Moon Lab

Astronomy 1
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Useful Moon web page: <http://www.seds.org/nineplanets/nineplanets/luna.html>

First and foremost this lab is an OUTDOOR lab, it must be done when it is clear and dark. The best time for this lab is to begin at 8:30pm when it is still somewhat bright out. Do NOT place the telescope on the Green, it is not a good viewing site due to Baker, the church, and the streetlights. The hill on the golf course is a good viewing spot for this lab.

Purpose:

1. To learn to set up and operate a Unitron refracting telescope.
2. To measure the angular sizes of both eyepieces by observing the Moon.
3. To measure the angular size of two (or more) different surface features of the Moon. To find the physical size of each feature.
4. To measure vertical relief of several features on the Moon.

Equipment:

1. Unitron Telescope available to be signed out from Kresge Library
2. A flashlight preferably covered in red to not ruin night vision.
3. A notebook and a pen to keep a record of the observing run.
4. A calculator will come in handy.
5. Lab sheet
6. A stopwatch or watch with a second hand.

Procedure:

1. Set up the telescope as instructed in class.
2. Using the 25 mm eyepiece attached to the elbow piece in the telescope, find the moon and focus on it. To focus use the large knob on the right of the barrel of the telescope. If the image does not resolve into a sharp one with full extent of that the focal knob will give, you may have to pull out the elbow piece and the 25 mm eyepiece from the connections. (This is effectively increasing the focal length of the telescope allowing the image to be focused.)

   Tip: Magnification = focal length of the primary lens (900 mm) divided by the focal length of the eyepiece (25 or 12.5 mm).
3. Once the Moon is in focus, draw with as much detail as possible what is seen in the field of view. Do the same for the 12mm eyepiece. Draw the moon as it appears to the naked eye for comparison - this will help you determine the orientation of the image in your eyepiece.
4. To measure the field of view of the Moon place the Moon as centered in the field of view as possible. Time how long it takes for a given part of the visible moon to drop out of the field of view. Knowing that the Earth rotates at a rate of 15 degrees per hour, calculate the size of the visible Moon in the telescope. Do this for both eyepieces.

   Sanity check: the Moon should be around 0.5 degrees in diameter.
5. Estimate the size of the craters knowing the field of view for both eyepieces. Try an eyepiece that gives a better detailed view to do this.
6. Estimate the size of the shadow of the crater to find its physical size.

   Tip: You can measure crater diameters and shadows within craters the same way you measure the size of the Moon, by timing how long they take to drift out of the field of view (FOV). If they drift by too quickly, you should estimate their size as a fraction of the Moon's disk. Accurate drawings help here.

Questions:

1. Give the date, time and weather conditions of the observing run. List observers (you and your partners).
2. What phase was the Moon in?
3. Show drawings of Moon. (There is a web page with labelled features at <http://www.arval.org.ve/MoonMapen.htm>.) Label at least 5 features.
4. What is the field of view for each eyepiece? (Show **ALL** calculations)
5. Label the size of a few craters or other features (Show **ALL** calculations)
6. Pick at least two features that cast visible shadows (like a crater wall). How tall are the features? You'll need to figure out the angle of the Sun with respect to the feature (use web page).