

High School Teachers 2011 Program		Master Class - Cosmology Mysteries of Universe – Dark Matter
	July 2011	Distance Measurements

INTERNATIONAL VERSION

Introduction

In general, the term parallax refers to the shift in apparent position of an object when seen from two different locations. For instance, if you hold up your thumb at arm's length and view it first through your right eye and then through your left, you will see your thumb's image jump from left to right.

In astronomy, the term geocentric parallax, or diurnal parallax, refers to the shift in apparent position of the relatively nearby object, such as the Moon or a planet when seen from two different points on Earth's surface. If you want to observe geocentric parallax, you don't have to go in an expedition: During the course of 12 hours the Earth will carry you in their daily rotation to the opposite point in your latitude.

Material

- Ruler

Procedure

- Measure how far you are from the wall.
- Extend your arm, hold up your thumb at arm's length and view it first through your right eye and then through your left eye, like in figure 1.

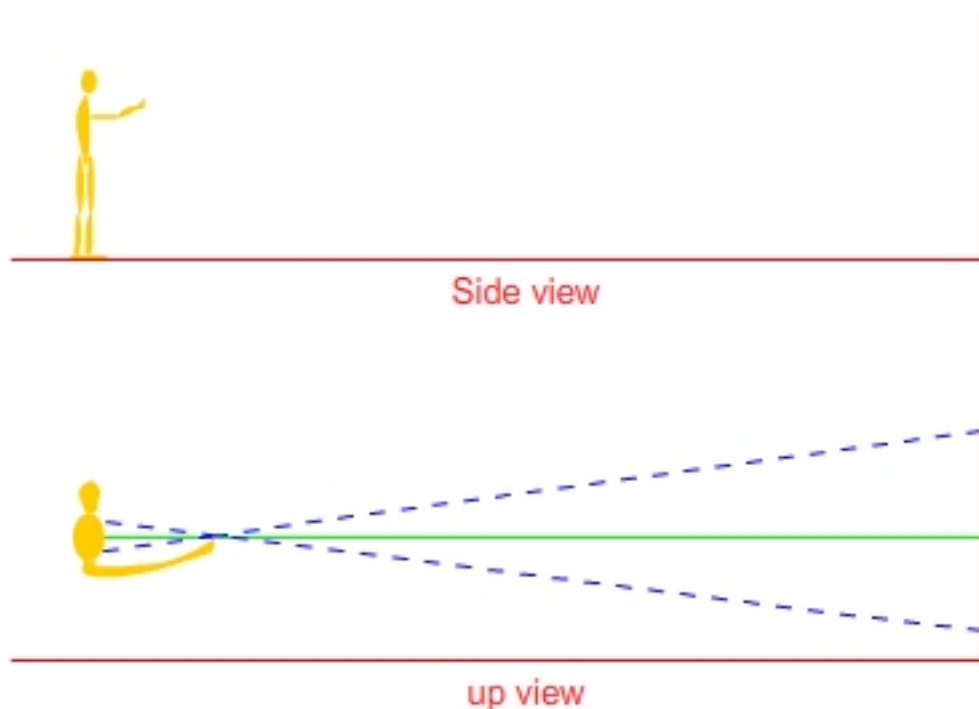


Fig. 1

- Move your finger until its apparent position will be at the same distance of the “0” for both eyes.
- Measure this position three times.
- Measure the distance between your eyes with the help of one partner.



Fig. 2

Questions

I – Measurements

1 – What is the distance between you and the wall? And between your both eyes?

2 – Fill in a table with the values of the measures of the apparent position of your finger?

3- What is the length of your arm measured directly?

II – Calculations.

1 – What is the average shift in the apparent position of your finger?

2 –What is the length of your arm? (Use the average value of your measurements).

III – Discussion about the results obtained.

Compare and comment the results obtained.

IV –Conclusions

1 – The method applied can be used for any kind of measurements?

2 – Any measurement has one error. In what situations the error could be so big that the method can't be used?

3- Can you describe other alternative methods to measure the distance between the planets and the sun?