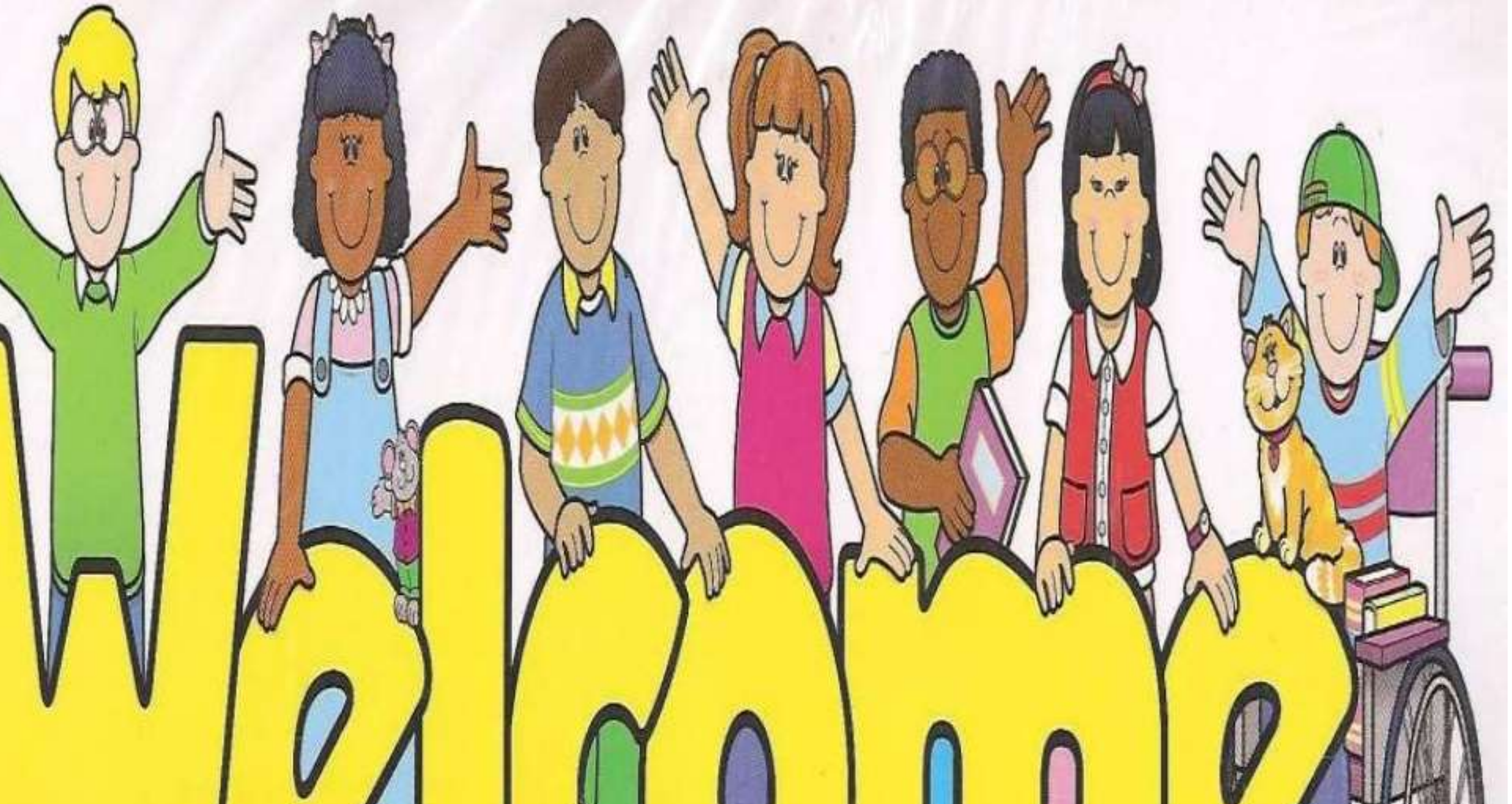


# Physical quantity

- Any measurable quantity is called physical quantity.
- Physical quantity is of two types

(1) fundamental quantity

(2) derived quantity

## Fundamental quantity

- It is a physical quantity which does not depend upon other physical quantities.
- Example : length , mass , time etc…

## Derived quantity

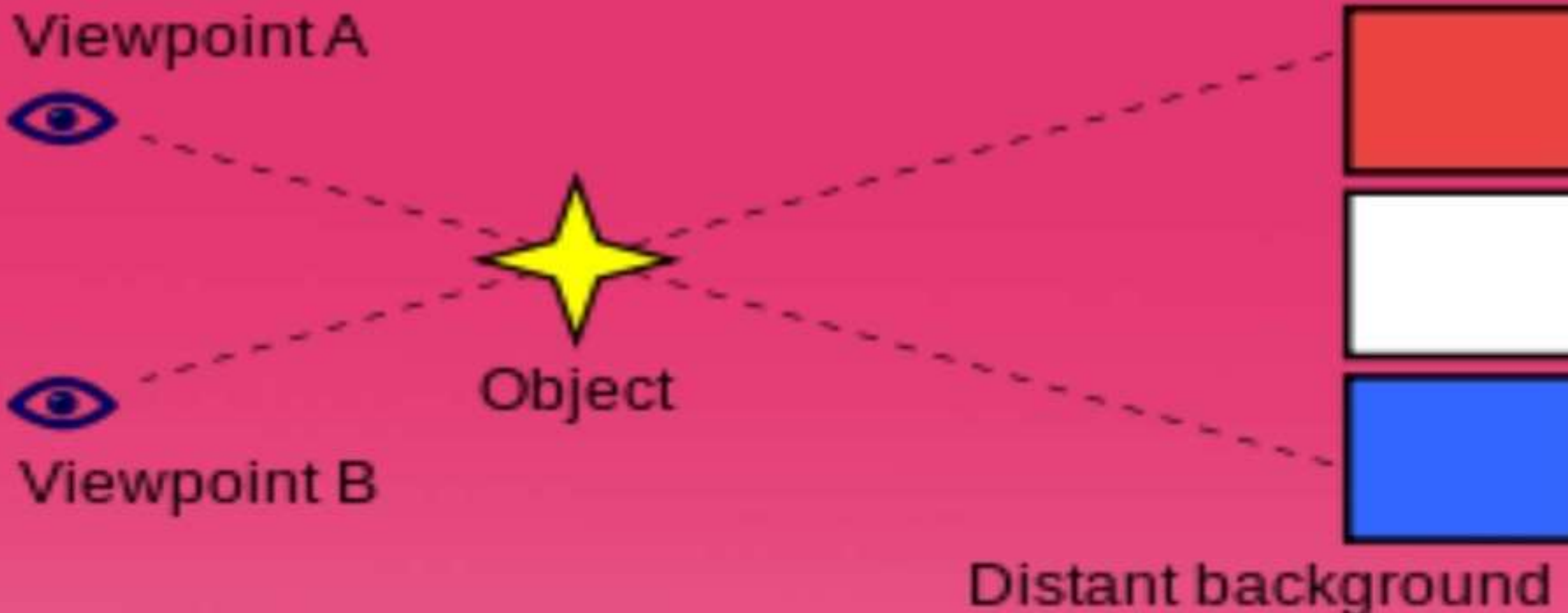
- It is a physical quantity which depend upon other physical quantities.
- Example : speed , area , velocity etc…

# SI UNITS

- ✓ CGS SYSTEM –CENTIMETRE, GRAM AND SECOND.
- ✓ FPS SYSTEM –FOOT, POUND AND SECOND.
- ✓ MKS SYSTEM –METRE,KILOGRAM AND SECOND.
- SI units – systeme internationale d' units .
- It is the standard scheme of weights and measure.

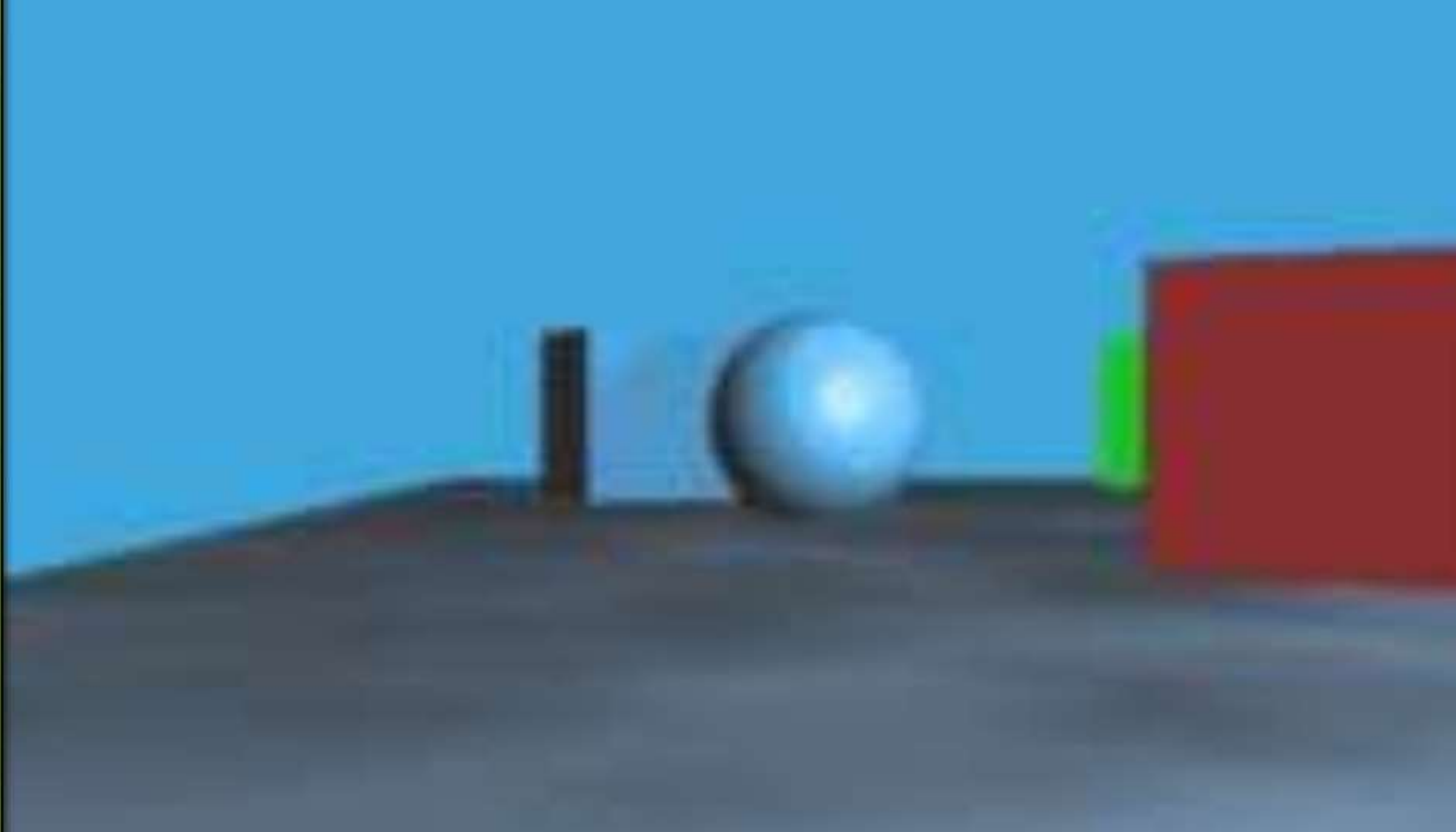
| **Base units** | **SI units** | **Symbol** |
|---|---|---|
| Length | metre | m |
| Mass | kilogram | kg |
| Time | second | s |
| Temperature | kelvin | K |
| Electric current | ampere | A |
| Amount of substance | mole | mol |

# Parallax method



Parallax is a displacement or difference in the apparent position of an object viewed along two different lines of sight, and is measured by the angle or semi-angle of inclination between those two lines.[1][2] The term is deriv from the Greekπαράλλαξις (parallaxis), meaning "alteratior Nearby objects have a larger parallax than more distant objects when observed from different positions, so parallax can be used to determine distances.

Astronomers use the principle of parallax to measure distances to the closer stars. Here, the term "parallax" is the semi-angle of inclination between two sight-lines to t star, as observed when the Earth is on opposite sides of sun in its orbit.[3] These distances form the lowest rung of what is called "the cosmic distance ladder", the first in a



scopes, binoculars, microscopes, and twin-lens reflex cameras that view objects from slightly different angles. Many animals, including humans, have two eyes with overlapping visual fields that use parallax to gain depth perception; this process is known as stereopsis. In computer vision the effect is used for computer stereo vision, and there is a device called a parallax rangefinder that uses it to find range, and in some variations also altitude to a target. A simple everyday example of parallax can be seen in the dashboard of motor vehicles that use a needle-

# Visual perception

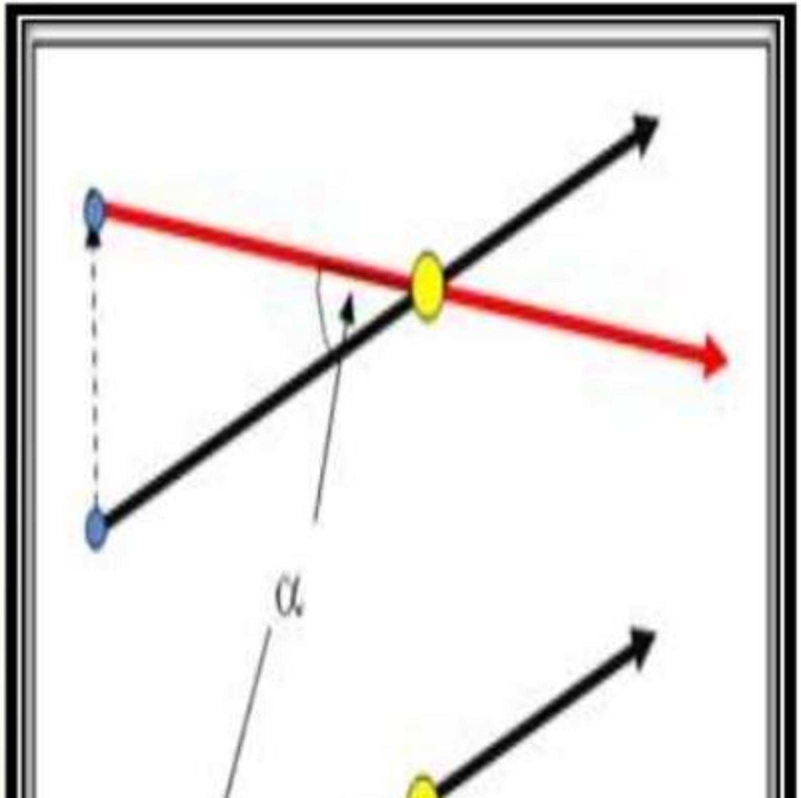
This image demonstrates parallax. The Sun is visible above t streetlight. The reflection in the water is a virtual image of the Sun and the streetlight. The location of the virtual imag is below the surface of the water, offering a different vantage point of the streetlight, which appears to be shifte relative to the more distant Sun.

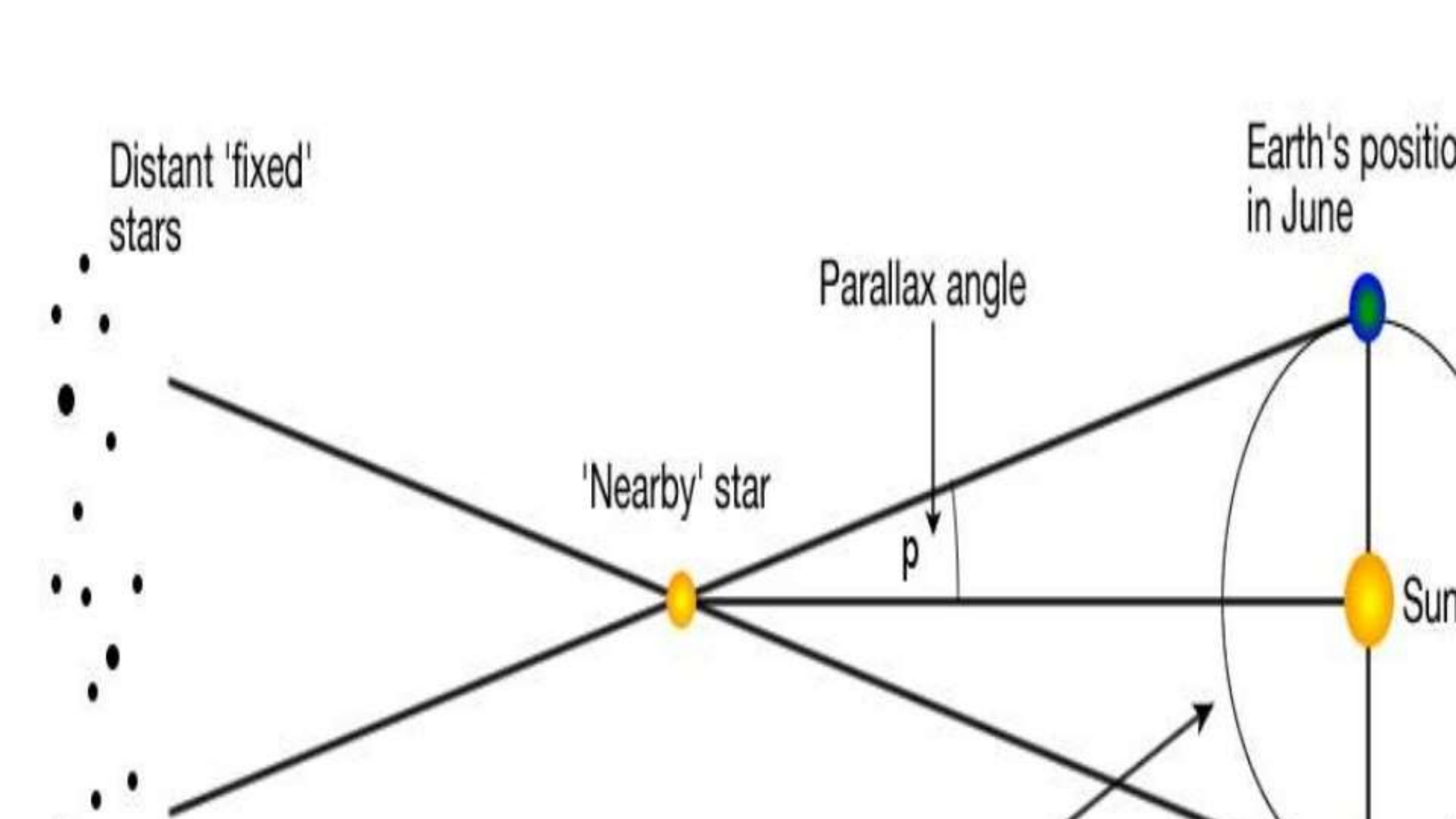
As the eyes of humans and other animals are in different positions on the head, they present different views simultaneously. This is the basis of stereopsis, the process which the brain exploits the parallax due to the different views from the eye to gain depth perception and estimate distances to objects.[4] Animals also use *motion parallax*, in which the animals (or just the head) move to gain different

# Parallax in astronomy

is an angle subtended by a line t. In the upper diagram the earth bit sweeps the parallax angle d on the sun. The lower diagram equal angle swept by the sun in ric model. A similar diagram can for a star except that the angle x would be minuscule.

arises due to change in occurring due to motion of the




Distant 'fixed' stars
Earth's positio
in June
Parallax angle
'Nearby' star
p
Sun

# Stellar parallax

Stellar parallax created by the relative motion between the Earth and a star can be seen, in the Copernican model, as arising from the orbit of the Earth around the Sun: the star only *appears* to move relative to mor distant objects in the sky. In a *geostatic* model, the movement of the st would have to be taken as *real* with the star oscillating across the sky w respect to the background stars.

Stellar parallax is most often measured using **annual parallax**, defined a the difference in position of a star as seen from the Earth and Sun, i. e the angle subtended at a star by the mean radius of the Earth's orbit around the Sun. The parsec (3.26 light-years) is defined as the distance for which the annual parallax is 1 arcsecond. Annual parallax is normally measured by observing the position of a star at different times of the year as the Earth moves through its orbit. Measurement of annual

Stellar reflex motion on sky
Earth orbit about Sun

measure. The nearest star to the Sun (and thus the star with the largest parallax), Proxima Centauri, has a parallax of 0.7687 ± 0.0003 arcsec.[8] This an is approximately that subtended by an object 2 centimeters in diameter locatec kilometers away.

2014).[9]

The fact that stellar parallax was so small that it was unobservable at the time used as the main scientific argument against heliocentrism during the early moc age. It is clear from Euclid's geometry that the effect would be undetectable i the stars were far enough away, but for various reasons such gigantic distances involved seemed entirely implausible: it was one of Tycho's principal objections to Copernican heliocentrism that in order for it to be compatible with the lack c observable stellar parallax, there would have to be an enormous and unlikely voi between the orbit of Saturn and the eighth sphere (the fixed stars).[10]

In 1989, the satellite Hipparcos was launched primarily for obtaining improved parallaxes and proper motions for over 100,000 nearby stars, increasing the rea of the method tenfold. Even so, Hipparcos is only able to measure parallax angle for stars up to about 1,600 light-years away, a little more than one percent of t diameter of theMilky Way Galaxy. The European Space Agency's Gaia mission

South
Pole
Equator
0 longitude
Equator
180 longitud
Pleiades
North

angles involved in these calculations are very small and thus difficult to measure. The nearest star to
Sun (and thus the star with the largest parallax), Proxima Centauri, has a parallax of
87 ± 0.0003 arcsec.[8] This angle is approximately that subtended by an object 2 centimeters in
neter located 5.3 kilometers away.

fact that stellar parallax was so small that it was unobservable at the time was used as the main
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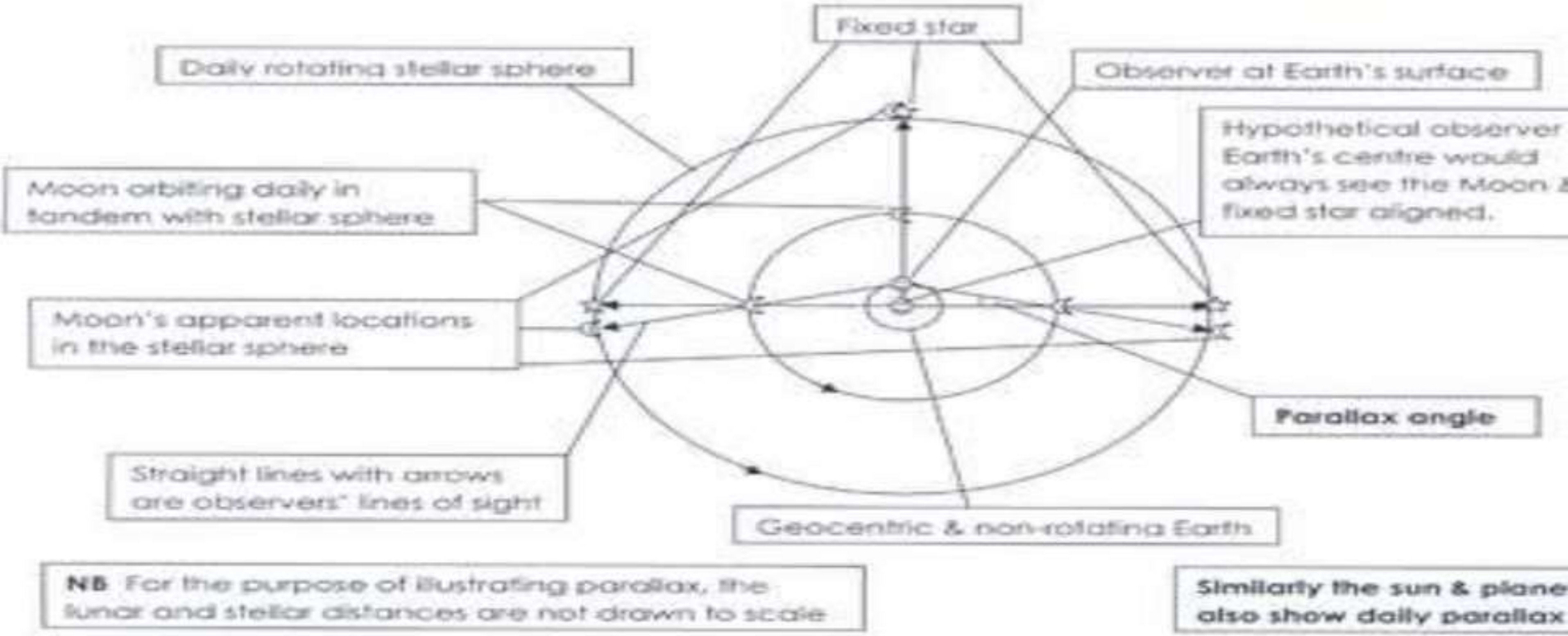
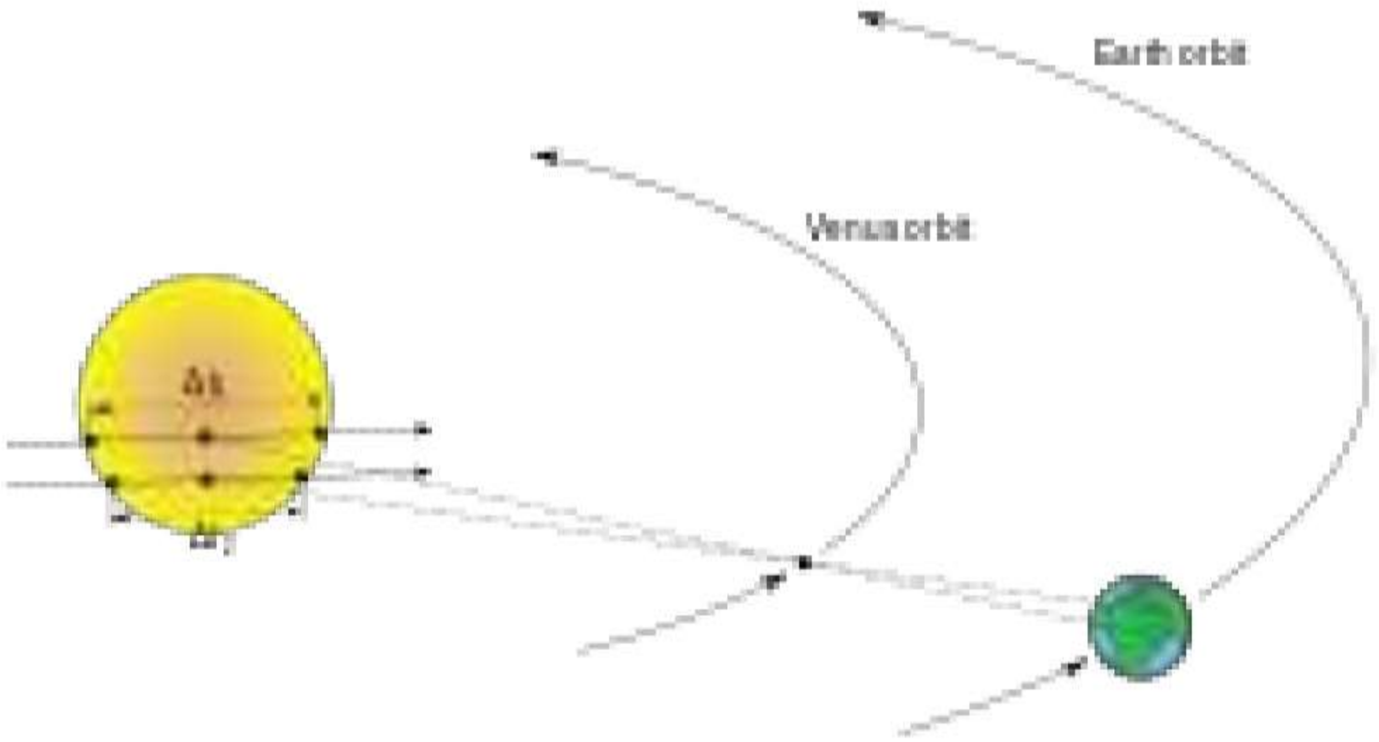
**Daily lunar parallax for a fixed observer in the geostationary-geocentric planetary model**




**Change of Moon's apparent displacement from the fixed star over 12 hrs**

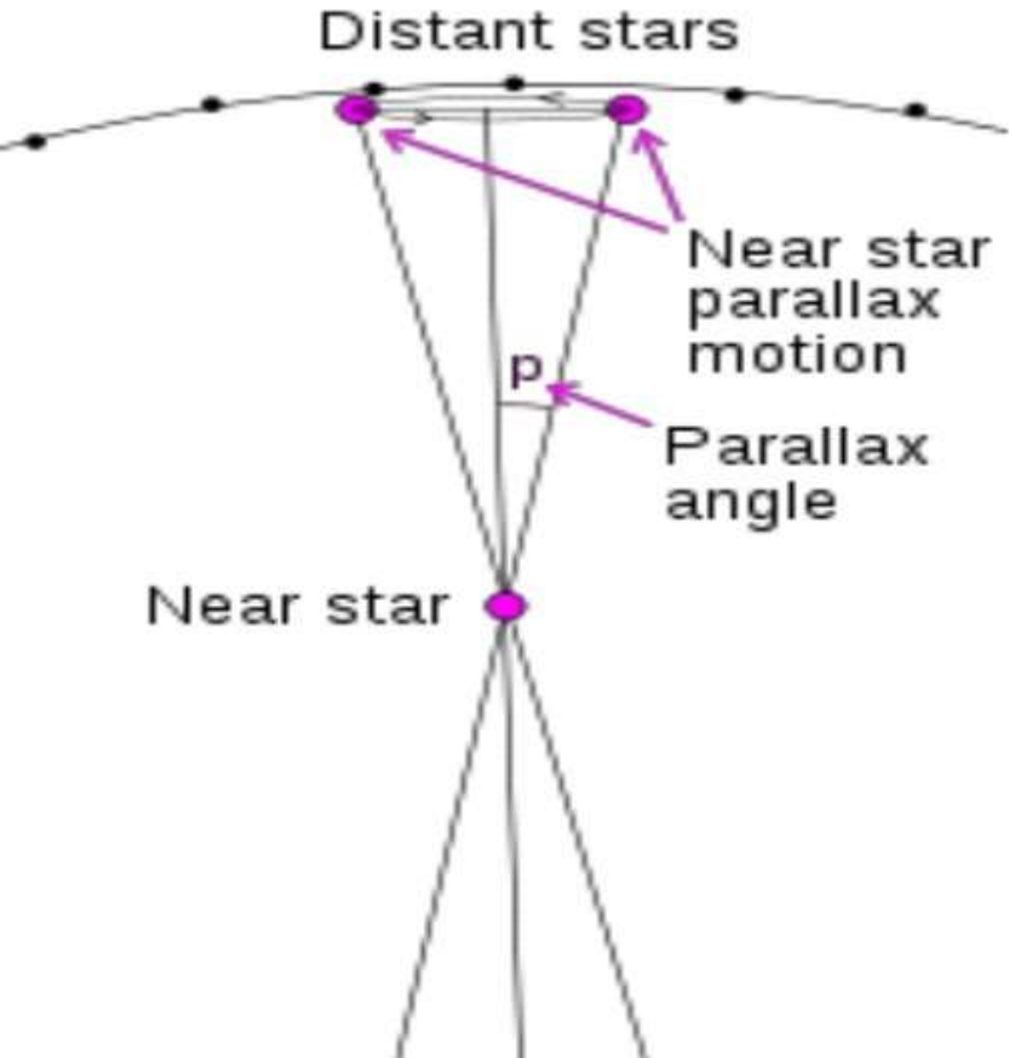
In 1989, the satellite Hipparcos was launched primarily for obtaining improved parallaxes and proper motions for over 100,000 nearby stars, increasing the reach of the method tenfo Even so, Hipparcos is only able to measure parallax angles for stars up to about 1,600 light-years away, a little more than one percent of the diameter of the Milky Way Galaxy. The European Space Agency's Gaia mission, launched in December 2013, will be able to mea parallax angles to an accuracy of 10 microarcseconds, thus mapping nearby stars (and potentially planets) up to a distance of tens of thousands of light-years from Earth.[11][12] In 2014, NASA astronomers reported that the Hubble Space Telescope, by using spatial scanni can now precisely measure distances up to 10,000 light-years away, a ten-fold improvement earlier measurements.[9] (related image)

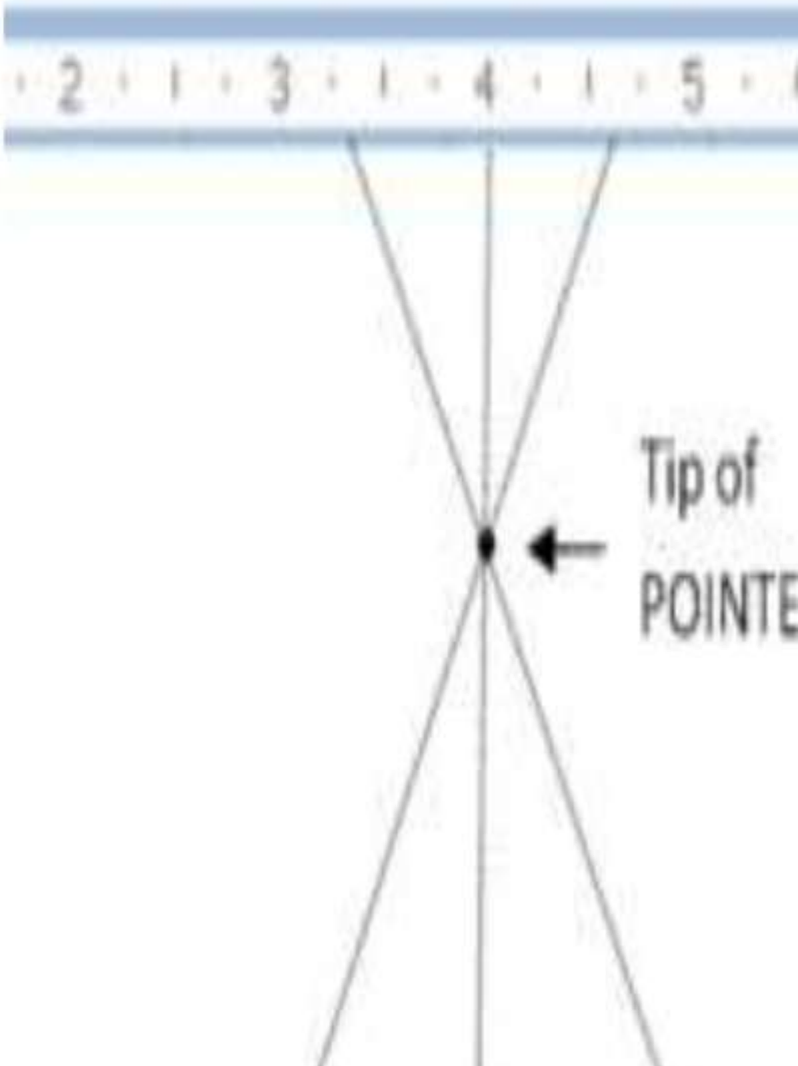


Earth orbit
Venus orbit

# Distance measurement

Distance measurement by parallax is a special case of the principle of triangulation, which states that one can solve for all the sides and angles in a network of triangles if, in addition the angles in the network, the length of at least one side has been measured. Thus, the caref measurement of the length of one baseline can fix the scale of an entire triangulation netwo In parallax, the triangle is extremely long and narrow, and by measuring both its shortest s (the motion of the observer) and the small top angle (always less than 1 arcsecond,[6] leavin other two close to 90 degrees), the length of the long sides (in practice considered to be equ

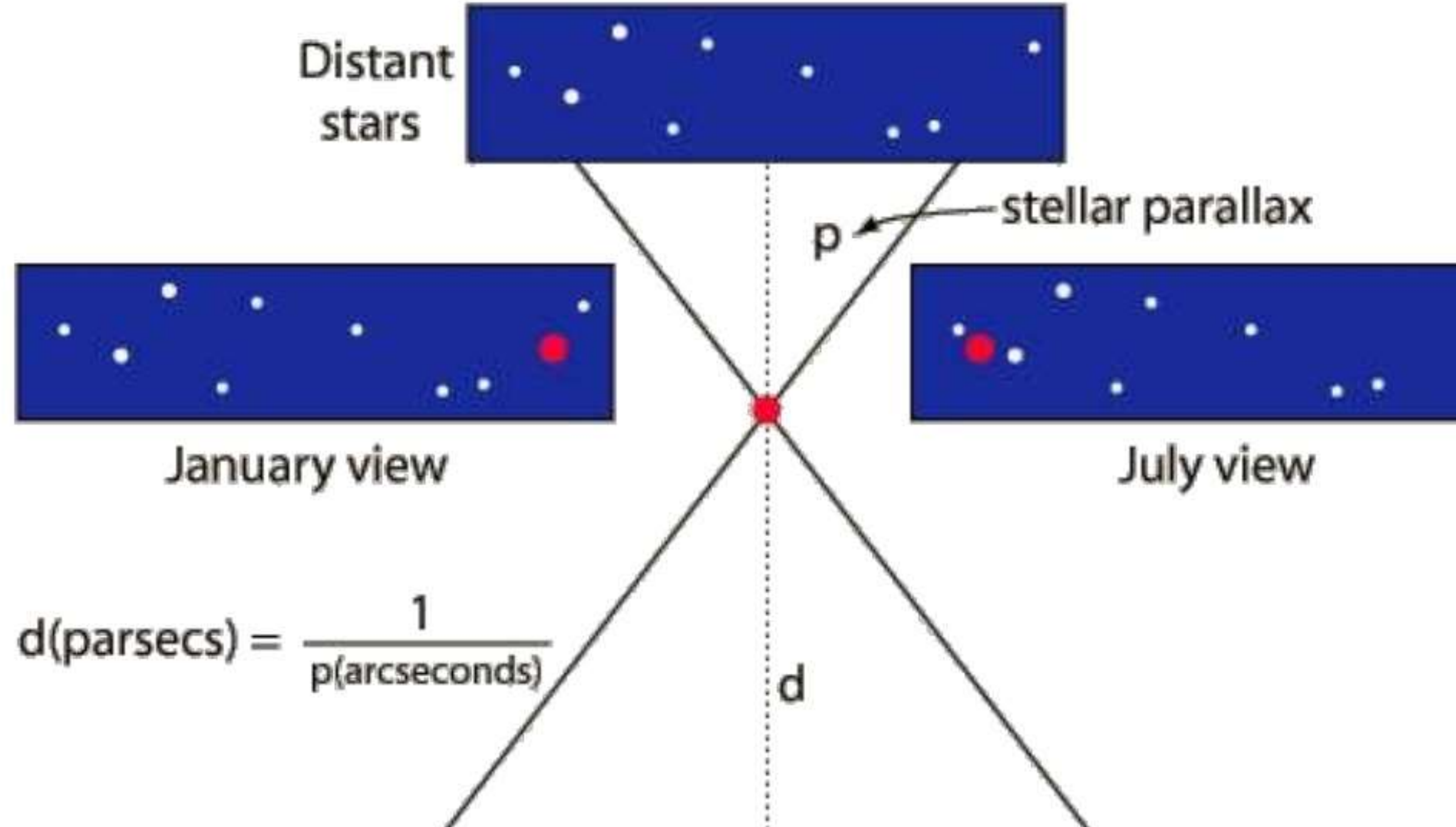

Distant stars
Near star parallax motion
p
Parallax angle
Near star


2
3
4
5
Tip of
POINTE

# Lunar parallax

*Lunar parallax* (often short for *lunar horizontal parallax* or *lunar equatorial horizontal parallax*), is a special case of (d parallax: the Moon, being the nearest celestial body, has by far the largest maximum parallax of any celestial body, it can 1 degree.

The diagram (above) for stellar parallax can illustrate lunar parallax as well, if the diagram is taken to be scaled right dow slightly modified. Instead of 'near star', read 'Moon', and instead of taking the circle at the bottom of the diagram to rep the size of the Earth's orbit around the Sun, take it to be the size of the Earth's globe, and of a circle around the Earth's s Then, the lunar (horizontal) parallax amounts to the difference in angular position, relative to the background of distan of the Moon as seen from two different viewing positions on the Earth: one of the viewing positions is the place from wh Moon can be seen directly overhead at a given moment (that is, viewed along the vertical line in the diagram); and th viewing position is a place from which the Moon can be seen on the horizon at the same moment (that is, viewed along one


Distant stars
stellar parallax
p
January view
July view
d(parsecs) = 1 / p(arcseconds)
d


THANK YOU