentioned the issues of "film creep" or "reciprocity failure" without any further explanation about what they represent.

4) Nothing was said about the 'crop factor' or the 'effective focal length'.

5) At the beginning of page 8 you stated that *"Due to all above reasons, the object of the first choice was the Moon. The imaging was scheduled to take place around Full Moon time in April"*. Why only around Full Moon? Why didn't you try at other lunar phases?

6) On page 9, at the end of the opening paragraph of Image Analysis, you wrote *"There are multiple other options, which can be turned on or off"*. Which were they? Why didn't you try?

7) On top of page 13, you stated that *"All those factors introduce lots of noise to the image. It was possible to achieve good results, however it might be much better to take multiple short exposures and stack them together, rather than take one long exposure"*. This important statement was certainly right, but you should have explained why.

8) Your reference list was quite shallow – just two books, the correspondent SAO unit and some easy web resources.

9) Your Observation Log omitted the essential information about the airmass (or sky altitude) of imaged targets.

10) Your report did not include correspondent number for each page.

As already said, this was a good project, Paulina. I honestly think that your evident effort and enthusiasm wasn't fruitful as expected due to your lack of experience on observational projects –

which not only require a lot of specific research and study prior at home, but also some practice and critical judgment in order to properly proceed at field. I would be pleased to continue providing assistance in case you want me to do so. Your enthusiasm about attempting observational projects should not end with this first one – on the contrary, I do hope you will have undertaken another observational project in the near future.

Adios,
Eduardo

Hello Bob,

Your project *Variable Star Monitoring* (P #026) received a grade of 50/50 (100 %).

This was an impressive project that proficiently covered all important topics about the issue. Your understanding of the whys and the wherefores of this project, what tasks to perform and how to proceed, were impeccable. Clearly, you did an exhaustive and deep initial research, followed by an enthusiastic and successful job at field, and properly ended by a rational data analysis. Your inferred information was excellent, in close agreement with actual values. Your Error Analysis was also quite appropriate. You have produced a comprehensive, trustable and large enough list of references.

I only have the following minor observations to formulate:

At the Abstract, you should have identified which particular variables your targets were.

On page 3, the third paragraph should have included the reference source.

On page 4, you introduced the lower case letter 'm' to refer to the stellar magnitude. However, "m" is technically used as the symbol of the SI longitude unit (the meter), or to represent the apparent magnitude of a star. The correct way to abbreviate the stellar magnitude unit is 'mag'.

At the Experimental Technique section, point 5.1 (page 8), you mixed up the term "pixel size" (which given a CCD camera is always a given value, usually expressed in micrometers) with the proper term "image scale" (which actually varies depending on the telescope f/ratio and binning, and it's usually expressed in arcseconds per pixel).

On page 11 you stated that *"Using more than one comparison star can improve the accuracy further. For this project, however, as a first experience in differential photometry, only one comparison star was used"*. Considering that you actually used MPO Canopus, this decision seemed me unintelligible.

On page 13 – and on several times after that – you expressed a measure as N.NN ± 0.00N. This is not correct. The principal magnitude should have as many significant digits as the error.

Finally, on page 18, the ~0.5 mag deviation most likely has been introduced by the used photometric star catalogue (which regrettably you did not identify).

As already said, this was an admirable project, Bob – right from the very first page up to the last one. Congratulations! It has been a pleasure to read it. Not quite bad for a *"first experience with photometry and CCD stellar photography"*! I would be pleased to continue providing assistance if I'm able to, and hearing from you about further plans and progress – perhaps even sharing a second observational project in the near future.

Adios,
Eduardo

Hello Steve,

Your project *Building and Using a Simple Radio Telescope* (P #143) received a grade of 46/50 (92 %).

Overall, this was an excellent project that covered important topics about the issue. Your understanding of the whys and the wherefores of this project, what tasks to perform and how to proceed, were very good. Clearly, you did an enthusiastic and successful job, nicely culminated in the capture of some rewarding radio images – which was properly and well-documented at the corresponding Observation Log.

On the other hand, on several times you introduced formulas without correctly defining their parameters, as well as information, concepts and/or non-trivial statements without properly referring them as required. Regretfully, you missed the important measurement of the Sun's flux density by means of your own radio telescope, which would have been the definitive test for assessing the real potential of your built instrument.

I also have the following observations to formulate:

On page 9, at the beginning of Section 4.3 (Calibration), you wrote *"The output from the ADC is a variable voltage, which is …"*. This is not correct.

On page 11, in the computation of the solid angle subtended by the Moon, you used its angular diameter (32 arcmin) instead of the correct radius value (16 arcmin), so that found derived values (Moon's apparent area and flux density) were both four times larger than actual values.

On page 12, you stated that from your lunar drift scan (Figure 14), where you measured a FWHM lapse time of 9 minutes and 14 seconds, you were able to determine the actual beamwidth of your radio telescope. However, this is true only on condition that the Moon would have drifted exactly by the center of your dish – a circumstance that you couldn't assure.

I didn't quite understand what you meant at Section 6.2.7.

As already mentioned, this was an excellent project, Steve – well done! I certainly applaud your effort. I would be pleased to continue providing assistance if I'm able to, and hearing from you about further plans and progress – perhaps even sharing a second observational project in the near future.

Adios,
Eduardo

Hello Thilo,

Your project *Observing and Measuring Visual Double Stars* (P #140) received a grade of 50/50 (100 %).

This was an impressive project that proficiently covered all important topics about the issue. Your understanding of the whys and the wherefores of this project, what tasks to perform and how to proceed, were impeccable. Clearly, you did an exhaustive and deep initial research, followed by an enthusiastic and successful job at field, and properly ended by a rational data analysis. Your inferred information was excellent, in close agreement with actual values. Your Error Analysis was also quite appropriate. You have produced a comprehensive, trustable and large enough list of references.

I only have the following minor observations to formulate:

The technical terms 'primary' and 'secondary' stars – fundamental concepts for this project – were never defined along your report.

At the top of page 10 you stated that: *"When using the focal reducer, the focal length becomes 380 mm (f/5.0). This ensures for an approximate 60% increase in light-gathering capability, …"*. The same incorrect concept was almost repeated five pages ahead, as on page 15 you wrote: *"But the most important reason might be that when the magnification of a telescope is increased, this usually also means increasing the focal length, and thus, the focal ratio, which ultimately will affect the light-gathering capacity of the telescope"*. The light-gathering capability of a telescope exclusively depends on its aperture. Most likely the confusion comes from the fact that in a faster telescope the same captured light will have been concentrated on a smaller area – so that it takes a smaller amount of exposure time to make a distributed object appear as bright as it would with a slower telescope of the same aperture.

On page 12, quite near the bottom, while explaining how the position angle should be measured, you stated that *"… one should measure clockwise, passing first through the east (90 degrees), then the south …"*. The reference to the clockwise direction was not correct – there is no unique rotational direction pre-established – just from North towards East.

Finally, you should have stated the epoch of each published data you compared your outcomes to. Considering that both separations and angular positions do vary with time, for a proper quality assessment of found values it becomes essential to know the time validity of reference data.

As already said, this was an admirable project, Thilo – right from the very first page up to the last one. Congratulations! It has been a pleasure to read it. Not quite bad for an observational project entirely undertaken from your home's balcony! I would be pleased to continue providing assistance if I'm able to, and hearing from you about further plans and progress – perhaps even sharing a second observational project in the near future.

Adios,
Eduardo

Hello Jamie,

Your project *Building and Using a Simple Radio Telescope* (P #143) received a grade of 45/50 (90 %).

Overall, this was an excellent project that covered important topics about the issue. Your understanding of the whys and the wherefores of this project, what tasks to perform and how to proceed, were very good. Clearly, you did an enthusiastic and successful job, rightly supported by the guru of amateur solar storm monitoring – Percival Andrews.

On the other hand, once your instrument was built no quantitative test for assessing its real performance was attempted – as explicitly required. Also, at no place you stated that in order to confidently attribute full responsibility to extraterrestrial sources (either variable solar activity or even Gamma Ray Bursters) for the occasional detection of Sudden Ionospheric Disturbances – the basis of your project – you need to be monitoring a high stable radio source.

In particular, I have the following observations to formulate:

Your opening ionosphere description was very good. Just to make it much more illustrative you should have included a picture showing its different layers.

You presented two different "Figure 1": one on page 4 and another on page 7.

No picture of your built radio telescope was included – just a partial block diagram with separate tiny images, in exactly the same format as included in Andrews' book.

On page 10 you stated that: *"Two main types of interference were identified in the setup of the SSRT. AC voltages from domestic sources caused a persistent interference that was broadband. This comprises of amplitude spikes at 60 Hz intervals across the bandpass."* Why 60 Hz? Isn't Australia's AC supply 220V, 50 Hz?

More graphs of your own ionosphere monitoring, clearly and conveniently discussed, should have been very enlightening about the actual potential of your built instrument.

No Observation Log was included.

Finally, two required report formats were not observed: (a) the page size should have been A4, and (b) the pages were not numbered.

As already mentioned, this was an excellent project, Jamie – well done! I would be pleased to continue providing assistance if I'm able to, and hearing from you about further plans and progress – perhaps even sharing a second observational project in the near future.

Adios,
Eduardo