PHY517 / AST443: Observational Techniques

Homework 1

1. If you have not done so, fill out the pre-class survey.

2. Read the Course Notes for PHY517 / AST443[1] and for PHY515 / PHY445[2] (pages 1-13).

3. Read the wiki page on Grading[3] and the information in the links on plagiarism. Answer the following:

   (a) Which of these are examples of plagiarism? (More than one answer may be correct.)

      i. Copying your lab-mate's introduction section of a lab report.

      ii. Taking somebody else's lab report, slightly modifying each sentence / paragraph, and submitting it as your own.

      iii. Copying your buddy's telescope proposal for a Keck telescope, and submitting it as your own.

      iv. Stating a "fact" from wikipedia without citing the original source.

   (b) What happens when you get a "Q" grade? (Answer yes/no/maybe.)

      i. Immediate expulsion from school.

      ii. You lose your scholarship.

      iii. You receive an "F" for the course grade.

      iv. You have to take the "Q" course.

4. Read the wiki pages on Computing Resources[4] and on Astro Software Overview[5]. In addition, answer the following questions:

   (a) Describe how you will log onto the Astro Computing Cluster. (Anticipate whether you expect to mainly log on from your own laptop, or from one of the machines in the lab.)

   (b) Where should you put your data?

   (c) Which software will we use to view images in fits format?

   (d) Which software can you use to manipulate fits images?

   (e) Which software can you use to figure out the sky location of an image?

   (f) Where can you find a list of papers written about the Andromeda Galaxy?

[1] https://github.com/anjavdl/PHY517_AST443/blob/master/documents/phy517_ast443_specifics.pdf
[2] https://github.com/anjavdl/PHY517_AST443/blob/master/documents/phy515_445_course_notes.pdf
[3] https://github.com/anjavdl/PHY517_AST443/wiki/Grading
[4] https://github.com/anjavdl/PHY517_AST443/wiki/Computing-Resources
[5] https://github.com/anjavdl/PHY517_AST443/wiki/Astro-Software

5. As soon as your lab group has been assigned, schedule the CCD Lab with the TAs. Note that you need to do the CCD Lab before the Exoplanet Lab, so do it as soon as possible!

6. Your code returns a number of $99.123456789 \pm 0.00004556$ for your calculation. How should you report it in your lab write-up?

7. Let's practice finding an object:

   - Convert a date of your choosing (e.g. your birthday) to a position on the sky using the following transformation:
     - Multiply the month birthday by 2. This number becomes the right ascension (if the result is 24^{h}, make it 0^{h}).
     - Subtract 2 from the day, and multiply the result by 3. This number becomes the declination.
   - Look up the resulting sky position on `simbad`[6]. Search for all objects within at least 0.5 degrees.
   - Sort the results by the number of references, and pick the most referenced object.

   (a) Make a finding chart for this object using the AAVSO finding chart tool[7]. The finding chart should be 15 degrees across. North should be up, and the chart should be orientated as if you were looking at the sky with the naked eye.

   (b) Use the ING StarAlt tool[8] to determine when your object is best visible from Stony Brook. The higher up in the sky it is, the better visible it is. Note that Mt Stony Brook is not a predefined option in StarAlt, so you have to enter the coordinates manually. Pay attention to the format! Also note that the observatory coordinates have to be positive floats. For the following questions, make sure to include the relevant figure in your homework submission.

      i. Use the 'StarMult' mode to determine the optimal observing date.

      ii. Use the 'StarObs' mode to see how the observability changes throughout the year. In which months is the target higher than 40° in the middle of the night?

      iii. Set the observing date to the optimal date, and make the 'StarAlt' plot. For how many hours is the target higher than 40° in this night? How far away from the Moon is it when it culminates? How much is the Moon illuminated?

      iv. Choose a date 6 weeks later, and make another 'StarAlt' plot. What changed? Are both nights good nights to observe your target, or is one clearly better?

[6] http://simbad.u-strasbg.fr/simbad/sim-fcoo
[7] https://www.aavso.org/apps/vsp/
[8] http://catserver.ing.iac.es/staralt/index.php