

Lab report example

[Science](#), [Physics](#)



6 March Astronomy Lab Report Viewing location and group members:

Englewood, Colorado Purpose: The use of elementary trigonometry and geometric measurement is the most effective way to determine angular size of objects like the moon in the sky. These concepts makes it possible for astronomers to estimate how big objects are, therefore, the purpose of this report was to carry out the apparent measurement of the angular size of the moon using the concept of angular diameter.

Procedure:

Materials

A ruler

Two index cards

A pencil

A paper for recording results

Method

The ruler (calibrated with 1mm margins) was placed and aligned on the arm

The second step was to ensure the ruler was rightly facing the moon (in front of the moon)

Two identical index cards were used to mark the moon edges as shown in the diagram below

Figure 1: Showing the method used to measure the moon size

Another partner played a role in measuring the distance from the eye of the person holding the ruler to the ruler itself while making sure that the widest size of the moon is taken into consideration.

The approximation of small angle was used in estimating the angular diameter of the moon based on the method below

Figure 2: Showing the method used in estimating the angular diameter

From this mode, the shortest side of the triangle was represented by the distance between thumb nails (D), while the longest distance represented the distance from the ruler to the eye (d). The angle made by the triangle is represents the moon's angular diameter (in arc seconds).

Sources of error

In appropriate alignment of the ruler could have been a source of error

Motion of the arm and approximation of the distances by a second person may vary results

Data and Calculation:

Three trials were carried out to validate the results and increase chances of reproducibility as shown the table below

Table 1: showing the measurements obtained while measuring size of the moon

Trials during measurement

Short distance

Long distance

Angular diameter (CM)

1

4

7

117865. 7143

2

3

7

88399. 2857

3

3

6

103132. 5000

Average

3. 333

6. 6667

103121. 6711

Calculating the angle

Using the formula (SOHCAHTOA)

Calculation of percentage errors

Conclusion and Analysis

Astronomical experiments predict apparent distances and sizes of the objects in the sky because most of the estimations are based on trigonometric and geometric measurements. This justifies the fact that every experiment would give a varied observation from previous experiments reported in literature that followed a similar protocol. However, the most important determining factor is the location of the experiment relative to the moon as well as the accuracy and the experience of the individual astronomer engaged in the experimentation. Given that the value obtained from this experiment reported an error of about 99 percent compared with the actual distance of the moon previously reported in literature as 384, 000 km (Reis, 1), it showed that the distance obtained largely depended on the astronomer's approximation. When the person carrying out the experiment

is closer to the moon, a larger size is likely to be obtained as opposed to when the experiment is done from quite a distance. Therefore, the discrepancy noted in this observation could be attributed to the distance of the moon and the inaccuracy in measurements that are common in estimations.

Work cited

Reis, F. Omar. “ Angular Distances between two celestial objects and Lunar Calculation”, <http://www.tecepe.com.br/nav/DistTwoObjects.htm>. 1 May 2012. Web. 6 March 2015